
Risky Discourse: pesticide use and recent developments in the greening of New Zealand's pipfruit industry.

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This thesis is dedicated to my darling brother
Nicholas Bernard Jowsey



Coddling moth and leafroller



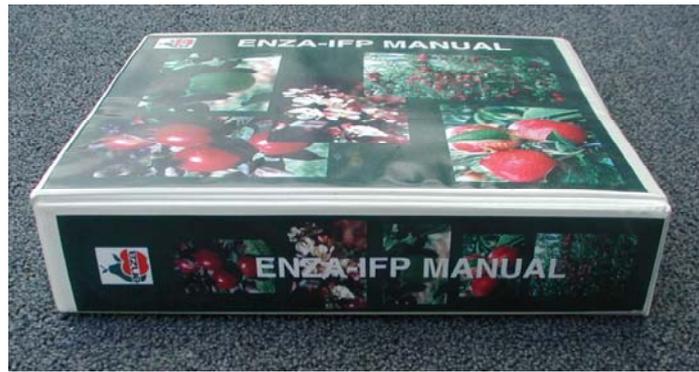
Trigonospila brevifacies



Xanthopimpla rhopaloceros

Leafroller parasitoids

Photographs kindly supplied by Jim Walker and Hortresearch



Abstract

The New Zealand pipfruit industry has changed dramatically over the past fifteen years due to major industry restructuring and deregulation, and also due to the adoption of more environmentally sustainable growing strategies. This thesis traces the socio-political context of pesticide use in the pipfruit industry over the past ten years (couched within a hundred year trajectory), through a content and discourse analysis of appropriate print and electronic material. The content analysis addresses the ways in which pesticide use has been framed in New Zealand's fruit journal entitled *The Orchardist*, and tracks its promotion of the ENZA Integrated Fruit Production program that was introduced to New Zealand pipfruit growers during the summer of 1997/98. The Foucauldian discourse analysis explores how print media reflects and produces knowledge, and how such knowledge causes transformation within the pipfruit industry. Identified in the print media are several central ideologies and themes that frequently serve as conceptual frameworks for interpreting issues that arise in the pipfruit industry, the most prominent of which, is risk. Therefore, risk is the key discourse explored in this thesis. The combined content and discourse analysis signal ways in which power operates through discourse to influence ideologies, world-making and modes of production.

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Introduction

“IFP has been lucky in terms of ENZA introducing growers to IFP before they fell apart, because that predisposed growers to use the IFP programme. And now Fruited is advocating it too and so the industry is moving that way now. ...It's harder for pipfruit than kiwifruit because kiwifruit are fine without chemicals. They can easily be grown organic because they don't have many pests or diseases; they have a thick skin, you see. But apples are a bit more work. The kiwifruit figures distort the overall effectiveness of IFP because they would be fine anyway. But apples need their copper and what have you...So kiwifruit account for a lot of the organic export figures. Even though apples account for twenty percent of the export, organic apples are fewer and they're covered in chalk anyway. And the price premium is basically the same for both. You see, organics gives off this image like they use less sprays [on apples] but that's not actually true. I was thinking of going organic. I thought organics might save me a few bob on the spraying so I went along to some meetings where they had some trees and what have you. But bugger me! They spray twice as much! Chalky white leaves with hydrated lime. The leaves were so covered in gunk the god-damn sun couldn't even get through!”

-Reg, a South Island pipfruit grower at a technical spray meeting engaging in a conversation with three other local pipfruit growers (audio recording, Aug. 2004)

This thesis concerns recent socio-political discourse of pesticide use in New Zealand's pipfruit industry through content and discourse analysis. Central points of focus in regard to such use include the development and influence of greening strategies such as Integrated Pest Management (IPM), Integrated Mite Control (IMC), and more recently, the ENZA Integrated Fruit Production (IFP) programme. Recent trends in industry-wide reduction of pesticide use (particularly in the past fifteen years) have been largely discussed – both here and in other literature – in terms of risk, power, danger, health, aesthetics, both local and global pipfruit markets, neo-liberalism and free trade, environmental sustainability, and New Zealand's 'clean and green' ideology. Each of these discourses connects to each other in different ways

throughout history, and as we shall see, it is essentially these discourses in particular that influence how New Zealand's pipfruit industry is framed.

"Greening" writes Lockie, "is a term used to describe the process of change in the ideologies and practices of (largely) western social systems as they move toward the incorporation of environmental concerns" (Lockie, 2001: 33). Although there is currently no legislation requiring grower conversion to IFP in New Zealand, ENZA remarkably secured almost complete grower adoption of the IFP programme within six years. Today, approximately 91 percent of pipfruit export growers produce pipfruit in accordance with IFP regulations (while the remaining nine percent grow fruit organically or are in transition between IFP and organics) (Pipfruit New Zealand 2004: 2).

Several key factors have influenced this adoption: concerns about health of people and the environment arose discursively during the 1960s and 1970s, during which time various greening strategies began to emerge. For growers Miler (2000) notes, issues such as agrichemical over-use, pest resistance and environmental sustainability are addressed by IPM strategies, which include IMC. IPM (including IMC) prepared the pipfruit industry for the IFP programme by creating an approach to fruit production that was neither conventional spraying nor organic. The development of IPM was made possible as a result of beneficial insects and mites being utilised as natural agents for pest control, and the selective use of 'soft' agrichemicals (meaning the products are used in a way not harmful to natural enemies such as natural enemies). Both national and international restrictions on maximum residue limits (MRLs) of chemicals on fruit were set in place. In addition, textual information concerning the greening ideologies and strategies emerged and were reinforced frequently in public documents, grower manuals, and in grower meetings throughout the 1990s. Stiefel (1999: 4-5) writes:

The greening ideologies were driven by issues such as:

- Pesticide resistance. Seven key pipfruit pests have developed resistance to one or more pesticides (Stewart, 1997);
- Pressure by government and the public to reduce and target pesticide use;
- A decreased level of pesticide acceptance by consumers; and
- [consequently] A reduction in chemical residue tolerances

For New Zealand growers, this reduction in residue tolerances has led to restricted use, or complete bans on use, of some pesticides.

However, despite these combined positive attributes of IFP, Miller (2000) notes that the issue of central significance to growers is not the environmentally sustainable nature of IFP; rather it is *money* that drives growers' decision-making processes and actions.

In this thesis I argue that discourse concerning IPM strategies began with a combination of scientific research and public intellectual discussion by people such as Carson (1962), who increased public awareness of the potential threats to the environment and to humans that the then-current (conventional) calendar spray approach represented. However, IPM and IFP should not be mistaken as the focal point of the thesis; rather, they are transformations made possible as a result of the *discursive space* in which IPM and IFP arose.

So what is Integrated Pest Management?

Smith and H.T. Reynolds write IPM is “a pest population management system that utilises all techniques in a compatible manner to reduce pest populations and maintain them at levels below those causing economic injury” (1966: 11). These techniques primarily concern the use of beneficial organisms to help control pest populations. Organisms that are used to control undesirable insects are broadly termed as ‘beneficials’, which fall into three categories; pathogens, parasitoids and predators. Additionally,

pheromones are used to disrupt natural breeding patterns of moths (such as the light brown apple moth) in some New Zealand pipfruit orchards.

Integrated Fruit Production (IFP)

IFP is an extension of IPM that is not solely concerned with pest control; rather it serves the complete fruit production system. IFP is an approach that involves consistent monitoring combined with specific strategies that encourage natural processes to flourish in the orchard. Strategies may include planting disease-resistant species, using selective pesticides that do not have damaging effects on beneficial insect populations or using rootstocks resistant to mealy bugs. IFP supports the use of pesticides only when they are necessary to prevent tree and fruit damage reaching economically damaging proportions. So although chemical use is minimized, it is still present in IFP strategies and remains a point of focus in related literature. Chemicals that comply with IFP requirements have more targeting capabilities than broad-spectrum pesticides and as such are referred to as 'soft' or 'selective' chemicals. Stiefel (1999: 10-11) writes:

In Europe, the development of IFP followed on from IPM programmes. In addition to integrated pest and disease management, European IFP programmes also cover:

- Site, rootstock, cultivar and planting systems selection
- Soil management and tree nutrition
- Orchard understory management
- Tree training and management
- Safe and efficient and spray application technology
- Crop management
- Eliminating pollution of the fruit from outside sources
- Maintaining habitat diversity, land sustainability and conservation of resources
- Maintaining fruit quality (post-harvest)
- Disposal of waste
- Employment standards
- The ENZA-IFP programme was modeled on the European IFP guidelines and technical subgroups were set up to cover all aspects of pipfruit production and produce an IFP grower manual (Batchelor, 1997).

Key 'Green' terms in pipfruit industry discourse

While I have attempted to keep the use of industry-specific terms that growers use to a minimum, there are a number of 'green' terminologies associated with agri-foods (including pipfruit) that regularly surface in industry-specific literature, such as 'green production', 'greening', 'corporate greening', 'green protectionism', 'green washing' and 'first and second phase greening'. While Burch, Lawrence, and Lyons (2001) describe each of these terms in detail, my thesis alludes to these terms and their implications under the blanket term 'greening'. The Zespri International Kiwigreen programme provides illustration for why such blanketing may be helpful in the context of this thesis. Zespri utilized IPM strategies in the production of New Zealand kiwifruit during the 1990s, so that New Zealand kiwifruit would be competitive in international kiwifruit markets (through guaranteeing fruit to have little or no pesticide residues). The industry-wide application of Kiwigreen by growers resulted in New Zealand reclaiming its competitive space in the exporting market. However, as Burch et. al. (2001) note, Kiwigreen also provided growers with the perfect stepping stone to full organic production and some growers have used Kiwigreen to this end. If the kiwifruit industry had only utilized Kiwigreen for the purpose of increasing export marketability, one would contend that the Kiwigreen programme was part of a corporate greening strategy towards green marketing and perhaps indicative of green washing (having the appearance of being concerned with the environment without actually being so). However, because the programme was (and is) being utilized as a stepping-stone towards full organic production, we can interpret the role of the programme in terms of green protectionism. That is, the programme encourages higher export standards in terms of lowered pesticide residues, and also encourages strict

environmentally-related behavior that is intentionally directed towards improving the environment through more sustainable practices.

In contrast, Burch, Lyons and Lawrence (2001) convey Zespri's use of IPM in a less pragmatic light:

Rather than indicating any interest in organic agriculture, however, responses to green protectionist trade barriers reflect a desire to maintain market access. In this way then, the shift to organics, representing a strategy for corporate greening, may be closely related to the implementation of regulatory arrangements, rather than reflecting the company's genuine interest in green issues (2001: 42).

In the remainder of this thesis I use the term 'greening' to cover the general rubric of these specific greening terminologies. While this decision may cause simplification of complex political discourses, such simplification is intended and necessary in maintaining focus on greening discourse as *productive* of the key greening strategies with which this thesis is primarily concerned. Here 'greening' incorporates all intended actions and decision-making processes that serve to increase the environmental sustainability of pipfruit growing systems (chapter six contains more detailed explanation).

Industry sensitive information and risk

Throughout the magazine and journal content analysis it became increasingly apparent that New Zealand's pipfruit industry is tightly bound by both politics and economics. Given that New Zealand's strength in the global market is sustained by New Zealand's unique apple varieties, and that the export of such varieties is contingent upon their meeting strict MRL standards, it follows that much of the discourse concerning this is considered to be 'industry sensitive'. During the research process, I became increasingly aware of the frequency with which this term 'industry sensitive' is used by

actors within the industry. Some of the reports I have been given permission to read I am not at liberty to discuss here because of the risk of such information getting leaked to outsiders (non-New Zealanders). At the beginning of 1999, when Chile was one of New Zealand's main competitors for apple exports to Europe and England, Chile was found to be "illegally growing about 65,000 trees of unique New Zealand varieties protected by plant variety rights" (TO, Feb. 1999: 3). It is alleged that some Chileans had stolen wood from Gala-Splendour crosses of the Scilgo and Sciros varieties some three years prior to New Zealand finding this out and the implication was that such an incident could ruin New Zealand's monopoly of these varieties within the industry (see also TO, Feb 1999: 7). The risk of outsiders obtaining industry-sensitive information such as the pipfruit grower's manual concerning IFP techniques is high enough to have prevented me from seeing a copy (and I am both a New Zealander and the daughter of a local NZ grower!). If such information were to be leaked it could have a potentially devastating impact on the economy of New Zealand's pipfruit industry. For this reason I have relied on Wiltshire (2003) and Walker (2005a) for information concerning the grower manuals. The kinds of political issues raised by this are discussed in chapter four, under the rubrics of discourse, risk, knowledge and power.

Literature sources

The research for this thesis contributes to a wider FRST funded project entitled *The Human Dimensions of Pesticide Risk Reduction in Horticulture*.¹ This is a long term project with five objectives: Use patterns, Workers,

¹ FRST stands for *Foundation for Research Science and Technology*

Communities, Decision makers, and Implementation. A large multidisciplinary team will achieve these objectives over several years. This research seeks to:

- Better identify and understand pesticide use patterns in different geographic locations and horticultural sectors;
- Identify key social and technological factors affecting pesticide exposure among workers;
- Assess potential environmental and community pesticide exposure;
- Determine the social, economic, and institutional factors involved in the uptake, implementation, and ongoing success of sustainable pest management systems among growers; and
- Integrate the human and environmental dimensions of pesticide use into pesticide risk assessment and reduction tools.

This thesis contributes to the understanding of the social, economic and institutional factors which led to the successful adoption of Integrated Fruit Production (IFP) in the New Zealand Pipfruit industry between 1997 and 2001 for Objective Four: Decision makers. This has been achieved by analyzing the socio-political context of pesticide use in the pipfruit industry over the past fifteen years as presented in appropriate print and electronic material

Public print data is information that has been published either in print or on the internet and that is easily accessible by the public. I am using the term 'public data' to also include public events such as the Annual New Zealand Fruitgrower's Federation (The NZFF) Conference, and to include industry-specific information discussed by professionals in the pipfruit industry.

Much of the background data needed to situate this thesis in terms of greening strategies has previously been addressed by Wearing (1988),

McKenna (1998), McKenna and Campbell (1999), Stiefel (1999), Miller (2000), and Wiltshire (2003). These authors provide a history of IPM and IFP and have addressed some key factors that prevented some growers from implementing the schemes in New Zealand and abroad. The factors identified as most influential include perceived risk to crops and finances, and insufficient communicated knowledge between specialists and growers. Stiefel identifies various mediums that are good communicators of specialised knowledge pertaining to IPM and IFP, some of which include contact between growers and specialists/advisors, group meeting, manuals, and the media (1999: 50-54; see also 81ff.). While Stiefel does not specifically list magazine and journal literature as a good communicator of knowledge, they are accounted for under the rubric of the media. Specialized knowledge transfer is identified by Walker (2003a) as key to successful implementation of IFP and much of this knowledge is included in New Zealand's fruit industry journal entitled *The Orchardist*, in text, photographs, life-cycle flow charts, and diagrams. Thus content and discourse analysis of *The Orchardist* is not only justifiable, but potentially invaluable to increasing our understanding of discourses concerning pesticide use and greening strategies within the pipfruit industry, and the influence of written media in terms of the specialised knowledge it presents.

While there is a wide array of research literature concerning the adoption of IPM and IFP strategies, there appears to be a gap in the literature concerning where and how growers learn about such strategies in New Zealand. Grower meetings and manuals are perhaps the most obvious sources for IPM and IFP information-consumption, but there are some less obvious sources that also influence the adoption of new pest management strategies (see Wiltshire, 2003). The public data sources consulted in this research project include the following:

- *Growing Today* magazine (GT)
- *The Orchardist* journal (TO)
- Various internet sites (see references, p170-171)
- An online life-style block forum <http://www.lifestyleblock.co.nz>
- The NZFF New Zealand Horticultural Conference, 2004.
- A Fruitfed Technical Update Discussion (August, 2004).
- Various published literature (see references, p168-171).

The information contained within these sources is discussed in chapter two and is examined through content and discourse analysis in chapters four and six.

Summary

The primary theoretical issues that this thesis addresses are the multiple locations and meanings of risk and agency as they arise in discourses connected to the implementation of greening strategies (and as such, the terms risk and agency are not defined here but will be explored in detail in chapters four and six). Central to the following argument is the proposition that risk is the key discourse that influences decision-making processes by growers and other members of the pipfruit industry in regard to pesticide use. Moreover, in chapter four I utilize Foucauldian discourse analysis to frame my proposition that risk is actually an episteme where all other pipfruit industry discourses meet.

Grower agency is restricted in terms of pesticide use and IPM encourages more grower agency. But this increase in agency is dependent upon both sufficient knowledge and constant agility if it is not to be outweighed by the increase in potential risk to crops and grower income. In the following

chapters I contend that these two themes - agency and risk - go hand in hand and that risk ultimately directs the actions of growers. With this direction in mind, promotions of IPM and IFP seemingly always address either or both agency and risk.

Content analysis of *Growing Today* and *The Orchardist* combines with discourse analysis in chapters five and six to illuminate the impact of IPM and IFP discourses within the pipfruit industry. In fact, the entire thesis serves to illustrate how Foucauldian discourse analysis is in itself productive, since it creates and presents a particular illustration of the discourses with which it is concerned (this proposition is most evident in chapter two).

Glossary

AG	Ancistrocerus gazelle wasp
DDT	Dichlorodiphenyltrichloroethane
ENZA	Technically ENZA is not an acronym since the letters do not stand for anything. ENZA is the marketing arm and brand name for NZAPMB pipfruit.
ERM	European Red Mite
ERMA	Environmental Risk Management Authority
FFV	Fresh fruit and vegetables
FRST	Foundation for Research Science and Technology
Fruitfed	Fruitfed Supplied Ltd (a horticultural supplies company).
NZFF	New Zealand Fruit Grower's Federation
FSR	Farming System Research
GT	<i>Growing Today</i> magazine
HSNO	<i>Hazardous Substances and New Organisms Act</i>
IFP	Integrated Fruit Production
IPM	Integrated Pest Management
MAF	Ministry of Agriculture and Fisheries
MRL	Minimum residue level
NZAPMB	New Zealand Apple and Pear Marketing Board
OC	Organochlorine
OP	Organophosphate
ppt	Power point
PAR	Participatory Action Research
PTD	Participatory Technology Development
FSR	Farming Systems Research
PGNZI	Pipfruit Growers New Zealand Incorporated
QSM	Quality Standards Manual
RMA	<i>Resources Management Act</i>
SP	Synthetic pyrethroid
TO	<i>The Orchardist</i> journal
TSM	Two-Spotted Mite
Vegfed	Vegetable Grower's Federation
WAA	Woolly Apple Aphid

History of the New Zealand Pipfruit Industry

Is history made primarily in the present? The question seems counter-intuitive, given the endeavour of historical analysis to discern in the lineaments of our everyday condition the development of certain historically instituted social orders and forms. ...People tell stories that concern the meaning of historical events, events that gain their significance through their very telling. (Houston, 2004: 1).

History: the great story teller

Houston's rhetorical question regarding the temporality of history illuminates a key dynamic of reflexive philosophy so often discussed by anthropologists, and by social scientists in general. For while history is comprised of actual events, locations, artefacts and participants; it is the *selection* of such things that give a 'history' its character. That is to say, it is the decisions of which aspects of the happenings will be emphasized, and which will not, that make history a unique mirror of the past. Furthermore, history of the past is always constructed in relation to the present, and as such, is informed by current social and political practices and knowledge (Southgate, 2001). Through correlating a wide array of literature concerning the pipfruit industry, this chapter actively demonstrates how the selection of particular portrayals of events, creates a mirror of my perception of that past.

Thus, in a reflexive moment, it should be noted that the following description is subjective, inasmuch as I have compiled an array of literature into one relatively cohesive portrayal of what I consider to be some key characteristics and events of the pipfruit industry. This perception is based solely on

literature widely available to the public (including pipfruit growers). The 'key characteristics', however, are intersubjectively negotiated in relation to the key focal points with which this thesis is concerned. Since this research is concerned with the socio-political context of pesticide use in New Zealand's pipfruit industry, it follows that this account of history will illustrate that context through description of some factors that have influenced current pesticide use. Factors such as the regulation and deregulation of the pipfruit market through the New Zealand Apple and Pear Marketing Board (NZAPMB); problems encountered through the use of 'hard' chemicals; the surge in 'soft' chemicals that arose during the emergence period of IPM and IFP strategies; the organics movement in contrast to traditional spray programmes; the regulation of pesticide use through New Zealand legislation; and the impact of Maximum Residue Levels (MRL) on pesticide use.

New Zealand is one of many pipfruit-growing regions in the world, and as such, is interdependent on global movement of pipfruit between countries that produce and countries that consume (though many countries are subject to seasonally-related production and consumption trends). Because of the global movement of this commodity, and because New Zealand produces far more apples than it consumes, New Zealand's pipfruit industry is inextricably linked with the global pipfruit industry. This means that at times, New Zealand's history is notably connected with wider global food regimes.

Food regimes are:

“...the global scale structuring of food production and consumption as governed by sets of rules. Important in constructing these flexible and shifting sets of rules are discourses of globalisation and sustainability (Marsden and Arce, 1995; Arce and Marsden, 1993) and the stretching out over space of power relations (Jarosz, 1996)” (McKenna, 1998: 38).

Megan McKenna articulates the key dynamics of food regimes in this succinct phrase and while little more can be said to expand on her observations, I would contend that perhaps the stretching out occurs not only over space, but also time. As this history chapter will demonstrate, pipfruit food regimes are subject to processes and discourses of globalisation and sustainability, which are inextricably linked to risk, and contain within them a series of related discourses such as export quality, single desk versus free trade, MRL standards, economics, agency, and global greening strategies (see also Busch, 2004: 163-178).

This chapter serves to illustrate how such discourses connect and change over relatively short periods of time. In doing so it also illustrates the key issues facing pipfruit growers today through focusing on historical happenings that have shifted the ways in which growers respond to changes in environmental, economic, and political conditions, as demonstrated through the rise of greening strategies. It should also be noted that much of the following historical account is discussed in *The Orchardist* and *Growing Today*, on which the content analysis of chapter five rests. It is not, however, limited to these two sources; rather I have intentionally explored other scientific and academic literature to compliment these sources in order to further answer the question of what kinds of written information concerning pipfruit and pesticide discourse are publicly available.

General history of the New Zealand pipfruit industry

The end of the 19th century saw the establishment of commercial fruit growing in New Zealand, with several large pip- and stone-fruit orchards emerging in the Hawke's Bay and Nelson areas. In the early years, pesticides were

administered to crops by horse-drawn cart and manually operated spray pumps (Mannering, 1999:46). From these humble beginnings, the pipfruit industry quickly became a staple of the New Zealand economy, and by 1996 the Hawke's Bay and Nelson areas alone hosted approximately 1300 pipfruit growers on 11,000 hectares of land (McKenna and Campbell, 1999:4). By the year 2000, Hawke's Bay and Gisborne hosted over 800 of New Zealand's 1600 export pipfruit growers (Miller, 2000:2).

There were several key factors that encouraged this rapid growth of the pipfruit industry. In the first instance, New Zealand's soil and climate provided the ideal conditions for such an enterprise, which in turn led to economic gains for the growers themselves. Economic ties expanded for those producing in the Hawke's Bay region when The Frimley Canning Factory was opened in 1904. Not only did the factory provide more economic opportunities for growers during years of surplus produce, but within two years it was also providing 171 seasonal jobs. Despite the factory's closure in 1912, a window of opportunity had opened for growers who continued to preserve excess produce through a number of New Zealand and Australian canning factories, including J. Wattie Canneries, which was opened in 1934 (Mannering, 1999: 11-13).

Orchards emerged in the early 1900s in both the North and South Islands. Nelson and Canterbury quickly became home to a number of entrepreneurial pipfruit growers. Soon after the arrival of orchards in Canterbury came the red spider mite in 1900. Growers at that time used caustic soda for mite control (Ward, 1995:39). Fifteen years later the infamous codlin moth² appeared in Canterbury. According to Ward (1995), codlin moth was

² There are two spellings for this moth; codlin and codling. This thesis uses the former spelling.

controlled with "...lime, salt and sulphur, mixed in two 60 gallon coppers" which was then "sprayed onto the trees while still warm. Later the salt was left out and straight lime-sulphur was used [by the Butcher Family in Christchurch]" (Ward, 1995:39). Francis Sisson (1862-1940) "was the first to use arsenate of lead for the control of codlin moth in 1905, first to import a cutler grader and first to erect a private cool-store in New Zealand in 1910" (Ward, 1995:27). Francis Sisson played a large role in the early years, and particularly between 1910-1915, while he was president of the Canterbury Fruitgrower's Association.

The South Island of New Zealand increased in pipfruit industry at a slower rate than the North Island, and although Nelson District was a leading area of growth for most of the 20th century, further south the pipfruit industry dwindled. However, by the 1990s the South Island's pipfruit industry was increasingly becoming a large contributor to industry exports. In May 1996 the "Canterbury-based Apple Fields company celebrated its one millionth export carton of apples... marking its place as the country's single largest grower [of export apples]" (TO, June 1996: 13).³

Another key factor in the rapid growth of the industry was the formation of the Hawke's Bay Fruitgrower's Association in 1899, whose role it was to take steps to prevent new orchard pests, such as the Queensland Fruit Fly, from entering New Zealand. The Association also researched, implemented and controlled export marketing, storage and shipping fruit from the region. The

³ Chairman Murray Valentine was quoted by Chris Hutching, saying "...this should come as no surprise since, over a hundred years ago; Canterbury was the first region to export apples from New Zealand". However, Ward asserts in the July Issue, this is not, in fact, the case. He maintains that Auckland was the first to export pipfruit by both local growers and the government. Before the turn of the 20th century Cantabrians were exporting to Britain and South America (Ward, 1995:52; see also Tipples, 1986).

industry grew rapidly between 1900 and 1911. In 1924 the Fruit Export Control Board was established in order to regulate pip-fruit exports until World War II when exporting ceased. The end of the war marked the beginning of a new era for the pipfruit industry, which quickly regained its growth momentum with the establishment of the New Zealand Apple and Pear Marketing Board (NZAPMB) in 1948 (McKenna, 1998: 44). The NZAPMB quickly became a governing force in the pipfruit industry as it increased export accessibility for growers through single-desk export. By the 1980s the industry was steadily growing with increases in orchard numbers and sizes (Mannering, 1999: 8-10).

New Zealand's growth in the pipfruit industry was also affected by global happenings. During the 1970s a global over-supply of apples left New Zealand growers in a profit depression which was miraculously eased by Europe's poor crops in 1977. Throughout the 1980s the New Zealand market strengthened and prices peaked in 1991-92 when Europe's crops failed again. However, another depression hit New Zealand's profit margins in the late 1990s when global market pressure accompanied by the strength of the New Zealand dollar had a negative impact on grower returns (TO, Nov. 1999: 15). In 1984, New Zealand's Health Department Food Regulations set the minimum residue levels (MRL) in accordance with international market trends. The New Zealand MRLs were lower than the MRLs set in several other countries at that time (Williams, 1992: 7; see also Walker, 2005b).

Social and political highlights of the pipfruit industry's recent history

During 1997 (the year that IFP was widely introduced to New Zealand growers) *The Orchardist* signalled several key concerns arising in pipfruit

discourse throughout the industry. The hottest topics include: early hail storms that lowered fruit production by eight percent; changes to the 1997 Pipfruit Commodity Levy rates; spray drift issues and agrichemical debates; and problems with Australian exports due to fruit fly and fireblight risks. These factors were discussed as influential in the production and sale of pipfruit, and as such were discursive. MAF and Hortnet also launched new software and internet sites that could help growers better manage their fruit production, with free access for pipfruit growers.⁴ The IFP programme, however, dominated as the hot topic of the year.

New Zealand's apple production was lower than anticipated in 1997 due to heavy hail damage, coupled with growers transferring to IFP programmes. Poor quality control resulted in fruit not meeting export specifications; the projected cost to growers was \$60 million – approximately \$4 per carton (TO, Aug. 1997: 6). Despite lower earnings, New Zealand apple growers were to be encouraged by *The World Apple Report*, who placed New Zealand “ahead of 24 other apple-supplying nations after marking on 21 criteria affecting competitiveness” (TO, Aug. 1997: 7; see also Walker, 2005b).

While 1997 introduced growers around the country to IFP through a variety of strategies, it was 1998 that would take centre stage for the IFP programme's success. Over 30% of pipfruit growers had transferred to the IFP programme by the end of the 1997/1998 season and this figure would double in the next 12 months (Wiltshire, 2003: 7). Issues of *The Orchardist* were jam-packed full of articles and advertisements concerning IFP in one way or another (TO, July

⁴ Orchardist, Feb 1997: 6, 35; March 1997: 3, 16; April 1997: 5, 39; June 1997: 36; July 1997: 3, 6, 7, 38, 40).

1998: 18; TO, Aug. 1998: 20; TO. Sept. 1998: 46; TO. Oct. 1998: 14; TO. Nov. 1998: 43). New IFP-friendly insecticides, such as *Match*TM by Novartis, appeared in full-page colour advertisements, and even the stonefruit industry's decision to trial IFP was celebrated.

Grower-driven focus orchards began to emerge in the Nelson region in 1999. The Nelson Focus Orchard Project received an AGMART grant of \$209,000 for funding 10 focus orchards over three years, in order to “establish benchmarks for management practices, profitability and environmental sustainability” (TO, March 1999: 23). Some of the growers on these orchards had, according to McKay, “been involved in IFP for several years and [were] keen to maximize income and increase profit from their orchards” (TO March 1999: 23). In regards to the IFP efforts, the committee chairman, Richard Kemp, asserted:

Many growers are happy to get away from the use of organophosphates. Products like *Match*TM and *Mimic*TM that are aimed at specific pests are now available but open the door for other insects so in the transition we have to be careful to monitor the changes. ...For some the decision to grow fruit under IFP is philosophically based, while others see IFP as a market reality. It is likely that one aspect of the project will be to identify factors important for the successful implementation of IFP by growers (TO, March 1999: 23).

The Nelson project further offered opportunity for comparisons made with the existing focus orchards in Otago and in Hawke's Bay. In February 1999, the NZAPMB celebrated its 50th birthday and in July the Hawke's Bay Fruitgrower's Association celebrated 100 years of service to New Zealand growers (TO. Feb. 2003: 33-34).

Focus on IFP continued in *The Orchardist* throughout 2000 and 2001. However, the number of IFP articles was matched by articles concerned with the ongoing discussion of deregulation and free trade. Export growers faced more

hardship, however, with California's declaration of the apple leafcurling midge as a quarantine pest (TO. Sept. 2000: 24).⁵ In February, pipfruit growers protested at parliament over ENZA's control over the export of pipfruit. Yet despite the turmoil, exports remained strong for New Zealand's pipfruit industry and total New Zealand pipfruit exports reached \$339 million in 2001 (www.HortResearch.co.nz; see also Walker, 2005b: ppt3). In 2003 more than 12,000 hectares of land in New Zealand sustained apple production, and of that more than half (6396 hectares) was located in Hawke's Bay. Tasman district was the second largest region supporting pipfruit production; hosting 3270 hectares of pipfruit orchards (www.stats.govt.nz).

Policy and the NZAPMB

The increase in orchards led to an increase in pipfruit, and export became more important as a means of supporting the industry. In order to consolidate the economic capacity of the pipfruit industry on the global market an Apple and Pear Marketing Act was passed in conjunction with the establishment of the New Zealand Apple and Pear Marketing Board (NZAPMB) in 1948. This provided stability for growers and a platform for an IFP programme to eventually emerge. However, with export came issues concerning quality control including maximum residue levels (MRL) of pesticides on fruit (Miller, 2000: 13ff.).

The percentage of pipfruit exports is higher than that of most other exported fresh fruit and vegetable (FFV) produce in New Zealand, which effectively

⁵ Quarantine issues and USA market access restrictions began to emerge as potential threats to New Zealand's pipfruit exports in 1996 when the U.S. Food Quality Protection Act was passed (Walker, 2005b).

meant that the NZAPMB was highly influential over the success of the FFV industry as a whole.⁶ Initially, its main role was to negotiate in export markets through its marketing arm ENZAFruit (which recently joined with Turners & Growers) and to make sure that New Zealand growers could maintain international market accessibility. In order to facilitate the high standard of production required, the Board worked with the Fruitgrower's Federation, Pipfruit NZ, and HortResearch to find ways of helping growers meet international quality standards while following national IFP regulations.

In 1993 the local pipfruit market was deregulated to make the industry more versatile in year-round marketing (TO, April 1999: 31). The deregulation increased competition between growers, and caused fluctuations in local fruit prices and fruit quality. Deregulation drew various reactions from growers and consumers, and while some growers were dissatisfied with the changes, nevertheless, deregulation of the local market had paved the way for deregulation of export pipfruit.

By August 1997, the 1993 deregulation of the local market resulted in growers' auction markets being replaced with more direct contracts between growers and end marketers. Ron Becroft, president of the NZFF, commented on the benefits and shortcomings of this switch, drawing specific attention to the important role of federations in representing growers on the export market.⁷ He stated that in regards to this, the NZFF would join with the Vegetable Grower's Federation (Vegfed) (TO. Aug. 1997: 2). Max Lilley,

⁶ In 2004 New Zealand kiwifruit exports totalled a value of NZ\$640 million, \$200 million more than apple exports. Total stonefruit export earnings were a mere \$20m in comparison (Walker, 2005b:ppt2).

⁷ Fruitfed Supplies Ltd began as a trading department within the NZFF. It became a separate company and joined with Williams and Kettle, which is now owned by Wrightsons (Kuiper, 2005: 1).

president of Vegfed supported the alliance because it would serve to strengthen export values, while reducing federation overheads for both the NZFF and Vegfed. This alliance would later serve to strengthen both vegetable and fruit growers after deregulation of the NZAPMB.

Before the deregulation of the Board in 2001, its purpose was to act “with an exclusive mandate to purchase and export fruit (through ENZA) on behalf of all growers” (McKenna, 1998: 44). Despite the apparent power monopsony,⁸ growers could apply to ENZA for private export licences. However, licences were only granted to growers exporting fruit that, for various reasons, was not being exported by ENZA to the designated area. Private licences of this nature were few and far between and NZAPMB continued to control 95% of New Zealand pipfruit exports (McKenna, 1998: 44). If the Board had not been deregulated in 2001 it would now be in its 57th year of managing acquisition, export and marketing of New Zealand pipfruit, both within New Zealand and abroad (in accordance with the amended Apple and Pear Marketing Act of 1971). What follows is a brief description of the events leading up to the deregulation of the NZAPMB.

In 1997, the NZAPMB came under pressure from growers as a combined result of the Board’s changes to grade-size standards and the low produce prices (averaging \$10 per carton instead of ENZA’s projected \$13) (TO, Nov. 1997: 18). The pressure led to a series of discussions between ENZA and growers regarding the deregulation of the Board (see Miller, 2000; Walker, 2004). The political climate of the industry was tense, and by November 1997

⁸ As Miller (2000:7) argues, the Board held a monopsony (also referred to as buyer’s monopoly) over New Zealand pipfruit through the single desk supply.

an organisation of independent pipfruit growers was formed by growers from the key pipfruit growing regions in New Zealand. The group's first goal was to seek reform of the New Zealand Apple and Pear Marketing Act of 1971. Other goals were essentially based on the redistribution of power and money that the Board represented (Miller, 2000: 13; TO, Dec. 1997: 4).

In 1997, as discussions of free trade and deregulation of the NZAPMB continued, growers vocalised their discontent with the proposition to deregulate the market (TO, Oct. 1998: 33; cf. TO, May, 2001: 12-13). However, most pipfruit growers were becoming increasingly disillusioned by ENZA's inability to secure high fruit prices. Despite a global flooding of the pipfruit market, growers blamed ENZA for the continuing low prices. In December 2000 farmers and growers protested on the steps of Parliament against the single desk monopoly of the Board. Growers claimed that only 36 percent of their pipfruit would reach ENZA's imposed size standards and that of the 36 percent that was exported only 33 percent of the earnings would reach growers. The almost-impossible grade standards combined with the halving of fruit prices for New Zealand export growers meant that ENZA sales did not cover growers' production costs (TO, Feb. 2001: 28-29). There were also other influential factors raised in the deregulation debate, such as 'legacy costs' and "New Zealand [losing] its competitive advantage because its two best-paying varieties Braeburn and Royal Gala [were] being planted by many competing producers" (Kuiper, 2005b: 2). By 2001 the NZAPMB was deregulated indefinitely.

Between 1995 and 2005, considerable change has taken place in the pipfruit industry, both in terms of reduced pesticide use and the restructuring of the industry through deregulation. While most growers have benefited by deregulation, some growers still see the deregulation as a step backwards for

New Zealand's apple industry. However, as Jim Walker of HortResearch pointed out to me in 2005;

We will never have the single desk again, we cannot go back. The WTO wouldn't let us. Growers choose to work together anyway because at the end of the day their nearest export is 10,000km away; their fruit all arrives at the same time and we are only as good as our weakest link so it's in our best interests to have all the fruit in top quality (pers. comm.).

Walker's comments accentuate the wider economic and political dynamics at play within the industry, and also highlight the remaining single-desk mentality by many growers. The enduring relative cohesion of growers is interesting, considering that in the first season following deregulation there were approximately 85 more export companies for growers to export through.⁹ That said, occasionally news snippets appear concerning the drop (or potential drop) in fruit quality as a result of deregulation (see for example www.telstraclear.co.nz, 25.01.05; One News <http://tvnz.co.nz> 25.01.05).

Pesticides : description of key chemicals and their history in the industry

Since New Zealand orchardists first began growing and marketing fruit they have attempted to eradicate the insects that damage pipfruit trees and fruit, resulting in reduced crop yields. Before 1940, pesticides were hand-pumped onto trees through a variety of labour-intensive methods that generally involved men wearing a knapsack sprayer on their back. Mannering quotes Napier orchardist, Les Jones, recalling his experiences of spraying in 1926:

⁹ ENZA now accounts for 40-50% of the export apple volume that it held prior to 2001 despite "...considerable agricultural policy 'free trade' reforms" (Walker, 2005: 1). Kuiper contends that ENZA actually only controls 35% of apple exports (Kuiper, 2005b: 2).

In the early days we used to spray with a hand pump and sledge. Then we bought a horse-drawn spray outfit. Two would spray at one time on each row. It was powered with a single cylinder petrol engine. We used mainly lime sulphur as a fungicide, and arsenate of lead as an insecticide. We never used respiratory equipment. Black Leaf 40, nicotine sulphate, used for mealy bug, made me sick. My brother, who was a smoker, wasn't troubled by it (Mannering, 1999: 46).

Horse-drawn sprayers were filtered out of the system in the 1930s with the arrival of tractors and rubber tyres. In 1940 "two state-of-the-art sprayers were put through their paces at a field day attended by 200 growers at Grasmere orchard" (Mannering, 1999:47). The sprayers were able to pump 25 gallons per minute through the two manually operated six-nozzle brooms. From this point on, spraying techniques and chemical knowledge among orchardists transformed rapidly.

And what was it they were spraying? The woolly apple aphid (WAA) and codlin moth were some of the first pests to arrive in New Zealand's pipfruit orchards. During 1910-1915 most apple trees were planted in Northern Spy rootstock to aid resistance to WAA (TO, July 1998: 11). This was necessary because WAA could otherwise survive underground. Wilton writes;

With the exception of the non-resistant Malling XII and XVI used during the 1950s before the introduction of the resistant Merton 793 and MM106 rootstocks, standard rootstocks used in New Zealand for most of this century have been resistant to WAA. Currently [1998] available dwarf and semi-dwarf rootstocks including M9, Mark, and M26 are all susceptible to WAA. ...In particular, the following factors have contributed to minimizing the problem to date: [1] most orchards planted on resistant rootstocks; [2] intensive organophosphate insecticide spray programmes have kept WAA numbers low; [3] directed sprays of organophosphate insecticides to the base of trees growing on susceptible rootstocks (TO, July 1998: 11).

The WAA is unique in its ability to survive both beneath and above the earth and throughout the 1990s growers have continued to pre-empt WAA breakouts by planting trees on WAA-resistant rootstocks. However, over the past 100 years growers have also controlled WAA with above-ground pesticides (as is the case with most pipfruit pest control).

The most common pesticide chemicals used to control other pests in the early part of the 20th century included copper, lead arsenate, nicotine sulphate and pyrethrum, among others. These substances were commonly used throughout the industry until 1941, when the latter three were replaced virtually overnight by the synthetic pesticide dichlorodiphenyltrichloroethane (DDT). The insecticidal properties of DDT, an organochlorine (OC), were discovered in 1938, and by 1941 DDT was being commercially used in Europe. Its effectiveness in controlling codlin moth and leafroller, combined with its incredibly low cost, made the product an instant success throughout the industry (Mannering, 1999: 47-49, see also Hunt, 2004: 240-256). By 1954, the New Zealand parliament estimated “that of the 150 tons of DDT used that year, 107 tons would be used to control grass grub and porina, 20 tons would be used in orchards, and 20 tons in fly sprays (New Zealand parliament, 1954, p.13)” (Hunt, 2004: 242).

The rapid pace of new chemicals entering the market did not slow even during DDT’s rise and fall. Indeed, the frequency of chemicals entering New Zealand was such that by 1958 the Government had decided their registration and regulation was mandatory. Hunt writes:

In 1959 the Agricultural Chemicals Act was passed, the main thrust of the legislation being the correct labelling of chemicals and clarification on how to use them. At the time DSIR [Department of Scientific and Industrial Research] listed 120 certified materials in 60 different classes. There were 15,000 agricultural chemicals on sale (Hunt, 2004: 242).

At that time, the Minister of Agriculture commented that in previous years use of chemicals in horticulture had far outweighed pastoral agriculture, however this was changing due to the discovery of DDT and potential for DDT-based chemicals to save the pastoral industry millions (2004: 243).

Twenty years later orchardists were complaining about the resurgence of pests in their crops and resistance to DDT. Even worse than this was the evidence that began to emerge throughout the 1960s, that DDT accumulates in soil and in animals at the end of the food chain (Mannering, 1999: 49). In other words, organochlorines and polychlorinated dibenzodioxins proved:

...resistant to microbial degradation and have a propensity to concentrate in lipid rich tissues. These properties lead directly to their most undesirable characteristic – the environmental persistence, bioconcentration, and biomagnification through the food chain of their residues (Holland, 2004: 1).

The world-wide overuse by orchardists and farmers of OCs such as DDT, gamma-benzene hexachloride (otherwise known as lindane), and dieldrin, resulted in detrimental health implications for more than the pest population they were meant to target. Thousands of people in New Zealand suffered from chemical poisoning because of the toxicity of the products and lack of user protection from them (Holland, 2004).¹⁰ Organochlorines were banned on farmland in the United States, most of Europe, Australia and in New Zealand by 1970 (Hunt, 2004: 240) and dieldrin was restricted in New Zealand to non-agricultural use (biotech.icmb.utexas.edu). In 1989 the Pesticides Board placed a total ban on DDT in New Zealand (*Ministry for the Environment*, 1997: 8 cited in Hunt, 2004: 253).

By the end of the 1960s new chemical products such as parathion, an organophosphate (OP), and Gusathion™ (azinphos-methyl), were rapidly replacing the use of organochlorine insecticides. The president of the Fruitgrower's Federation condemned parathion as both highly toxic and

¹⁰ Furthermore, although OCs were considered relatively harmless to humans and non-carcinogenic at the time, "current biomedical research is pursuing the theory that some OCs and other xenobiotics mimic estrogens, leading to increased susceptibility to carcinomas in fatty tissue such as the breast" (Holland, 2004: 2).

ineffective against codlin moth and leafroller, which resulted in the product's quick dismissal. However, Gusathion™ was praised for its relatively low toxicity and high effectiveness against targeted pests (such as codlin moth and light brown apple moth) (Mannering, 1999: 50).and it remains a popular product to this day in many parts of the world; although not in New Zealand (www.bayercropscience.com).

The banning of the OCs also opened an opportunity for more research on OPs, which resulted in less harmful insecticides such as pirimiphos-methyl (Actellic™) and diazinon (an OP) becoming available.¹¹ Synthetic pyrethroid insecticides (SPs) were also researched during this time because of their similar effects on insect nervous systems to OCs. Synthetic pyrethroid insecticides are more effective than OCs. The most relevant differences between OCs and SPs are that SPs are biodegradable and are also effective in small quantities, making environmental residues uncommon. Despite these positive attributes of the SPs, fruit growers tend to use SPs sparingly because of their tendency to eliminate both pests and beneficial insects (Holland, 2004: 1-6).

The use of organophosphate insecticides in recent times has dropped dramatically and the 1990s have been dubbed by some as the environmental awareness decade (Bell, 1996). In the early 1990s newspapers printed a variety of environmental agricultural reports that largely condemned the over-use of heavy chemicals and chemical dumping. There was debate over whether New Zealand's clean and green image could be justifiably utilized by a country so heavily reliant upon chemical use. In 1992 the Hazards Control Commission

¹¹ Diazinon is still in use today but its use in pipfruit has reduced dramatically between 1995-2000 by 58% as a result of the IFP programme (TO, Sept. 2000: 24).

spent more than \$4 million on cleaning up toxic chemical dumping (Williams, Nov 1 1992: 7) and providing safe storage facilities.¹² During this time there was an increase in implicit and explicit self-regulation campaigning through the media. Farmers and growers alike were encouraged to dispose of chemicals at designated sites, to warn their neighbours before spraying, and to use appropriate protective gear when mixing and spraying chemicals. For example, in Murray William's 'investigation' into the chemical clean up, he quotes Barry Marshall (the MAF residues manager) as saying, "the industry actively promotes residue awareness among chemical users and the ministry's involvement is decreasing gradually as self-regulation occurs" (Williams, Nov 1 1992: 7). The concerns current during this period provided a receptive environment for the introduction of lower chemical use strategies such as integrated fruit production. As Mannering (1999: 50) asserts:

Consumer concern and environmental safety issues in the 1990s have brought about the next revolution in pest and disease control. Integrated Fruit Production utilizes selective chemicals, leaving beneficial insects in the orchard, so a mixture of biological and chemical control can be achieved. There has also been a strong move towards organic practices.

During this time general pesticide use slowly began to decrease. The pests of most concern for orchardists around the country during the 1990s were WAA, codlin moth, mites, leafroller, mealy bug, light brown apple moth, and in Hawke's Bay the Fullers rose weevil. While WAA growth was restricted by rootstocks, some WAA populations initially proved hard to control with the IFP strategies because of the withdrawal of broad spectrum organophosphate insecticides. The greening of the industry through introduction of IPM and IFP strategies caused an increase in grower tensions with regard to WAA damage risk, through fears about the reduction of pesticide use potentially

¹² The Hazards Control Commission is now called the Environmental Risk Management Authority or ERMA

leading to heightened WAA problems. The response was to again focus on rootstock options rather than above-ground insecticides (TO, July 1998: 11). There were few pesticide options available during this period: tebufenozide (Mimic™) was most often used for the control of leafroller (TO, July 1998: 18), while mealy bug was controlled with buprofezin (Applaud™) and chlorpyrifos (Lorsban™). Mealy bug was arguably the largest pest threat to orchardists during the 1990s and growers were encouraged to rotate insecticide use to control populations in order to keep pest resistance to pesticides at a minimum.

By 1996 mealy bugs were already resistant to chlorpyrifos in 66% of Hawke's Bay orchards. Likewise, diazinon and azinphos-methyl were insufficient in controlling mealy bugs during the season. With mealy bugs' ability to increase 200-fold per population it was and is critical that populations be adequately restricted. Tokuthion was also used for the control of mealy bug, but with caution; tokuthion is not compatible with integrated mite control (IMC) and its use can lead to mite problems (TO, July 1998: 19; *cf.* Wiltshire, 2003: 6).

In 1999, mites were largely controlled with tebufenpyrad (Pyranica™) and abamectin (AVID 3™) miticides. The product company Novartis, asserted that AVID 3 would be especially useful for growers practising IPM strategies because the miticides were systemic and would not harm predatory mites (TO, November, 1998: 73-74).

Finally, pesticide fumigants were also used post-harvest for quarantine and pre-shipment fumigation. Methyl bromide (MB) is one such fumigant that was used internationally during the 1990s for the control of insects,

nematodes, weeds, fungus, and bacteria, and for soil sterilization.¹³ However, Dr Michael Lay-Yee stated that while MB has a number of properties that make it a convenient product (such as its good penetration, efficacy at low concentration, and fast acting nature), it also has a number of disadvantageous characteristics:

These include its high toxicity to humans (with the associated operator safety and health issues), and its tendency to reduce the quality of the horticultural commodities which it is used to treat (Batchelor et al., 1985; Lay-Yee, 1989; Lay-Yee, 1993). ...In addition, MB has been identified as an ozone depleting substance (TO, March, 1997: 24).

MB began to be phased out of use by over 100 countries under the Montreal Protocol in 1997 and at that time the phase out was projected to be complete by 2010. At the 2004 New Zealand Annual Fruitgrower's Federation conference held in Christchurch, a guest speaker informed growers that other effective treatments such as pure alcohol fumigation were being applied by several European countries with marked success. So it would seem that although chemicals with pesticide characteristics such as DDT and MB have been used in the recent past in relatively large amounts, many of them have been phased out over the past 30 years as a result of the industry learning more about their detrimental properties and more about safer compounds that can replace them. In New Zealand, some growers now obtain a satisfactory result (that is, the removal of enough insects from fruit for the fruit to pass quality inspection) by spraying the fruit with water instead of chemicals.

¹³ Strictly speaking, MB does not fall under the pesticide category because it is used as a general fumigant post harvest.

History of IPM: green washing or green protectionism?

Pipfruit Integrated Pest Management (IPM) is a strategy that, in New Zealand, places focus on both the monitoring of pest populations in crops and the introduction of beneficial arthropods into those crops to manage pest populations. Pesticides have traditionally been used to manage these populations, however, after the notorious over-use of chemicals such as nicotine and DDT in the 1950s, growers have become more aware of the damaging effect of chemical over-use on the environment. During the 1960s and 1970s various research findings also began to emerge that linked chemical use to a variety of detrimental health conditions affecting humans. Consequently, during the 1970s and 1980s there was an increase in consumer awareness of chemical related health and safety issues (including chemical residues on food) (see Hutching, 1991). IPM was introduced to growers in the 1960s as a tool for lowering chemical use, and thus, environmental, economic, and health risks (see Walker, 2005b: ppt66).

Although IPM strategies started to appear overseas in the 1950s, they did not reach the New Zealand agro-food market until 1977 (Wearing, 1978). One broad definition of IPM that perhaps best summarizes the aspects of IPM strategies that have been incorporated by New Zealand growers is provided by R.F. Smith and H.T. Reynolds, who explain that IPM is “a pest population management system that utilises all techniques in a compatible manner to reduce pest populations and maintain them at levels below those causing economic injury” (1966: 11). In her definition, Heidi Stiefel notes that while IPM is interpreted as holding different characteristics in different agricultural sectors and different countries, it may simply refer to the management of an arthropod pest (1999: 5). However, more often than not, an IPM programme involves focus on agricultural concerns indirectly affecting and affected by

the control of arthropods; including management of soil, water, diseases and weed management (Koeher 1997 cited in Stiefel 1999). While most IPM strategies tend to minimize rather than eradicate chemical use, the chemicals used have targeting capabilities – that is, they are less harmful to beneficial insect populations. In connection with this, many magazine advertisements for miticides in particular, and pesticides more generally, specifically state the targeting capabilities as a feature of the product.

The primary purpose of the introduction of IPM strategies was to educate growers about alternative means to chemical use of managing pests. Indeed, the common thread that runs throughout IPM discourse is IPMs' central characteristic aim to reduce overall chemical use. Integrated Mite Control (IMC) was the first IPM programme to be assessed in New Zealand from 1975-77 for the control of European Red Mite (ERM) and Two-Spotted Mite (TSM). This particular IPM strategy had two focus strategies: the introduction of insecticide-resistant predator mites *Typhlodromus pyri* and *Phytoseilus persimilis*; and the use of targeting-miticides where necessary (Stiefel, 1999: 6 ff. and Stewart, 1997).

However, the specialised knowledge and beneficial insect populations took a long time to filter through to growers. The research that is required before control agents can be imported into New Zealand is time consuming (see Simberloff and Stiling, 1996, 1998; see also Frank, 1998). The result is growers do not have enough sustained access to the beneficial insects needed for successful integrated pest management. Most pests that attack New Zealand pipfruit are present in other countries. Pipfruit IPM strategies are still employed in many countries around the world. However, because of the inconsistent availability of necessary beneficial insects for the IPM strategies to be completely successful, some countries have a more successful

integration of the IPM strategies than others (see Wearing, 1988). The success of IPM in New Zealand hinged not only upon successful transfer of technology and availability of beneficial insects (such as parasitic wasps from Europe), but also education of orchardists and specialists through a range of delivery methods, and successful long-term implementation of the strategies by orchardists.

There were also a number of dangers associated with the IPM strategies and these pertained predominantly to the inherent problems with introducing new species into a new environment. The main dangers include naturally occurring “unexpected deviations from known host range where another host is attacked in preference to the target” (*Pipfruit New Zealand*, 2004: 9), unexpected environmental damage caused by the introduced species, and “failure of the introduced natural enemy under ‘foreign’ conditions” (*Pipfruit New Zealand*, 2004: 9; see also Simberloff and Stiling, 1996, 1998; see also Frank, 1998). Simberloff and Stiling (1996) note that insufficient trajectory research previous to introducing new species or control agents can lead to devastating consequences throughout ecosystems; their example of the “myxoma virus-rabbit interaction in Australia” illustrates this point (1996: 1968). The introduction of the myxoma virus into Australia for the control of rabbits upset ant habitats, which led to the extinction of the *Maculina arion* butterfly. While this example is not specifically related to the pipfruit industry, it demonstrates that not only can unforeseen consequences be devastating, but also that if the butterfly were not so popular its extinction may have never been noticed (because the research of impacts on non-target organisms/environments is limited) (*cf.* Frank, 1998). Similarly, insufficient research prior to the use of DDT led to “the local decline and even disappearance of many moths and butterflies (Brody 1995; D. Schweitzer, *personal communication*)” (Simberloff and Stiling, 1996: 1970).

There were a number of technical and organisational obstacles to overcome. Monitoring methods required a high level of specialized knowledge and labour, and in IPM's early years it became apparent that more simple monitoring methods were necessary for successful adoption. Much of the IPM research during the 1980s cited monitoring and action thresholds as the largest problems affecting adoption success (Wearing, 1988: 23, see also French, 1982: 52-86). A lack of selective chemicals (chemicals that target pests without killing beneficial insects) further jeopardised the success of IPM. However, in the past 15 years there has been a wealth of research on selective chemicals.

The HortResearch eco2000 project began in 1996 and IPM was seriously trialled for pests in pipfruit. The project entailed a three year trial at an estimated total cost of \$140,000, after which the trials would be discussed in the year 2000, in a series of forums held in Gisborne (TO, June 1996: 21; *cf.* TO, Nov 1998: 43). The focus of the project was sustainable land management practices that are both economically and ecologically sustainable. Joan Pollock, project manager, clarified that this does not mean no sprays, rather, a change in chemical use to make it more effective. The reason promoted for the eco2000 project was essentially consumer-driven, according to Guy Salmon. Salmon reported that "New Zealand's clean green image was still potent, but increasingly it was becoming more vulnerable. A survey in Japan showed New Zealand products were not seen as safe as those from Switzerland, Canada, or Australia" (TO, June 1996: 22).

The pipfruit IPM strategies were relatively successful in New Zealand in terms of increasing grower knowledge of pests and sustainable management of their environment, and of increasing growers' options regarding chemical

use. However, successful grower adoption was minimal before the advent of the IFP programme). Wearing played an active role during the 1980s and 1990s in educating growers about the strengths and pitfalls of IPM. For example, when it was suggested that the solitary wasp *Ancistrocerus gazelle* might be an effective predator of leafrollers, Wearing clarified that in fact, preliminary research findings suggested that only 2% of the wasp's diet was leafroller caterpillars and that the wasp prefers caterpillars in their final stages, once the caterpillar has already damaged fruit. "...to suggest that it [AG wasp] could become a "big leafroller cure"" Wearing writes, "is a giant leap of faith with little to support it" (TO, June 1996: 23).

IFP: transforming an industry

There were several key factors influencing the development of the pipfruit IFP programme. These include "...pressure from both consumers and trade regulators to formalise production practices that are 'safe' and guarantee minimum consumer risk through unacceptable chemical residues" (McKenna and Campbell, 1999: 1), the replacement of tariff barriers with 'green protectionism' in several international markets (that is, the lowering of MRLs), and the increased power of large supermarkets and consumer co-operatives to impose specifications of chemical use on producers of fresh fruit and vegetables (TO, March 1998: 17). These factors began to be widely influential in the early 1990s and by 1996 ENZA had begun introducing an IFP programme into the pipfruit industry. During the second half of the 1990s, other fruit sectors also began to adopt IPM/IFP management systems. Peach and other stonefruit growers began their transfer to integrated pest and disease management in 1995, with the help of J. Wattie Foods (now Heinz-Wattie Ltd) and the Government's Technology for Business Growth (TBG)

scheme (TO, March 1998: 39; TO, Dec. 1998: 53). By 2005, citrus, lettuce, potatoes and stonefruit were well underway in transfer to IFP programmes (Walker, 2005a).

Peter Cameron has written a brief literature review (per comm.) that contextualizes the IFP programme in the New Zealand pipfruit industry. In his review he elaborates on the key dynamics at play under the following headings: regulators, markets, consumers, pipfruit industry, government agencies, plant protection industry, environmental agencies, growers, and research organisations. According to the review, these are the main groups that influence or are influenced by the pipfruit export market. While the groups obviously influence local growing dynamics, the growers represented in the review are the 900 bona fide growers in NZ that provide a combined 91% of their produce for export.¹⁴ Cameron cites the main influencing factors for IFP adoption and organics in the economy. There are a number of smaller influencing factors on decision making processes regarding transfer such as reduced risk of crop failure, sustainability of pesticide use versus IFP programmes, communication of research and crop outcomes from early IFP adopters, and market pressures to meet MRLs. The majority of the review's findings were also covered in the *Technical Spray Discussion* by Ken Jeffery in August 2004.

Having realised that successful implementation of IFP was subject to economic factors, ENZA initiated the programme with a 25 cents per carton incentive for IFP fruit. Other strategies employed to help growers transfer include an interactive website with a questions and answers forum (1997-2000), discussion groups such as technical sprays discussions, training days –

¹⁴ 'Bona fide' is a term used by various professionals in the pipfruit industry, which refers to growers whose primary income is pipfruit growing and export.

often held in orchards (held a minimum of 3 times annually), and a *Pipmark Bulletin* that was regularly sent out to growers (Walker, 2005a; see also Wiltshire, 2003: 9). There were 75 discussion groups throughout New Zealand, each group consisting of 12-20 growers, IFP researchers, and IFP facilitators (Wiltshire, 2003: 9).

At the Fruit Federation Technical Spray Discussion in Christchurch (August, 2004), a pipfruit orchardist from North Canterbury named Reg informed me that he thought ENZA and Fruitfed's strategy towards IFP during this time was critical:

...See ENZA introduced IFP to us farmers just before it started falling apart, and it was them who got us thinking it might be a good idea. Then when Fruitfed introduced it again we had already heard of it, so we were predisposed to picking it up. Then they provided all the chemicals that were IFP approved and we just used them instead...

Reg's analysis is similar to those discussed by the other growers present and provides an insight into local understandings of the dynamics that influenced grower adoption of the IFP programme.

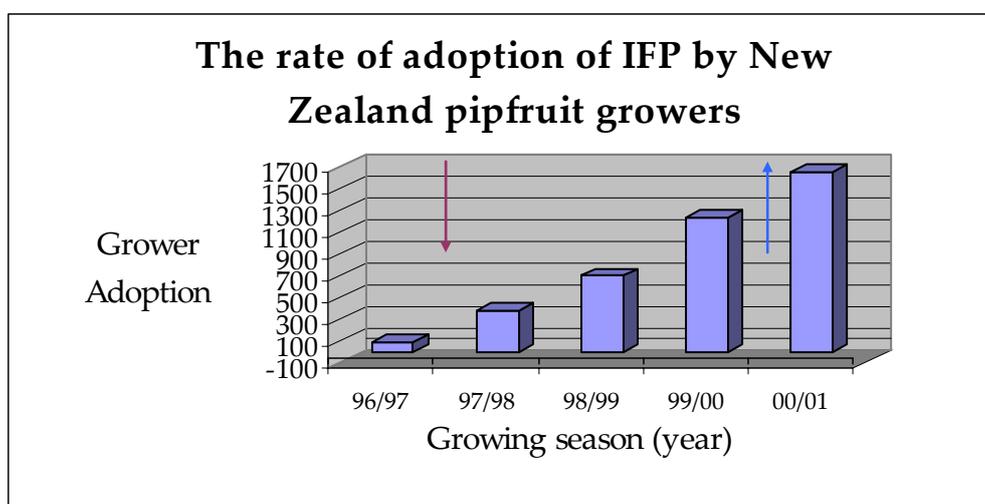
Heidi Stiefel's (1999) thesis suggested that the adoption rate required to meet ENZA's IFP target was steep. The reality of the success of the programme was masked by Stiefel's opening assertion:

To maintain market access to the key pipfruit export markets of Europe and the UK ENZAFRUIT New Zealand LTD has set a target of 100 percent by the year 2001. In 1996, eighty eight growers had adopted the programme out of a total of 1650 growers nationally, hence the adoption rate required to met [sic] this target is very steep (1999: 1).

In fact, the 88 growers had been chosen for trials of the programme and when their transfer resulted in a green light with success of their crops, other growers quickly jumped on the bandwagon. One hundred percent grower adoption was achieved by October 2001. Stiefel situated the key reasons for grower's adoption from 1996 to 1997 as being based in philosophical and

environmental factors, while factors hindering adoption concerned perceived risk (1999: 112 ff). The perceptions of risk were alleviated, however, by the successful crops and market accessibility attained by growers who had adopted. Combined efforts from every sector in the industry led to complete transfer of the pipfruit industry to IFP within five years, placing New Zealand as an IFP leader in the global pipfruit industry.

Figure 1 Grower Adoption Incidents



Source: Wiltshire, 2003: 7; Pipfruit NZ, 2004: 4
 Figure 1 Down arrow = NZ\$0.25 /carton incentive;
 Up arrow = NZ\$0.75/carton penalty.

In a 2004 report, Pipfruit New Zealand articulated the details of the transfer in the following way:

Implementation began as a phased introduction of an extensive IPM programme in 88 orchards during the 1996-97 season (the New Zealand growing season extends from September to May). Uptake was rapid over the next 5 years (Figure 1 [my numbering]) with 91% of growers undertaking an IFP programme and the remaining 9% of growers following a certified organic programme (Pipfruit NZ, 2004: 4).

The transfer was not only successful but had taken place over the projected time period.

While the IFP programme is one of the focal points of this thesis, its history of adoption has been addressed comprehensively in literature elsewhere (Cameron, 2004; Stiefel, 1999; McKenna, 1998; Miller, 2000; Walker, 2003b, 2004, 2005b; Wiltshire, 2003) and will be further discussed in other sections of this thesis (chapters five and six).

IFP insecticides: what now?

When IFP was first introduced by ENZA in 1996 there were limited options for growers in terms of chemicals they could use to control pests. Wiltshire notes:

With few drivers for the introduction of new products, the agrichemical industry continued to supply those products which had become the 'backbone' of pest management since the mid 1960's. IFP required the use of 'soft' pesticides but in 1996 there was only one selective insecticide available, Mimic (tebufenozide), and few developments in new fungicidal chemistry (2003: 11).

ENZA used its position of exporting-monopsony power to direct changes in the products available to growers, and chemical companies produced more soft chemicals that met with IFP regulations.¹⁵ Consequently, softer IFP approved chemicals began to emerge in the late 1990s, and by 2001 there were enough such chemicals to cater for growers' needs. Some of the leading pesticide products surfacing in 2001 include *Stroby*, *Chess*, *Success Naturalyte*, and *Reach*. 'Hard' chemical use was decreasing at a phenomenal rate; by 2003 national statistics confirmed a reduction in insecticide use by 50% (since 1996). Furthermore, organophosphates were virtually replaced by IFP-friendly insect growth regulators (Wiltshire, 2003: 17).

¹⁵ If ENZA had attempted to introduce IFP to growers after the deregulation of the Board it may have struggled because growers would have had more options in selling non-IFP fruit. As it was, the timing was perfect and ENZA managed to use its position of power to influence grower transfer to IFP.

The 2005 season began with six leading pipfruit IFP insecticides in New Zealand. Figure 2 details their primary use and properties.

Figure 2 Leading insecticides and their properties

	insecticides	activity group
Mealy bug and scale	Calypso (thiacloprid)	Chloronicotinyls
	Applaud (buprofezin)	Chitin synthesis inhibitor
Leafroller and Codlin moth	Match (lufenuron)	Chitin synthesis inhibitor
	Mimic (tebufenozide)	Ecdysone agonists
	Avaunt (indoxacarb)	Axonal transmission
	Success (spinosad)	Biologicals

Source: Walker, 2005b: ppt.24-25

Insecticide use has dramatically reduced in the past five years through a successfully integrated IFP programme and the primary chemicals now used around the country are not only more environmentally friendly than chemicals of the recent past but they have more targeting abilities to keep beneficial populations safe.

Moreover, international pressures to lower the use of pesticides in the past 15 years have been an influencing factor in the New Zealand government's decision to pass two legislative acts related to chemical use: The Resource Management Act (RMA) in October 1991, and the Hazardous Substances and New Organisms Act (HSNO) in 1996. In relation to the pipfruit industry, this legislation serves to limit and regulate pesticide availability, use and disposal, in order to reduce risk to the environment and living organisms (Cameron, 2004: 2; see also www.ermanz.govt.nz). The main governing body that enforces this legislation is the Environmental Risk Management Authority

(ERMA). All agrichemical substances and any new plants must be approved by ERMA before they can be used in agriculture (TO, Sept 1998: 47).

Organics

During 1960–1980 the organic fresh fruit and vegetable industry drew increased interest from growers and consumers alike. This interest arose from a number of factors, some of which include: Rachel Carson's *Silent Spring* (1962) and other notable books concerning pesticide and health related issues; the banning of most organochlorines for agricultural use in many countries including New Zealand; New Zealand's clean and green image construction; and the rise in pest resistance to pesticides. The increase in knowledge of organic growing systems contributed to a complex organics discourse that continues to this day, with a driving question behind it; can organic growing systems effectively replace 'conventional agriculture'? (Stanhill, 1990). While this question continues to circulate in organics discourse, it has taken on a transformative characteristic through some actors within the discourse actively searching for the answer. That is, organic growers and those in transition to organic growing, in connection with researchers, manifest one answer to the question as they themselves search for it. In this regard, I would contend that the question has historically served to increase numbers of organic orchards while also influencing a general greening environmentalism of the industry. Furthermore, the IPM and IFP programmes that surface throughout the agricultural industry may even be indicative of the discursive nature of the organics discourse.

To an organic farmer, the avoidance of agri-chemicals reflects not simply a distaste for the hazards of chemicals but more centrally, a rejection of the linear thinking which underlies the use of the chemicals. ...Controlling pests with an insecticide is dealing with *symptoms* rather than *causes*, rather like putting a band-aid on skin cancer. The

insecticide is no more effective than the band-aid, because the weeds or bugs come back, as does the cancer. ...The single most defining element in organic farming is that it is designed to *avoid* problems rather than to *solve* them after the fact [original emphasis]. (Clark, 2001: 6).

Clark's description of the key philosophical difference between organics and traditional growing strategies criticizes the use of chemicals, while emphasizing the avoidance strategies inherent in organic systems, in direct opposition to strategies employed in other growing systems. I would contend that, while this description is typical of the organics discourse, it is also misleading. The IPM and IFP strategies clearly demonstrate an emphasis on *avoidance* strategies such as introduction of beneficial insects into the environment. However, the interest in organic systems began to increase because IPM was in its infancy in New Zealand and IFP had not even been imagined. So while we could argue that Clark's description is not charitable towards other growing systems, we might also contend that when organics first started drawing the attention of growers, Clark's description held more merit.

During the mid to late 1990s, organics had another surge in popularity among both growers and consumers, locally and globally. The Organic Products Exporters Group and Tradenz reported on potential for organic exports to Japan, stating that more produce was required from growers to secure their position in the market (TO, Feb. 1997: 4; TO, April 1997: 5; see also Coombes and Campbell, 1998). Likewise, articles and reports began to appear that were specific to organic apple transfer issues (see for example TO, July 1997: 51; TO, Oct. 1998: 14; Coombes and Campbell, 1998). Organic export production grew in the Bay of Plenty and Gisborne regions faster than other leading horticultural regions of the country, such as Nelson district (Coombes and Campbell, 1998: 1).

Apples are about the toughest fruit to grow organically. They make a marvellous flagship for the organic movement because success with apples is clear proof that anything can be grown organically [and] commercially...Apples are important. They provide leadership for the rest of the growing industry. (J. Clearwater, cited by Hadyn 1997:17 in Coombes and Campbell 1998: 22-23).

Indeed, it would seem that not only are apples notoriously difficult to produce organically, but the global demand for organic apples in 1998 was higher than demand of any other organic produce! Thus, organic apples took on a symbolic status as the almost unattainable holy-grail of produce that — if a grower succeeded — promised high export prices (Coombes and Campbell, 1998: 23-27; *cf.* TO, Aug 1997: 3).

By the year 2000, organics was a buzz word of the pipfruit industry and organic production was mentioned more in *The Orchardist* during 2000 than in previous years (TO, March 2000: 46-47; April 2000: 12; June 2000: 12). This was a trend which continued into 2001, with organic pipfruit the focus of various articles (see for example TO, March 2001: 20; April 2001: 54; June 2001: 25). This seemingly endless representation of organics in literature was mirrored by the actual growth of the pipfruit organics industry. In 2001 there were approximately 60 certified organic apple orchards in Hawke's Bay alone (GT, Sept. 2001: 2) and by October 2003 it was estimated that almost 10% of New Zealand's pipfruit growers were either organic or in transition either to organics or IFP (Walker, 2003b). In short, organic fruit production remains a popular production strategy for pipfruit growers in New Zealand because of the higher prices currently attainable in both local and export markets.

Food for thought: discourse and history

Returning to the discussion with which this chapter started, it is apparent that food regimes both form, and are informed by, New Zealand's pipfruit industry. While this chapter has done little to address the power relations stretched across *space*, it has said something of the intricate power dynamics at play between growers, and the institutions that would represent and manage them in New Zealand (*cf.* Phillips, 1995; see also Burch et. al. 1996). Furthermore, when stretched across *time* some of the internal food regime issues illustrate a move towards a more sustainable and *greener* future for New Zealand's pipfruit industry.

We can see that discourse concerning free trade and deregulation of the NZAPMB led to an irreversible change in the way New Zealand's export pipfruit is managed and represented abroad. This change was one of many neo-liberal changes taking effect in New Zealand's economy during the 1990s. Not only this, but the deregulation signals a delicate relationship that binds single growers to global networks. This relationship between growers and global networks is further evident in the reduction of chemical use through IPM and IFP strategies.

The history of the pipfruit industry, as presented in this chapter, indicates discursive features of the industry that have been actively negotiated by individual growers and grower networks facilitated by both the NZFF and Fruited supplies. The symbolic forms that have featured in this account of New Zealand's pipfruit history begin with an early history account. The early history provides a platform for comparison; it sets the stage for pesticide use and illustrates the role that pesticides played in the early years. This becomes important as a point of comparison with greening strategies that began to

emerge in the 1960s because the amounts and types of pesticides used in the early years provided a reference point for our current gauging of pesticide use. That is to say that pesticide use is not considered heavy until lowered pesticide-use strategies demonstrate successful control of pests. During the early years of New Zealand's pipfruit industry pesticide use was presumably considered necessary, rather than heavy. The rise in health-related research in conjunction with greening strategies illuminated just how excessive the traditional spray programmes had been in terms of pesticide use. Here we can see that discourse concerning pesticide use changes over time and takes on a discursive role through manifested symbolic forms such as Carson's *Silent Spring*.

Social and political highlights of the pipfruit industry's recent history further signalled discursive structures such as risk and blame; structures that influenced pesticide use and the ways in which pesticide use was discussed. Risk was most significantly located in discussion concerning growers transferring to the IFP programme, though it also surfaced in connection with quality control issues and economics. Uncontrollable forces such as heavy hail were blamed for poor quality yields in conjunction with semi-controllable forces; in particular, grower knowledge and application of the IFP programme. The emergence of new software and internet sites provided virtual locations for pesticide discourse to circulate in and for growers to consult with IFP specialists. During this time the IFP programme was presented in literature as a positive, successful greening strategy that provided growers with a means to significantly reduce their pesticide use (TO, April, 1997: 39). The focus of IFP discourse during its introduction in 1997 was greening of the environment and catering for "an increasingly environmentally sensitive public in New Zealand" (TO, July 1997: 6).

The latter half of the 1990s saw virtually constant neo-liberal discussion of free-trade and the role of the NZAPMB. Free-trade and deregulation of the export market arose as a predominant theme in pipfruit industry discourse, during which time individual grower narratives concerning growers' experiences with the NZAPMB began to surface in magazine literature and internet forums. In brief, the dominant discourses circulating in print media that have surfaced in this historical account of the pipfruit industry are those concerning pesticide use, more 'sustainable' greening processes, connected political issues such as deregulation of the NZAPMB, and the rise in greening strategies such as organics, IPM and IFP.

What is interesting about this particular chapter is that the chapter itself not only draws together various pipfruit discourses, but it is also a creative force on such discourses since its very existence adds to the body of print media this thesis seeks to analyze. By its nature, this history chapter is a manifestation of pipfruit industry discourse. It demonstrates many dominant discourses and by doing so creates a particular narrative of what I understand the key themes and occurrences of general pipfruit industry discourse to be.

Methodology

This thesis is part of a long term FRST project with several objectives, including the analysis of sustainable environmental pipfruit growing practices in New Zealand. The primary task objective for this thesis is to analyze the socio-political context of pesticide use in horticulture over the past ten years by analyzing appropriate print and electronic material. While other members of the FRST team have been assigned interview and qualitative assessment methodologies, my job has been limited to the analysis of print and electronic data. In order to further narrow the field of analysis, this research was limited to the pipfruit industry and involved analysis of two key sources; an agricultural journal entitled *The Orchardist*; and a country lifestyle magazine entitled *Growing Today*. Other literature sources that were consulted and analysed throughout the research include published science reports, academic literature and M.A. Theses. The internet was also identified as an appropriate source of electronic information concerning the socio-political context of pesticide use in the pipfruit industry, and as such several web sites and a popular internet forum were consulted. The research was further restricted to public data – information readily available to the public – in order to avoid ‘industry sensitive’ information accidentally surfacing. Data was collected in 2004.

Fieldwork and sources

The traditional qualitative research tool utilized by anthropologists is that of fieldwork (ethnography and participant observation). However, I spent most of my time in the office perusing literature. Thus, literature became the field site, with words and photographs as my primary informants. In order to also fulfil the requirements of a Master of Arts in Anthropology, this thesis explores both content and discourse analysis of the written material with attention to current anthropological and sociological risk and discourse theory.

Consulting with orchardists in the North Canterbury region resulted in the identification of eight magazines and journals that are both widely read by orchardists and relevant to the pipfruit industry. These include the *Journal of Agriculture*, *Organic NZ*, *BeeKeepers*, *Growing Today*, *North and South*, *The Organic Gardener*, *The Orchardist*, and *Grower*.¹⁶ From these I selected the source that consistently contains the most information specific to the pipfruit industry; *The Orchardist*. *Growing Today* was also selected as a tool for comparison on the grounds of its wide readership and general agricultural and horticultural content. Secondary sources include other magazine and news letter articles that are related to the pipfruit industry.

One issue concerning the restriction of sources to the public domain arose primarily through my need to clarify information by conversing with professionals. Three key informants were consulted in their professional capacities in order to clarify some issues that surfaced in the public documents. It is my contention that as the informants were discussing their

¹⁶ *Grower* magazine was formerly entitled *The Grower* and before that was entitled *Commercial Grower*.

profession and their understanding of the pipfruit industry, they too can be interpreted as public sources of data—since other members of the public can also contact and consult with them. The informants were Jim Walker of HortResearch; Hans Kuiper, editor of *The Orchardist*; and Mike Jowsey, a pip and stonefruit orchardist in North Canterbury who happens to also be my father. These three informants were especially helpful in the context of the research parameters (given that without the informants this research would be practically devoid of any traditional anthropological fieldwork component) and they were also indispensable in terms of clarifying public data and pipfruit industry dynamics.

Other sources consulted

- I attended the *New Zealand horticultural conference week* in August (10-13th), 2004; held at the Christchurch Convention Centre.
- I also attended the NZFF Technical Update Discussion, held in Christchurch on the 17th of August, 2004. Meeting with Jim Walker at the HortResearch station in Lincoln, Canterbury (2005). Discussion of general ENZA-IFP strategies and issues.

Data analysis of *Growing Today* and *The Orchardist*

Growing Today and *The Orchardist* were first analysed in terms of content and then in terms of discourse. Content analysis methodology is described in the following section entitled Content analysis, and discourse analysis is described in detail in chapters four and five. As *The Orchardist* was identified as the primary source it was analysed in more sophisticated detail than *Growing Today*.

Magazine and Journals: sources of specialized knowledge

Magazines can be an influential source of information for growers, who may be consciously or unconsciously guided by the material contained within magazines in their daily orcharding practices. After several months of wading through magazines, I realized one day the extent to which information had seeped into my mind when my father showed me an apricot he was displeased with. "Look at that" he said, "I don't even know what that is, but its spreading like wild fire through my orchard!" Upon a brief glance at the culprit in question, I was able to inform him of the infection and the chemicals he would need to combat it. Needless to say, we were both shocked.

This is interesting for two reasons; first of all, the magazine analysis is the only part of my research where I could have picked up such information because none of the reports I had previously read concerned stonefruit at all. Second, while reading the magazines I was focused on pip fruit, not stonefruit. Yet the information managed to filter through, regardless. I had very specific questions in my mind when reading the magazines and none of them concerned apricots. So although the following information will not include lengthy quotations from grower interviews about the importance of magazines as sources of valuable information that can influence readers' decision-making processes and actions, perhaps my own account of realisation will suffice. In explaining the importance of rural print-media in research, Lockie (2001: 143) cites van Dijk (1993) in the assertion that definitions of preferred meanings are not only located within rural print-media, but are also given power and validated by it. Indeed, I am inclined to agree with both van Dijk and Lockie in the assertion that rural print media

(such as *Growing Today* and *The Orchardist*) hold some of the keys to unlocking industry-specific discourses.

Technology transfer

While extension and technology transfer models are not a focal point of analysis in this thesis, they do serve to locate the methodology in terms of the importance of communication – and more importantly – communication of specialised knowledge and technology through written or printed mediums. Extension and technology transfer models have been discussed in detail by Wearing (1988) and Stiefel (1999), who use technology transfer models as tools for understanding processes at play in the adoption of greening strategies (specifically IPM and IFP). In the New Zealand context such models often form the basis of strategies involving the introduction of new research and technologies. According to Roling (1988: 39, cited in Morris *et al.* 1995: 3), one of the key characteristics of an extension model is its use of communication as the “instrument to induce [intentional or ‘targeted’] change”. It naturally follows that analysis of such communicative strategies and/or media may serve as a catalyst in the perfection of such strategies. Certainly it is my contention that such understanding further validates the research parameters and objectives of this particular research project.

In her discussion of technology transfer, Stiefel’s most relevant observations in relation to this project include educational factors (1999: 24-43; 88ff.). “...Ridgley and Brush (1992)” writes Stiefel, “found that higher levels of education generally led to higher levels of adoption (Rogers 1983), and growers that have contact with extension workers and information have a higher rate of adoption” (1999: 43). This information is dispersed through a

variety of mediums and while growers' meeting with each other and with specialists is identified by growers as the most effective means of information dispersal, written media is also identified as effective (Stiefel, 1999). Much of the recent literature concerning technology transfer methods and effectiveness in agriculture has focused on human interaction factors, technical and organisational factors, and environmental and political factors (Stiefel, 1999; Miller, 2000; Wiltshire, 2003). This project fills a gap in such literature by way of focusing on recent literature itself; on the kinds of discourses (specialised knowledge) circulating in public data during and after IPM and IFP adoption.

Reports concerning the pipfruit industry and the adoption of IPM and IFP have tended to focus on technology transfer adoption models. The reason for mentioning such models here is to acknowledge their influence in pipfruit industry literature, and to locate common discourses concerning factors that influence growers' adoption of new technology. The "Diffusion of Innovation" (extension) model "assumes that scientists are the creators of a technology and the receivers are farmers [or growers]. Linking the two are extension agents" otherwise known as advisors or specialists (Stiefel, 1999: 24; see also Roling, 1988). While this model has been heavily critiqued over the past thirty-odd years it continues to be widely used (Stiefel, 1999: 24-27). In the case of IFP adoption, much of the programme was created by scientists. However, the success of the programme was also heavily influenced by grower feedback in the refinement of the programme (Stiefel, 1999; Walker, 2003b, 2005a, 2005b). It is for this reason that either the Participatory Action Research or the Farming Systems Research (FSR) model is more appropriate to apply to the IFP programme (see Stiefel, 1999: 27-29; Paine, 1997: 35; Roling and Fliers, 1994). Growers were able to give feedback on the programme at meetings, through their grower diaries, and even in journal articles written by or about growers adopting the IFP programme. However, the literature does

not fully explore the impact or even potential impact of media (including written media) in grower adoption practices. Nor does this thesis address in full such impacts because to do so would presumably involve interviewing growers about their perception of the role of media. Be that as it may, the parameters of this project did not cater for such interviews and it is on the basis of written media and literature alone that this thesis attempts to answer the question of what kinds of information or 'specialised knowledge' is travelling between growers and scientists in public data.

Fortunately, we can draw on the Agricultural Knowledge Systems (AKS) theory as discussed by Roling and Flier (1994) and Paine (1997), in order to further ground the methodology employed in this project. Paine uses AKS:

“...to refer to the concept that specifies a social domain of knowledge construction and use for the benefit of those actors that interact in that domain. The systemic behavior of an AKS can be represented as a dynamic system of actors that interact to construct knowledge. In addition to the definition above, there must be added an appreciation of the continuously changing status of knowledge systems, both in relation to the construction of knowledge, and in relation to extent of actor interaction (1997: 37).

Furthermore, the 'dynamic system of actors' constructing and changing knowledge systems can be represented in literature, or indeed, any form of discourse. Drawing on the works of Engel (1995), Paine writes that “the AKS perspective is described as a diagnostic frame to explore the way organisations interact to generate and use knowledge” (1997: 38). In our case the organisations may be HortResearch, NZFF (and by extension *The Orchardist*, and all the growers who are members of that organisation), Pipfruit NZ, or broader research institutions such as universities.

Hierarchies of resort

When a grower seeks information concerning his or her orchard practices his hierarchy of resort may be similar to the one in Figure 3 (see also Wiltshire, 2003 and Walker, 2005b). Identified sources of information that assist technology transfer include: the IFP pipfruit grower manual, wall charts, IFP Field notebook, pocket sized identification guide, grower diaries, group meetings between growers and scientists or specialists/advisors, technical spray meetings, industry conferences, field days and conventions, possibly chemical labels, any and possibly all written/printed media; especially industry-specific journals such as *The Orchardist*, horticultural reports, and so forth. Many of these sources have been thoroughly analysed in other industry literature (many of which are included in the reference list of this thesis). To the best of my knowledge *The Orchardist* has not been analysed in these terms and many of the analysis reports themselves have not been analysed before now.

Figure 3: Hierarchy of resort for pipfruit growers

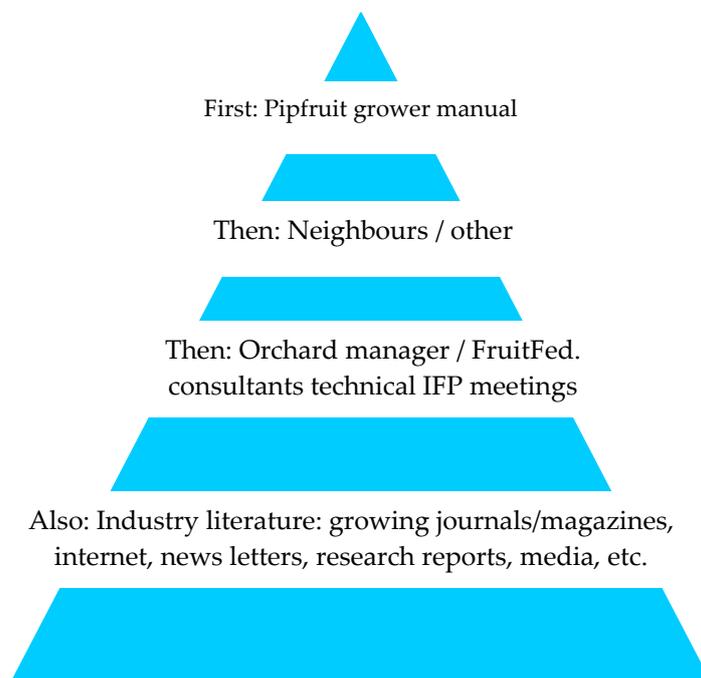


Figure 3 summarises my application of Roling and Flier (1994), Paine (1997) and Stieffel (1999) to the knowledge sources used by growers. Growing journals/magazines may account for some of the sources from which a grower draws knowledge about the pipfruit industry and how to grow and market fruit effectively (see also Stiefel, 1999: 28ff). Indeed, such sources certainly hold a great deal of knowledge required for growers' success, and may even be located higher on a grower's hierarchy of resort (*cf.* Stiefel, 1999: 78-90). Likewise, the information contained within certain magazines can serve to not only inform, but also *confirm* knowledge that the grower picks up from other sources.

New Zealand statistics verify that many, if not all, pip fruit growers subscribe to at least one growing magazine or journal. *Growing Today* magazine, for example, has a readership of 77,000 growers and non-growers (www.isubscribe.co.nz). *The Orchardist* journal also boasts high readership, with all levy-paying New Zealand growers of fresh fruit and vegetables (FFV) receiving issues. Other magazines/journals that pipfruit growers may consult include *Organic NZ*, *New Zealand Farmer*, *Grower*, and to a lesser extent; *Cuisine*, *NZ Gardener*, *the Organic Gardener*, *NZ Home and Garden*. As previously noted, the two sources analysed in the magazine/journal category of this project are *Growing Today* and *The Orchardist*. This decision is based on the frequency of specific pipfruit industry information appearing throughout the sources. *Growing Today*, like most of the possible sources, caters for a broad readership and as such contains less specific information concerning the pipfruit industry than *The Orchardist*. However, information related to the pipfruit industry was found in *Growing Today* more often than in the other candidate sources. Also, given that *Growing Today* has a high readership in comparison to *The Orchardist*, it provides a good contrast to *The Orchardist* in terms of the kinds of discourses and messages circulating throughout the

issues. *The Orchardist* was chosen because it is a widely distributed grower journal specific to the fruit industry, which contains more specific terminology and data concerning the pipfruit industry than other agricultural magazines/journals. Also of note is that *The Orchardist* is a New Zealand journal and while it is also distributed overseas, it is funded by New Zealand NZFF for the purpose of keeping New Zealand's fruit growers up to date with current science, technology, knowledge, growing strategies, political and economic issues, and quality regulations.

Content analysis

The content analysis (in chapter five) follows Weber's method (1990) to make "...valid inferences from text. These inferences are about the sender(s) of the message, the message itself, or the audience of the message" (1990:9). For Weber, content analysis is a data-generating technique that can serve to make qualitative data into quantitative data (in a manner of speaking) because "...culture indicators can be used to assess quantitatively the relationship among economic, social, political, and cultural change" (Weber, 1990: 9). The quantification of terms such as 'sprays', 'quality', 'chemicals', and 'pesticides' may indicate trends at play within the industry and may point towards social, political, and cultural change in the status of pesticides (see the Sprays section in this chapter for more detail).

At first glance it might seem that searching for answers in written data may not be as fruitful as interviewing growers about their perception of discourse and risk. However, I am inclined to agree with Weber's assertion that;

Compared with techniques such as interviews, content analysis usually yields unobtrusive measures in which neither the sender nor the receiver of the message is

aware that it is being analyzed. Hence, there is little danger that the act of measurement itself will act as a force for change that confounds the data [Webb, Campbell, Schwartz, and Sechrist, 1981] (Weber, 1990: 10).

Thus, we might assume that at the very least, the content of the message is not directly influenced by the person analyzing it. However, it should also be reflexively noted at this point that it is entirely possible that I may have ‘confounded the data’ in the following analysis simply through unfamiliarity with coded meanings inherent in the language of the pipfruit industry (this will be revisited in the section entitled Locating Pesticide Issues: content analysis).¹⁷ Also on the note of reflexivity, given that this thesis is both a content and discourse analysis it is also possible that the thesis itself discursively operates as a signifier of knowledge and as such, creates the discourse it seeks to analyze (see chapter four).

The problematic nature of content analysis

Content analysis can be useful as a tool for extrapolating meaning from text by counting the frequency with which words, subjects, and themes appear. Such frequencies can illuminate patterns in the data that are missed through discourse analysis. Similarly, content analysis can serve to validate the conclusions made through discourse analysis and as such it is a valuable analytical method. Content analysis finds patterns in frequencies that can illustrate the changing popularity or importance of a specific body of knowledge. However, like discourse analysis, content analysis is not without shortcomings. If the categories of content analysis are too broad they can lead to conclusions that are inconsistent with the discourse analysis, suggesting

¹⁷ That said, I would also contend that anyone who reads approximately 180 issues of growing magazines in four short months may very well be in a position to crack the code of language that resides within those pages.

themes or words to be more important or relevant than they actually are. For example, in the content analysis of *The Orchardist* one of the categories was 'IFP specific' which included every time the term IFP appeared in each issue. The category did not differentiate between an advertisement that had 'IFP' written in small letters at the bottom of the page and a two-page article concerning IFP. The advertisement and the article were both counted as one when in fact the article placed more emphasis on IFP and explored IFP strategies. The frequency of IFP-specific in 1997 totalled 15 and in 1998 the frequency dropped to six. While it appears that IFP was not as important in 1998, most of the appearances in 1997 were in advertisements, but in 1998 they featured in articles. These kinds of observations could have been made through either a refinement of the categories or through the discourse analysis. In this case, the observation was not made until completion of the content analysis, when it became apparent that another category would have been helpful to clarify the issue (due to the time restrictions of this research such refinements were not possible, but have been discussed in chapter five).

Weber notes that:

The central problems of content analysis originate mainly in the data-reduction process by which the many words of texts are classified into much fewer content categories. One set of problems concerns the consistency or reliability of text classification. In content analysis, reliability problems usually grow out of the ambiguity of word meanings, category definitions, or other coding rules (1990: 15).

As the IFP-specific example illustrates, ambiguity can lead to analytical problems. Moreover, Weber's observation raises the added issue of meaning and interpretation. Text is used to describe meaning but because words can have more than one meaning, sometimes the intended meaning of a message can be missed. To avoid confusion, words within the text that are considered by the author as more important or influential than others, are often

expanded upon to illustrate more precise meaning or emphasis that the author is trying to convey. Moreover, text – like any form of communication – is subject to interpretation and often misinterpretation by the reader, who draws on his or her own sets of knowledge in deriving meaning from the text. Thus, an intersubjective relationship between the author and the reader is established through meanings accented and derived from the text.

We may wonder whether written text is less subject to misinterpretation than spoken text. For while the author may spend more time reflexively thinking about what they intend to write, it is also true that spoken text is intersubjectively subject to clarification of meaning by both the sender and the receiver of the message (*cf.* Jackson 1998). Even in interviews, when the researcher has the opportunity to clarify meanings intended by the informant, such clarifications do not always occur. As such, there is always room for interpretive assumptions to lead to error in the translation of meaning when the researcher comes to write up their analysis.

Sprays

The example from the magazine literature that follows may illustrate these issues of interpretation. Pesticides are seldom referred to as such in the *Growing Today* magazine; rather they tend to fall under a general rubric of 'sprays'. The sprays are not specified by their product name and no further explanation is given. This would suggest that when the term 'spray' appears in an article the writer assumes that most readers will know which sprays the writer is referring to. The added assumption here would seem to be either that readers who do not know which sprays are being indicated do not actually use the sprays in question and therefore, they do not need the specific spray information; or, if they do use sprays, they can obtain more specific

information about the sprays elsewhere (see for example GT, May 2003: 45-48; GT, June 2003: 29-30).

The advertisements that appear throughout the magazine often comprise lists of products that are labelled under the generic term 'spray' and less frequently labelled as 'pesticides', 'chemicals', miticides or 'herbicides', for example. Drawing on Foucault's discussion of enunciation, it becomes apparent that even though the advertisements are from private companies, they participate in the enunciation of sprays and draw on a common terminology with the articles (see Foucault, 2003: 162). The term 'spray' has contextually based meanings and applications that change in accordance with the surrounding text. The title of a Somerfields advertisement in 2003, for example, is "Somerfields spray free nursery" (GT, 2003: 51), which clearly refers to the generic category of chemicals rather than the verb meaning and this is made clear through the words surrounding 'spray'. Advertisements for pesticides or sprays are, however, uncommon in *Growing Today* in comparison with *The Orchardist*, and most frequently appear in an 'organic spray' context (GT, March, 2000: 47; cf. GT, December 1996: 50).

Such generic terms as spray always rely on a given level of assumed knowledge by the receivers of the message. While this may be warranted, the assumption can lead to misunderstanding of meaning by actors without the level of knowledge commonly held by other actors in the narrative. The *insider* knows that 'sprays' refers to fungicides (or even a specific fungicide), but the *outsider* may interpret the narrative to concern pesticides because they simply do not recognize the indicators that clarify the meaning of the term.

Furthermore, in the case of *sprays* the receiver of the message may be further hindered in their interpretation of the message through limited knowledge of

the (temporally bound) social, political and cultural meanings inherent in the choice of words used. I would contend that it is no great coincidence that the term *spray* appears far more frequently than the more specific terminology that could be used. Perhaps this indicates the increasing social taboo towards chemical use that has developed since the 1950s. Perhaps the seemingly excessive use of the term *spray* in replacement of more specific terminology conveys a broad range of meanings and as such it does not draw specific attention to any one chemical product. That is, by referring to the general rubric of chemicals used in horticulture, the term includes a wider scope of actors within the industry, and thus reduces the potential for concentrated criticism to any given sector of the chemical-using (or producing) community. Words such as pesticide, chemical, fumigant, fungicide and poison are replaced with generic *spray*; which in the Reed Dictionary of New Zealand English is defined as “a liquid blown or forced through the air as fine drops” (2001: 1118). Similarly, www.dictionary.com defines *spray* as meaning “a fine jet of liquid discharged from a pressurised container” or “any of numerous commercial products, including paints, cosmetics, and insecticides, that are dispersed from containers in this manner”. There is little mention of the array of chemical products now associated with the term by the pip fruit industry. My orchardist neighbour suggested that the current meanings held in the term *spray* certainly “...indicates an overwhelming euphemistic watering down of terminology that keeps everybody happy” by providing a metaphor that draws attention away from reality. The implication here is that the orchardists from years gone by used chemicals, but now we enlightened folk use (more eco-friendly sounding) sprays.¹⁸ Regardless, it would seem that

¹⁸ See for comparison Katy Miller’s interpretations of the grower and market meanings for fruit *quality*. Like *sprays*, *quality* holds subjective meanings that are subject to quality standards discourse (2000: 8, 42 ff).

with or without the watering down of terminology *spraying* may always spook the public (TO, Aug. 1997: 4; cf. TO, Aug. 1998: 22).

If we consider the dynamic socio-political history of pesticide use in New Zealand, it seems plausible that consideration of the changing and targeted meanings of words used by the industry may lead to a better understanding of the current problems and restrictions facing today's growers. However, to do a word analysis of all literature related to pesticides and the pipfruit industry would be both laborious and only helpful to a certain extent. Here we can see some of the issues that arise within one single word, and we may take this to be indicative of the kinds of issues of interpretation faced by the analyst.

A content analysis of the wider pipfruit discourse may be more appropriate for this particular discussion. Thus, the methodology employed for this content analysis combines both word/acronym counting with thematic/categorical counting. Weber's observations of the flaws in content analysis aside, content analysis in combination with discourse analysis of literature is, I would contend, the most appropriate method of analysis for this specific project. What follows is applied content and discourse analysis of the use of pesticides in New Zealand's pipfruit industry.

Risky Discourse: theoretical food for thought

'From a constructivist perspective, the social sciences can play an important role in agricultural science, not only by understanding and stimulating the collective learning process but also because they themselves help shape human sense making. Social science cannot send a man to the moon (ie.,[sic] excel in instrumental action), but it can greatly influence the way people think about themselves (Roling, 1995: 11 cited in Paine, 1997: 39).

This thesis concerns written information regarding New Zealand's recent use of pesticides in the pipfruit industry, and the ways in which pesticide use has been discussed and located in recent written media. The analytic framework outlined in this chapter will be used to answer the following question: *what does pipfruit industry written information that is available to the public tell us about the current dynamics of pipfruit pesticide discourse?* Most of the relevant data concerns risk in one way or another. For this reason I also address the ubiquity and transcendence of risk in this chapter, because to omit it would be to misrepresent the complexity and intensity of risk-impacts on the industry as a whole, and specifically on pesticide use and discourse. By the end of the chapter I will contend that risk is so ubiquitous that it may be the central episteme that links seemingly all other discourses connected with the pipfruit industry.

This chapter takes a thorough look at risk discourse by addressing some key terms often associated with risk and the pipfruit industry, such as power, neo-liberalism, agency, autonomy, and of course, discourse. A number of social theorists have paved the way for the following discussion, including Foucault

(1980), Douglas (1992), Giddens (1991, 1995), Beck (1992, 1995, 1998), and more recently, Culpitt (1999) and Haukanes (2004). These theorists are of particular interest in this chapter because they have enriched academia with provocative and complex ideas about individuals in society, the salience of power and agency, and shifts in risk discourse throughout modernity. As we shall see, some of these subjects combine to create a useful heuristic for thinking about pesticides and their use in the pipfruit industry. With the heuristic framework in place, analysis of written media will provide some interesting observations about changes both in the pipfruit industry and pesticide discourse.

Risk – what are we talking about?

The early 1990s marked an emerging discourse of risk in society, commented on and theorised by anthropologists. But what were they talking about and why? Where most theorists could meet in agreement on defining risk was that its “essence ...consists of the probability of an adverse event and the magnitude of its consequences” (Rayner, 1992: 93, cited in Culpitt, 1999: 9). Beck takes this definition further in describing risk of adverse events as “physical harm due to given technological or other processes” (Lash and Wynne, 1992: 4). In *Ecological Politics in an Age of Risk* (1995) Beck describes risk as:

“...determinable, calculable uncertainties; industrial modernity itself produced them in the form of foreseen or unforeseen secondary consequences, for which social responsibility is (or is not) taken through regulatory measures. They can be ‘determined’ by technical precautions, probability calculations, etc., but (and this is frequently not taken into account) also by social institutions for attributions, liability and by contingency plans. There is, accordingly, a consensus in international social-scientific literature that one should distinguish here between pre-industrial hazards, not based on technological-economic decisions, and thus externalizable (onto nature, the gods), and industrial risks, products of social choice, which must be weighed

against opportunities and acknowledged, dealt with, or simply foisted on individuals (1995: 77).

Essentially, Beck calls for a distinction between industrial and non-industrial risks, arguing here that individuals cannot be held accountable for risks arising through non-industrial or 'natural' means. Giddens also draws on this distinction by shifting the focus to social discursivity, through referring to risk as 'manufactured uncertainty'. That is, he contends that people are no more at risk of life-threatening danger today than they were in the past, but through the politicisation and individualisation of risk in late modernity, (through what Beck refers to as industrialisation), risk changes and shifts between society and the individual (Giddens, 1991; see also Douglas, 1992). In contrast to Giddens, Beck argues that risk has not just changed or shifted, but has actually increased.

Douglas defines contemporary risk as 'forensic' (1992: 27, cited in Culpitt, 1999: 10) meaning that "... (in respect to a universal risk) someone must be held to account – that blame be laid and protection from future risk obtained" (Culpitt, 1999: 10). After exploring the definitions posed by Giddens and Douglas, Culpitt describes the nature of risk in the following way:

The nature of risk involves the possibility of random fate, whether individual or social, shrouded in the intellectual and political dilemmas of endless rationalisation about cause and responsibility. The language of risk, however, is also full of interesting paradoxes. Risk is about individual fears and social rights. Risk is something chosen and something imposed. Risk is manageable and can be insured against or, alternatively, is overwhelming and uncontrollable. Risk is about ensuring survival and avoiding contamination. Risk assessment involves the protection of assets and the maximisation of profit in complex market exchanges (Culpitt, 1999: 10).

Culpitt's description almost seems to balance the different definitions of Beck and Giddens by taking the meaning of risk past survival to the avoidance of contamination. Also, like Beck, Culpitt acknowledges the complex

relationship between risk and economy, which I would contend is central to risk discourse and theorisation, and also central to daily lived experience of individuals within society. I also see merit in Beck's distinction between non-industrial and industrial forms of risk, and Giddens' observation of shifts in risk between the individual and society.

Drawing on the works of Beck, Haukanes (2004) adds further insight to the dynamics of risk by addressing virtuality and 'real' aspects of risk:

According to Ulrich Beck (1999: 135) risks do not refer to damages incurred. Risk is a peculiar state between security and destruction, a period when the worst can happen but has not yet occurred. To understand the social materialization of risks, their *becoming real* for people, we have to think of them in terms of a *virtual reality* which is itself defined by the way that risks are mediated in science, politics or popular culture. This process of 'virtualization' is particularly important in cases such as the BSE situation [or in this case, pesticide use], where the risk is invisible and cannot be detected by the sensory apparatus of humans (2004: 101).

This final point concerning invisible risks is particularly useful for thinking with in terms of the consumption end of the pipfruit industry, where consumers are unable to discern between non-labelled sprayed and unsprayed produce, and who are generally not in contact with people directly suffering from pesticide-related health problems (*cf.* Haukanes, 2004: 101ff.).¹⁹

Risk categories: mundane, universal, private, and social

Risk, like change, is constant. Throughout the ages all living beings have figured out that there are certain risks associated with most, if not all, their activities and actions. In human history even thinking has often been

¹⁹ Haukanes' insights are also useful as heuristics for analyzing invisible risk negotiated by consumers and how their decision-making processes regarding risk management are informed by the media and by widely circulating discourse concerning greening strategies. I suggest that further qualitative research may be useful for determining how pipfruit consumption trends are affected by media representation and public literature concerning pesticide influences on human health and the environment.

considered dangerous and risky! We learn to accept that certain risks cannot be avoided and that focusing on risk too much can be crippling. Most of the time, however, we weigh up the odds and attempt to guess the probability of an adverse event occurring. This guessing game is always based on knowledge and whether our knowledge is basic or complex does not affect the potential risk but can affect our perception of it. Indeed, sometimes it seems that the more we know, the more risky everything seems! Social institutions have been formed in order to manage risk and danger or guard against them, such as hospitals, police and law, insurance companies, and so forth (see Culpitt 1999: 58-59). There are so many mechanisms for managing risk in the 21st century that most of the time we hardly notice them at all. Traffic lights, for example, are one of the mechanisms we have created to reduce the risk of automobile accidents, and since the risk in this example is associated with everyday industrialised life, I refer to it as 'mundane risk'. Mundane risk is the kind of risk that most people are aware of to some degree, but that is so commonplace to them that they barely notice it. Mundane risk is primarily 'industrialised' or 'manufactured' (to use the terms employed by Beck and Giddens). Here I draw a distinction between mundane risk and universal risk. Universal risk includes risks associated with natural events that are essentially uncontrollable, such as hurricanes, meteor showers, shark attacks, and so forth.²⁰

Furthermore, in much of the literature about risk one finds a distinction between private and social risk, which I too find useful for thinking about risk. Private risk usually refers to risk that primarily impacts on an individual or is discussed in relation to individuals, whereas social risk has a generalised

²⁰ Although Culpitt does use the term 'universal risk' he does not explain the specific meaning of the term. While this term may be explained elsewhere I am unaware of it, as such the description here is of my own creation.

impact on society. Shifts between private and social risk can be seen in *The Orchardist* and in other pipfruit industry related literature. These shifts are identifiable in issues such as spray drift, non-organic fruit being mis-labelled as organic and new insects being introduced into the country. Each of these examples involves risk to the individual and to society and/or the environment. In such cases however, boundaries between private and social risk often blur. Similarly, it becomes clear that the use of pesticides by orchardists can be risky for their individual health, but when the sprayed fruit reaches supermarket shelves that individual risk multiplies through consumers who are largely unaware of exactly what risks (if any) they subject themselves to through consumption of the sprayed fruit (*cf.* Halkier, 2004: 21ff). Again, knowledge is one element that contributes to social management of risk. Informing consumers of the risks concerning consumption (through what Foucault calls 'true utterances' - statements historically located as factual), can lead to dramatic impacts on economic returns for the industry and individual producers (see McHoul and Grace, 1993).

Risk and danger

Risk points to 'the possibility that an undesirable state of reality may occur' (Renn, 1992: 56). Thus risk represents something threatening; something that those who feel at risk must handle. In order to understand risk and risk handling, sociologists have made a distinction between risk and danger. Risk refers to people's intentional and systematic ways of dealing with threats and insecurities, whereas people are exposed to danger irrespective of their own choices. Risks are taken, whereas dangers happen to you (Beck 1992: 21 cited in Halkier, 2004: 23).

In Beck's description of the sociological difference between risk and danger he signals a common blurring of the two as catalysts for such distinction. However, can risks exist that cannot necessarily be 'taken' but occur outside

and beyond human control, or are these dangers? Mary Douglas has this to say about the blurring of risk and danger:

The probability theorists, who developed risk assessment as a purely neutral, objective tool of analysis, must find that it is much transformed as it moves into national and international politics. Though the public seems to be thinking politically in terms of comparative risks, the number-crunching does not matter; the idea of risk is transcribed simply as unacceptable danger. ...The dangers are real enough, and terrifying too. Furthermore, action taken to avoid one provokes another set of dangers (Douglas, 1992: 39).

Growers encounter risk and danger on a daily basis, and for them, risk is more than a discourse or a political subject of analysis; it is a threat to their very livelihood. Douglas asserts that action to avoid one set of dangers often provokes another and this is perhaps nowhere more evident than in the pipfruit industry. The export pipfruit grower struggles to balance risk and danger stemming from almost every facet of their business, usually in connection with either economy or the environment.

Culpitt: the ubiquity of risk and neo-liberalism

The apparent ubiquity of risk, according to Beck (1992) and Culpitt (1999), can be understood as the result of a general “shift from ignorance to knowledge” (Culpitt, 1999: 4). According to Beck and Culpitt, the more we know about something the more ubiquitous risk appears and in this regard we may contend that, indeed, ignorance can be bliss. Take for example knowledge about pesticides. If all one knows is that a certain chemical can eliminate certain pests from an orchard then one may use it for that purpose. If, however, we discover the carcinogenic properties of that chemical, or find that the chemical also kills beneficial insects, or that concentrations of the chemical have unforeseen implications for the environment or society, then

risk associated with the use of that chemical appears to have increased. Suddenly the risk of not controlling the pests is coupled with the risk associated with use of known control methods. While risk can be manipulated it cannot always be eliminated. Drawing on Beck's treatise (1992), Culpitt explains that risk is no longer related to fear or ignorance of the unknown, but that it now encompasses fear of knowledge of "what we have created" (1999: 4).

While Culpitt's focus pertains to the impact of neo-liberalism on the welfare state, he raises some provocative concerns and observations about the ubiquity of risk, security, and power, which are salient for thinking about pesticide use within the pipfruit industry. During the 1980s neo-liberal changes in social policy shifted social security and risk concerning economics from institutions to individuals with the intention of giving individuals more power over trade commodities – such as pipfruit. Drawing on Gordon (1991), Culpitt writes:

Security for neo-liberalism is, therefore, only an individual, an autonomous, private 'security', gained by self responsibility through the market: which, by definition, is part of the hazard of ever changing dynamism of the world. Security for neo-liberalism is *from* the world not *within* the world. It is this that informs the rhetoric. How can we be secure or elude the risks that are seen to be unavoidable and which generate the need to protect the self? Within neo-liberal thought the moral duty to care [in this case for the environment] is understood as a 'duty of man in society, rather than as a duty of society' (Gordon, 1991: 23) cited in (Culpitt, 1999: 58).

In his discussion of risk and social policy Culpitt draws on Foucault's discussions of power, knowledge, and the productions of so-called 'truth' (1999: 33-35). According to Culpitt, risk has shifted from the welfare state to the individual through neo-liberalism. While I agree that neo-liberalism has greatly impacted the location and 'ownership' of risk, I also see this location and ownership as being constantly subject to renegotiation and change.

Indeed, Foucault and Culpitt contend that change is a constant inevitability (Culpitt, 1999: 15), and as such, I would add that it continues to effectively shift risk. While present neo-liberalism tends to locate risk with individuals it is presumably 'true' that at some stage, and in some contexts, risk is located in connection with institutions such as the welfare state/government. These issues will be returned to in the conclusion of the thesis.

The chapter began with an introduction to some broad perspectives on risk, some ways in which risk relates to power, agency, individuals and society, change, neo-liberalism, and economics. The past ten years has seen an explosion of risk theory in social science and it should be noted that this chapter has merely introduced some of the leading theorists of the 1990s. Discussion of neoliberalism and risk provides an interesting tool for interpreting some of the politics of risk at play within the pipfruit industry during its period of deregulation. As pesticides and their use are the focus of this project the next section serves to focus on how some of these ideas about risk have been picked up by people researching and explaining the pipfruit industry and pesticide use.

Foucauldian discourse

In order to 'say something new' about the industry the following section of this chapter explores discourse – to be related to pipfruit pesticide discourse in chapter six – in order to determine its role in the introduction of new pest control strategies such as IPM and ENZA-IFP. In general, discourse would be understood as salient ways of thinking about and discussing a given idea, topic or artefact. The following exploration is concerned however, with Foucauldian discourse as it arose during the 1960s. Foucault theorised on discourse, not so

much in terms of meaning and what could be inferred, but in terms of actual statements and linguistic collections of discursive facts or 'truths' that both represented and created identities and boundaries of knowledge.

The past twenty years have produced a proliferation of academic discourse theory based on the works of Foucault. Indeed, like risk theory, it seems that the wealth of discourse theory leaves little room for anything new to be said. Fortunately, there is little pre-existing literature concerning Foucauldian discourse *and* the pipfruit industry; and none that I am aware of which concerns the combination of Foucauldian discourse, the pipfruit industry, and risk. In exploring discourse I draw on the works of Rapport (1997) and Jackson (1998), whose insights on agency, story telling and intersubjectivity serve to illustrate one way in which discourse theory is relevant to greening strategies within New Zealand's pipfruit industry (although their works do not explicitly relate to the pipfruit industry). Before getting ahead of ourselves, let us first begin with Foucault's insights into discourse.

Definitions: discourse, Foucauldian discourse, knowledge and epistemes.

Foucault does not provide a concise definition of what discourse means. Given that Foucauldian discourse is complex and that Foucault was a complicated fellow, I turn instead to Stuart Hall (2001) who has translated and simmered down the genius of Foucault into succinct description. According to Hall, Foucauldian discourse is:

...a group of statements which provide a language for talking about – a way of representing the knowledge about – a particular topic at a particular historical moment... Discourse is about the production of knowledge through language. But... since all social practices entail meaning, and meanings shape and influence what we do

– our conduct – all practices have a discursive aspect (Hall, 1992: 291 cited in Hall, 2001: 72; cf. McHoul and Grace, 1993: 44).

To Foucault, discourse has an actively transformative effect on objects of knowledge through allowing the identity of such objects to be subjectively appropriated and altered by participants in the discourse. It is the transformative or dynamic capacities of discourse that makes his theory useful. Elizabeth (2000: 91) writes: “Discourses are made up of chains of discursive elements, or signifiers. And it is these signifiers that we utilize when we link together formerly disparate discursive elements to create new discourses and new subjectivities (Davies, 1991; Hekman, 1991; Valverde 1991).” By Elizabeth’s account the transformative qualities of discursive elements come into effect through the use of them in creation of new discourses and it is this productive aspect I wish to focus on.

According to Foucault, searching for the beginning of discourse or the specialised knowledge on which it is based is an impossible task, since the *essence* of discourse can arise through what is not said as much as through that which is said (2002: 27-29). Finally, Foucault introduced the term ‘episteme’ as a tool for conceptualising the ways in which discourses exist and operate. While Foucault later deemed the term superfluous, I would maintain that it could be useful for conceptualising the ways in which discourses operate. McHoul and Grace write:

And in place of the ‘grand underlying theory’ or ‘spirit’, [Foucault] suggests that the various discourses of a period form an ‘episteme’... The episteme is not a theme which unites the different discourses: rather it is the space they inhabit, which ‘is a space of *dispersion ... an open field of relationships*’ (1978b: 10). Hence instead of imagining a single and essential historical principle acting in a shadowy way ‘behind’ each period (sometimes called the *Weltanschauung*, the *Zeitgeist* or the ‘spirit of the times’), Foucault posits the episteme as a non-unified, multiple and complex field of play” (1993: 45, original italics).

Thus, epistemes are the space in which various discourses are formed and connected. The different trajectories that each discourse takes throughout history cause it to come into contact with the trajectories of other discourses, sometimes simultaneously. In accordance with this theory many discourses can exist along side each other and depending on the trajectory each takes they will impact, even create, other discourses.

Foucault, Rapport, and Jackson on agency and discourse

Making decisions and having the ability to act on those decisions entails agency. Since decision-making processes are based on knowledge (including that gained through print media), this section details some locations of agency in regards to discourse and information concerning the pipfruit industry. While Foucault, Rapport, and Jackson, might seem to hold incompatible viewpoints, the combination of their perspectives does provide some interesting food for thought on the productive nature of discourse and various locations of agency in relation to Foucauldian discourse. Rapport's theory (1997) is useful for thinking with in terms of the stories, narratives, and discourse which growers subjectively engage in their own world-making (1997: 24-25). In a similar vein, Jackson's theory of intersubjectivity (1998) transfers the focal point from the individual's world-making (agency) capacities *ex nihilo* to the interaction between individuals and between individuals and objects. In accordance with Rapport and Jackson's perspectives, we might conclude that Foucauldian discourse influences and is influenced by the actors engaged with it; and thus carries an intersubjectively negotiated discursive or productive characteristic (Rapport, 1997; Jackson, 1998; Hall, 2001; *cf.* Elizabeth, 2000).

While Rapport and Jackson are not primarily concerned with Foucauldian discourse, it is also true that Foucault is not overly concerned with agency, thus we have three seemingly incompatible theorists. However, I would contend that we may combine Foucault's attention to the *power* dynamics of discourse to strengthen the theoretical position of Rapport and Jackson's combined perspectives on agency and world-making. I mention Rapport and Jackson here for the purpose of grounding Foucault in terms of individuals' world-making capabilities through discourse. For agents creatively negotiate discourse and hold the ability to create new discourses through their various modes of communication (though Foucault would argue that individuals do not *have* agency just as they do not *have* power). I would contend that individuals can express agency through the medium of Foucauldian discourse. However, it is also equally plausible that the productive capacities of social discourse impact the world-making capabilities or realisations of the individual.²¹

To return to Foucault's position on power, Foucault argues that power moves through people. If agency includes the power to act on one's own decisions then how can we say a person *has* agency if, according to Foucault, they do not have power? Foucault would argue that people have the ability to choose aspects of discourse in their world-making and that their own experiences influence the ways they contribute to discourse. Although Foucault does not discuss this in terms of agency, I would argue that we can, and that the combination of Foucault's insights with those of Rapport and Jackson serve to bridge the gap between agency and Foucauldian discourse.

²¹ Rapport would disagree with me on this issue, arguing instead that the individual can always maintain their agency through his or her ability to ignore aspects of a narrative (or discourse), a process Rapport refers to as 'ontic dumping' (1997:14).

For the purpose of this project I draw on the works of Rapport (1997) and Halkier (2004) in situating the most salient characteristics of agency. In Rapport's location of the individual in society he takes agency to include the creative world-making capacities of autonomous individuals. Halkier by contrast explains agency in the following way:

...the concept of agency separates active and socially directed actions from all other actions. In principle, everything that people in society do every day can create consequences for each other and for overall social dynamics. In this sense we are all actors all of the time. But most of us do not drive in our car to work in order to aggravate the CO₂ problem. Neither do most of us buy conventionally produced fruit in order to support the use of pesticides. Most of our actions have unintended consequences (Giddens, 1984: 27) on an aggregated, and hence political, level. Thus one important element of agency is intentionality... (2004: 27).

Combining these two perspectives, I would describe agency as the combination of autonomy with intentionality and creativity, which enables individuals to engage in political activity and to intentionally cause an effect through their actions.

Lockie (2001) provides interesting insight into the agency of farmers in regards to both risk and advertising, which are also applicable to FFV growers. According to Lockie, social constructions of farmer identity usually focus on their abilities to produce when they could just as easily focus on tendencies to consume. Both farmers and FFV growers consume "...off-farm inputs in the form of chemical, fertilizer and mechanical inputs, technological innovations and advisory services. They consume in order to produce" (2001:141). Furthermore, farmer/grower consumption is influenced by ideologies of the 'good farmer/grower'. Farmers rely on other farmers (who hold similar ideational views) "as their most valued source of information" when making decisions regarding consumption (2001:143). It is these ideologies that advertisers turn to in their attempts to convince farmers/growers to purchase and consume new products.

Drawing on Abercrombie, Lockie (2001) discusses two means by which the agency of consumers (in this case, growers) can influence meanings and discourses concerning commodities. Potential meanings of commodities are altered through the “increasing aestheticisation of everyday life and “the expertise, skills and knowledge of consumers in relation to particular commodities” (2001:142). That is to say a commodity’s utilization and contemporary discourse concerning it can change the meanings attributed to it and its meaning.

Furthermore, these meanings, uses and identity of a given commodity are also affected by the existence, uses, and meanings/identities of other related commodities. To illustrate; many of the pesticides that were used on orchards during the 1970s and 1980s were at the time commonly considered to be the most effective means for pest control. However, the introduction of ‘soft chemicals’ for the IFP programme during the 1990s onwards facilitated a change in the meanings associated with previous chemicals that were consequently termed ‘hard chemicals’ (*cf.* Cowan and Gunby, 1996). Lockie concludes:

Despite the agency that both producers and consumers of these products (*chemicals*) clearly have in the attribution of meaning to them, there does appear to be a degree of homogeneity in the meanings that are, in practice, associated with them (2001: 154; *cf.* Appadurai, 1997; see also the section on *kiwigreen* in chapter one of this thesis).

So even though individuals have agency to shape the meanings of discourses including commodities, such meanings are often the result of conformity. Nevertheless, the fact remains that growers can employ agency through the meanings and significations they attach to commodities in general and to pest control strategies in particular. This is how commodities are discursively produced.

In a similar vein to Lockie, Halkier explores restrictions on agency and discourse in relation to Foucauldian governmentality. "Consumers", Halkier writes, "negotiate different ways of applying a risk-oriented discipline to their food practices. Rationalizing food-consumption practices, for the purpose of limiting risk, can be regarded as part of self-discipline and social control" (2004: 29). So although consumers (both growers and pipfruit consumers) can maintain some agency and autonomy through their risk-oriented self-discipline, their world-making capacities are governed or restricted by social control. In this sense consumer (grower) agency is, I would argue, incomplete or restricted. For as Halkier observes, at the end of the day consumers "are crucially dependent upon what producers supply" (Halkier, 2004: 32). The most transformative impacts consuming agents create tend to be discursively manifested. The micro-local voicing of opinions and experiences by consumers (either growers or FFV consumers) can and often does impact on discourse, cultural norms, and policy. Halkier (2004: 33) summarizes these issues in the following way:

When consumers negotiate food-related risks and negotiate norms relating to food risk and food consumption, using a micro-local voice dynamic of influence, they reproduce, legitimize and reject particular repertoires of thinking about handling food-risks in their own regimes of practices. ...The social order is not inflicted upon consumers; they themselves participate in establishing, reproducing and perhaps challenging this order by drawing upon and contributing to larger discursive repertoires in society (Dean, 1999: 12-13).

A risky discourse: the central framework of pipfruit pesticide use

It has been widely acknowledged that within agriculture risk plays a major part in a grower's daily decision making (Steifel, 1999; Lockie, 2001; Cameron, 2004; Walker, 2005b). Moreover, there are a number of transmitters or objects of knowledge through which the notion of risk arises, such as market quality,

politics, economics or health (Lockie, 2001). Indeed, I would contend that risk is a central episteme that seemingly links all pipfruit pesticide discourses.

The following example of the way risk connects health and economics illustrates some of the dynamics at play within risk discourses such as the pipfruit industry. Growers need to produce fruit to sell at a profit and the most economical way they can get good yields of sellable produce often includes the use of pesticides to combat risk of pest damage. However, they must balance the risk of pest damage with the risk of overspending on pesticides or overuse of pesticides (which results in fruit not meeting MRLs), both of which ultimately result in lower economic returns. Meanwhile, some consumers become aware of a potential risk to their health located in pesticide residues on the food they consume. The discursive element that results from such changes in meaning is ultimately consumption patterns of fruit and social discourse concerning fruit and pesticide use. Once supermarket giants (such as Sainsbury and Tesco) realise that some of their consumers are not purchasing produce because of the perceived risk attached to pesticide residues, they attempt to compensate by negotiating private contracts with growers that demand lowered residues on the produce. These kinds of private contracts are widely available and becoming common practice in Europe and the United Kingdom, thanks to free trade (see Marsden et. al. 2000: 73-84; see also Miller, 2000). Why do supermarkets do this? Because it reduces their risk of lowered profit margins if they can convince the consumer that buying and consuming the fruit they sell is more beneficial for their health than it is risky.²² Thus the health risk perceived by consumers and

²² I acknowledge that this illustration is somewhat simplistic and does not cater for what Nerlich (2004) describes as the consumer's financial ability to include 'hidden' environmental or health risk-related concerns in their consumption practices. Economic considerations are paramount and there are consumers who cannot "afford to count (hidden) costs" such as

supermarkets is transformed into economic risk for growers who must attempt to lower residues while still producing the same amount of pest-free fruit in order to maintain their contracts with the supermarkets.

This brings us back to the saturation of risk as a framework on which other discourses and decision-making processes are built. Such discursivity hinges on what Heller (2004) calls 'riskocentrism', where actors (in this case engaging with pipfruit industry discourses) assume risk is "the exclusive and solely legitimate frame for evaluating technoscience practice generally" (2004: 82; see also 92-93).²³ Similarly, Paine writes:

In agricultural science the framing of problems and roles is usually not explored explicitly – the construction of reality is not questioned, therefore researchers are often not aware of alternative ways to frame problems" (1997: 49).

'Alternative ways to frame problems' are sporadically addressed in pipfruit industry literature and are built on other central discourses such as power, free trade, organics, and the 'clean and green' or 'nature' ideologies, for example (see chapter six). However, due to the seemingly riskocentric nature of all pesticide discourse, pipfruit pesticide risk discourse usually prevails as the central frame for constructing reality. Furthermore, the discursivity of risk is negotiated throughout time, power and space. That is, risk discourse caters for new forms of knowledge, changes in dominant political forces, global relations, even changes in grower networks, and environmental conditions. In

"environmental cost, animal welfare cost and cost to people's health rather than solely the (overt) cost to their purse and wallet. For those who can afford it, shopping habits have changed from being a straightforward act of buying something to eat to being an agonizing conundrum of choices" (2004: 51-52).

²³ While risk may be interpreted as the sole legitimate frame, it does not follow that it is such. McHoul and Grace (1993), and Lockie (2001) illustrate the ways in which other legitimate frameworks can exist without being identified as such; including power, for example. While it is important to acknowledge that such frames can exist without conscious acknowledgement, these tangents are not fully addressed in this thesis.

the former illustration it becomes evident that the consumer will not affect the grower's financial risk concerns until consumer knowledge includes that of health risks associated with the grower's sprayed produce. In this case it becomes clear that knowledge *is* power. However, we should also note that this illustration is simplistic and that at the same time, the consumer's decision making (or world-making) is also influenced by other factors such as the fruit's price, appearance, and quality.

Food for thought: agency, discourse, risk

This chapter has been an adventure in theoretical wonderland, through which I have sought to provide both common and uncommon ways of interpreting some of the key dynamics directing New Zealand's pipfruit industry. I have addressed some of the ways in which we can analyze the New Zealand pipfruit industry in terms of people and practices; agency, identity, and discourse. The purpose of this has been to provide a heuristic means of understanding the specific historical happenings to be discussed in chapters five and six.

The three focal points throughout this chapter have been discourse, agency and risk. When exploring changes in the pipfruit industry it is useful to consider how they have eventuated and who has been pivotal in such changes. While scientists and marketing companies certainly have played their role, it is to the growers and print media to which our attention has turned. I would also like to acknowledge that my research does not claim to address all aspects of any discourse discussed in this thesis. Indeed, it would seem that such a task may not be at all possible. This is because of the complex and ever-changing dynamics of discourse, and because we can never

tally everything that is said about something. By its very nature discourse defies complete accountability and cohesion.

However, the aspects of discourses concerned with the subject matter that have been addressed indicate some of the complex processes at play within New Zealand's pipfruit industry. Furthermore, many of the discourses that have been addressed thus far overlap, which creates an even more complicated picture of the industry. For while it is more manageable to consider each discourse on its own, we must also remember that in 'real life' discourses do not exist as separate sets of knowledge. They are complex, multi-layered, and intangible. In many ways describing the nature of discourse is almost as impossible a task as describing all the factors attributed to a given discourse. Perhaps this is why Foucault has not provided a one-sentence definition!

The intangible nature of discourse aside, I have attempted to methodically deconstruct the discourse of risk throughout this chapter. Risk has been signalled as the most prominent discourse that exists in the pipfruit industry, which influences grower decision-making processes. Culpitt's observation of the ubiquity of risk certainly seems justified in this exploration, where risk relates to every facet of the pipfruit industry. When introducing and implementing a new production strategy concerns about risks/hazards must be addressed at the outset if adoption is to be successful. Furthermore, the new strategy/programme must also cater for other leading discourses and influencing factors such as economics (including neoliberalism, globalisation, and increasing aestheticisation), politics, the environment and environmentalism, ideologies such as 'clean and green' and 'nature', and so forth. Growers manifest agency through juggling discourses in their decision-making processes.

Magazine and Journal Analysis

“When we perform textual analysis on a text, we make an educated guess at some of the most likely interpretations that might be made of that text” (McKee, 2003: 1).

This chapter explores the ways in which discourse operates in the pipfruit industry, through textual analysis of a grower journal and an agriculture magazine. After a brief introduction to the two sources, this chapter explores inferences from text through indicator word analysis of the pipfruit industry in terms of the constantly renegotiated discourses and representations of the industry. The dual focus on both content and discourse serves to illustrate how quantitative and qualitative data can be forged to better understand dynamics at play within processes such as the greening of New Zealand’s pipfruit industry or the strategies to lower risk.

The traditional anthropological tool of fieldwork was not fully utilized in this research project because the project objective was limited to analysis of written literature. Thus, written literature fills the role of ‘informant.’ Since the theoretical framework concerns discourse and risk this chapter serves to illustrate the ways in which discourses are negotiated within the pipfruit industry. What follows is an introduction to the two sources in terms of their readership, thematic content, style of information-presentation, and the kinds of people and industry represented by each source. The introduction is followed by a content analysis of both sources, which quantitatively demonstrates how the sources differ in terms of insecticide discourse. Finally, a discussion of the discursive features of each source will illuminate the ways

each source may be used as a source of decision-impacting information for growers. This last section will effectively illustrate how the magazines differ in their strategies to engage the reader and how history is politically, economically, and socially constructed and represented through the two sources.

Growing Today: the audience

Growing Today began publication in March 1990 and since that time has catered for a wide audience by including a variety of articles (of varying complexity) concerning lifestyle farming. Indeed, when online shopping for magazines, one finds the following description indicative of exactly how wide the audience can be:

Targeted at lifestyle farmers, larger farmers and those dreaming of living in the country, *Growing Today* offers advice on horticulture, agriculture and all aspects of rural living (www.isubscribe.co.nz).

Growing Today is predominantly focused on aspects of lifestyle farming and this often encompasses various aspects of orchard life.²⁴

Each issue of *Growing Today* contains one or more articles concerning general orchard topics such as pruning, choosing planting sites, managing pests, organic composting, and so forth. Also, most issues contain one or more advertisements pertaining to chemical or organic sprays for agricultural pest control (and approximately 100 advertisements that are not related). However, few issues contain IPM or IFP specific information, and even fewer are concerned solely with either IPM or IFP *and* the pipfruit industry. While general pesticide topics do arise in various locations within most issues, it is safe to say that in comparison with *The Orchardist*, *Growing Today* is not particularly engaged with either the pipfruit industry or insecticide issues. Indeed, *Growing Today* is arguably more engaged with organics, life style farming, and general agricultural practices. Since this magazine caters for a

²⁴ In December 2003 *Growing Today* had a readership of 72,000 (a large readership in comparison with *The Orchardist*; but relatively small in comparison with *NZ House and Garden magazine's* 659,000 in 2003) (www.mpa.org.nz).

broad selection of readers it is understandable that specific insecticide issues are not often presented as feature articles.

Pages two to eight of *Growing Today* usually contain small snippets of news, events, and/or letters (although in 2003 this section was limited to letters only). Information concerning the pipfruit industry or insecticides often appears in this first section of the magazine. The relevant information, however, is minimal. The snippets offer such information as statistics on advances in science and technology, global organic apple export prices, and the latest research concerning a particular plant, crop, or insect. It is the scientific and economic information so frequently conveyed in this snippets section that resembles the kind of more technical information found throughout *The Orchardist* (see for example GT, Feb. 2001: 2; GT, May 2001: 2; GT, Sept. 2001: 2). The snippets tend to present minimal information and it seems that their purpose is to target a broad range of people and interests. When statistics are concerned they are presented in a conversational tone, as seen in this extract:

Pines Stop Sprays

Pines and cedars are being touted as buffers around crops to reduce the spread of pesticides sprays. An Ohio State University study has found that evergreen trees can contain two to four times more pesticide drift than broadleaf plants which produce wide, flat leaves (GT, Feb. 2000:2).

As this example illustrates, the statistics lack the scientific tone that is often found in agricultural literature. Vague information such as “An Ohio State University study” and “can contain two to four times” present very general information for a broad readership. However, the reader is not told when the research was conducted or how to find out more on the topic. While this may be frustrating for readers interested in spray drift issues, it is also important to remember that the magazine is geared towards a very broad readership and

that the editors must limit information presented in any given section due to space constraints of the section. Also, the snippets tend to provide enough information to enable readers to research more on the given topic, should they be interested in doing so.

With regards to the letters, they frequently begin with a comment regarding the impact of *Growing Today* magazine on the life of the writer; the magazine is depicted as a diverse and informative source of rural knowledge. This general notion is indicated by such opening sentences as “Congratulations on a great magazine” (GT, Oct. 1998: 8). However, some writers go into more detail:

Dear GT,

Ah, *Growing Today* has arrived in the letterbox, with the next year’s subscription to fill out. My first GT was September 1991. How much we enjoyed that copy. It was read and re-read, and the next month’s, and the month’s after that. There were so many interesting articles eventually we got to the point where we had to have a subscription. *Growing Today* has certainly influenced our lives. We installed hydro power after reading articles about it, got into breeding Dexter cattle, planted many of the wonderful plants that we saw in the magazine and tried many of the great ideas... (GT, April, 2002: 4).

Although the readership may not all experiment with such information, they presumably purchase the magazine with the intention of reading it, and by doing so consume the presented ideas (to varying degrees). Letters such as the one above indicate that some readers appreciate the magazine for ideas it contains, and that some readers even act on information they have consumed through reading the magazine. Not only does the magazine have an active engagement with its readership, but it is also the most relevant general magazine for analysis in this project because it presents ideas related to orcharding more so than the other magazines that growers read (such as *Organic NZ*, *New Zealand Farmer*, *Grower*, or *Organic Gardener*).

Growing Today: within the pages

The articles that are consistently the most relevant to this research project are produced by Ruud Kleinpaste who has written for the journal since its first issue in March 1990. Kleinpaste is a Dutch entomologist who writes articles concerning a wide variety of insects and ways of identifying and managing them. Although much of his advice is not specifically labelled as integrated pest management strategy, it is clear that his methods leave insecticide use as a last alternative when it comes to managing pest populations in either the garden or orchard (see the following Bugman section for more detail). While the Kleinpaste article is a regular feature of each issue, the focus of his articles is any (and seemingly all) insects, not only those found in orchards.

Other subjects frequently broached throughout any given year (by various authors) include composting techniques, bee-keeping, transitioning to lifestyle blocking, and farm animal care – especially concerning cattle. Another frequent topic is genetic modification (GM) of plants and trees (see for example GT, June 1999: 30-37; GT, June 1999: 36; GT, April 2001: 3). As GM can offer several answers to managing insect activity in crops and orchards, the GM debates in *Growing Today* newsletters and articles are also related to insecticide use. In the late 1990s both *Growing Today* and *The Orchardist* included articles concerning GM trees that were resistant to certain pests and diseases. While the scientific break-through in this area caused some concern among the public (GT, Dec. 1998: 3), it also meant lowered fungicide and insecticide use for the resistant varieties (as previously mentioned in chapter two). The implication of this is that insecticide use is not the only method of pest control in orchards, and that IPM strategies are not always specifically labelled as such.

Bugman

Ruud Kleinpaste has a regular monthly spot in the *Growing Today* where he goes by the alias Bugman. And for good reason. Kleinpaste knows his bugs. The name Bugman was originally bestowed upon him in 1987 when he began a weekly talkback show on 1ZB. Kleinpaste describes the meaning of this alias:

...people associate “The Bugman” with a slightly weird scientist, who actually likes insects and tries to stop as many people as he can from hating them and stomping on them and spraying them... (GT, May 2003: 45).

In many of Kleinpaste’s articles he addresses the positive attributes of insects and provides alternatives to insecticide use in the control of unwanted insects.

Bugman articles range in length from two to six pages and they always have at least one glossy colour photograph of insects in their habitat. The photographs are ‘telling’ in several ways; their point of central concern is the insect and so the insect tends to take up most of the photograph with leaves and twigs in the periphery. Without even reading the article, the reader can often quickly guess which insects and plants are linked together by habitat simply by looking at the photographs. If a reader was only interested in reading an article about insects that affect his or her orchard, they could look at the photograph and discern the plant species or insect in question to decide whether the article is likely to be helpful. Likewise, they can also read the blurb present under the ‘regular features’ section of the contents page (present in every issue).

The presence of flora in the photographs is note-worthy because the articles themselves do not always address the plants that are affected by the insects in question. Rather, plants are mentioned in relation to the insects if the occasion

arises within the article where a description of likely habitats is deemed necessary. An illustration of such description is found on Kleinpaste's monarch butterfly article (GT, Jan. 2000: 45) where he mentions the different habitats of monarch caterpillars and where the reader could purchase the plants (GT, Jan. 2000: 51). However, when an insect has several different habitats and is diverse in its dietary needs, Kleinpaste seldom focuses on the flora concerns affiliated with the insect species. Aphids, for example, are diverse consumers and can be found on anything from roses to cherries. In an article concerning aphids Kleinpaste focuses on the anatomy of aphids, predators such as ladybugs and preying mantis, and aphid management methods (GT, Feb. 2000: 51). Although there is little mention of plants, Kleinpaste does provide description of IPM techniques (some of which may be applicable to pipfruit strategies).²⁵

In terms of overall format, the Bugman articles usually begin with a long general introduction to the world of insects before locating the specific species with which the article is chiefly concerned. This is followed with a brief description of either the anatomy of the insect in question or its habitat (or both). A description of the virtues and problems associated with the insect follows. In the problems section, Kleinpaste often describes one or more methods of eradicating or at least controlling the population of the species in question. The Bugman articles are accompanied by small advertisements that are related to pest control. These advertisements range in topics from organic insecticides to alternative fly traps to worm farming (see for example GT, 2000: 52).

²⁵ The discussion of IPM strategies in this article is longer than the IPM discussions found in Bugman articles of most issues, and as such is unusual.

In short, *Growing Today* caters for a wide audience and as such contains a wide array of generalised literature. While insects are discussed in every issue, insects affecting pipfruit are infrequently discussed. Pesticides, IPM and IFP also appear less frequently than in *The Orchardist*, which would indicate that such specific topics are less important concerns for the majority of the magazine's readership. However, given that these topics do arise from time to time, we may also interpret this as indicating that these topics feature in general agricultural or lifestyle-blocking discourse, and as such are not limited to pipfruit industry discourse. The fact that IPM and IFP terminology appears in *Growing Today* illustrates that IPM and IFP in particular, are important discursivities in the wider growing industry.

The Orchardist: the audience

All New Zealand commercial fruit growers who pay the point-of-sale levy are automatically subscribed to *The Orchardist* publication and the subscription is also open to non levy-payers both within and outside New Zealand. In January 2005 the magazine circulated to 3200 levy-paying growers and 530 other subscribers (Kuiper, 2005a). Since the magazine serves five broad groups of growers each issue contains a section specific to each group, pipfruit being one of them.²⁶ The pipfruit section of each issue varies in accordance with the season. In the off-season politics, pruning, the latest gadgets, new technology or scientific break-through, and market forecasts commonly feature in articles. In the peak-season the most frequently

²⁶ Kiwifruit, Pipfruit, Citrus (mandarins, lemons, limes, navel oranges, tangelos), Summerfruit (cherries, apricots, nectarines, peaches, plums), Exotic fruits (avocados is the largest group in terms of numbers and revenue, the other groups are passionfruit, Nashi (Asian) pears, feijoas, tamarillos, persimmons).

addressed topics include politics and market prices, pack out rates, fruit quality, and spraying issues.

On *The Orchardist's* internet advertisement page there are a number of findings listed from a survey conducted in 2001 regarding their rural readership. The survey was conducted by *Colmar Brunton Research* who presented the following statistics:

- 79% of readers are extremely or very satisfied with *The Orchardist* overall.
- 74% agree that *The Orchardist* provides useful information for day-to-day operations.
- 68% of readers read ALL of the issues.
- 54% keep *The Orchardist* for future reference. (www.fruitgrowers.org.nz)

According to this survey, it would seem that *The Orchardist* has a very attentive audience, and that the audience is very pleased with the journal's content.

The Orchardist: within the pages

The magazine always begins with a contents page that includes feature articles, and a comment from the president of NZFF. The president usually comments on general export market processes, industry politics, and the hardships presented by climactic conditions around New Zealand. On the opposite page there is usually important FFV industry news.

As previously noted, the magazine caters for five groups of fruit growers. While articles often appear throughout the magazine on issues that are relevant to more than one fruit sector, most of the articles have particular relevance for one particular fruit sector and thus appear in the fruit specific section of the issue. There are also sections entitled Products and Services,

Research, and News or International News, where the latest break-throughs that concern most or all of the FFV industry are located. Such break-throughs may concern scientific research into chemicals or insects, internet programmes and computer software capabilities, political legislation that impacts on some or all fruit sectors, levies, weather prediction capabilities, and so forth. The Products and Services, Research, and News sections also appear throughout the magazine in the fruit group sections they are primarily concerned with. At the end of the pipfruit section, for example, there may be a Research section concerning pipfruit and ripening technology.

No two pipfruit sections are the same and it seems that there is no clear format or information hierarchy followed in terms of the themes addressed in each section. The range of topics addressed is broad and can include anything from history of the pipfruit industry or people within the industry to fumigant strategies and vapour percentages. The following list of article titles (taken from a single issue of *The Orchardist*) demonstrates the broad nature of the pipfruit section:

- (Industry news) Report on organic growing available
- (Pipfruit) Spray application, pest and disease control issues
- (Pipfruit) Alcohol as a scald inhibitor for apples – worth a closer look
- (Pipfruit) Levy rate lifted
- (Pipfruit) Landmark decision on pipfruit industry co-operation
- (Research) Sweet solution to ripening issue (TO, August: 13-27).

This particular pipfruit section flows into a small (4 page) Research section, followed by an Industry News section; both of which related to pipfruit and the wider FFV industry. This editorial strategy serves to link pipfruit to the wider FFV industry while also setting it apart as an important sector of that

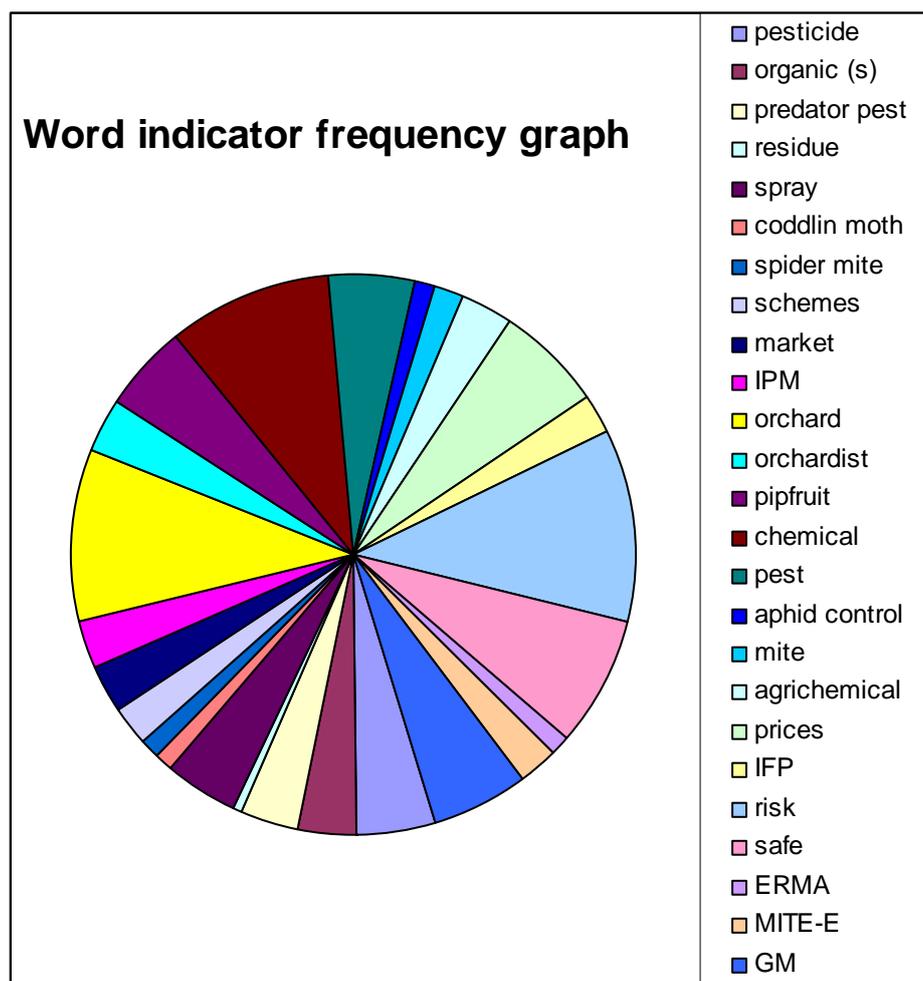
industry. It also signals to readers which information is relevant or important for their specific fruit interests.

Methodology for content analysis (of both *Growing Today* and *The Orchardist*)

After choosing the magazine and journal, I spent two days flicking through some randomly selected issues, compiling a list of word indicators that were key to pipfruit-pesticide discourse, and that also appeared frequently throughout the selected issues.

Two 1998 issues of *Growing Today* were selected at random and analyzed for word indicators. The following pie graph illustrates the frequencies with which the indicator words appeared.

Figure 4: *Growing Today* word frequencies



As figure 4 illustrates, words such as risk, orchard, chemical and safe, appeared most frequently. This may indicate that the senders of the message (the authors of the articles and the magazine’s editor) may consider these four words to represent popular topics that are of interest to their readership. Alternatively, they may be buzz-words that are prevalent in the pipfruit industry, and the frequency with which such words appear could be interpreted as indicative of driving forces of the industry. However, ‘risk’ and ‘safe’ are words that widely circulate in everyday discourse, and as such may be found in any number of magazines and journals, in a vast array of contexts. With this in mind, the frequency with which they appear in *Growing Today* indicates that safety and risk are part of pipfruit industry discourse, but not specific to it. The same can be said of ‘orchard’ and ‘chemical’ because

while orchards and chemicals are commodities associated with the pipfruit industry, they too are not specific to it.

The acronyms 'IFP' and 'IPM' appeared often enough throughout the issues to indicate that the IFP and IPM programme/strategies played important roles in the pipfruit industry, but again, these acronyms did not always appear in direct relation to the pipfruit industry: IPM was often associated with tomatoes and IFP with kiwifruit. Nevertheless, all the words that appear on the graph appear often enough to indicate the types of things with which pipfruit orchardists are concerned. For while we can argue that 'chemicals' are associated with other discourses and industries, we can also see that the frequency with which such words appear in the magazine indicates that chemicals are especially topical within this particular growing discourse.

The word indicator frequency analysis also provides insight in connection with the comparison of related indicator words. For example, 'chemical' appeared 17 times, 'spray' appeared eight times, and 'agrichemical' appeared six times. These three words can be used interchangeably in most circumstances and as such total 31 appearances of essentially the same subject. This means that the subject of chemicals surfaced more often than other subjects throughout the two issues of *Growing Today* and that chemicals are widely associated with a broader growing discourse. Likewise, the categories 'predators of pests', 'MITE-E', 'IPM' and 'IFP' all signal general greening strategies within the pipfruit industry and if we tally their combined frequency (19/182 or 9.579%) it becomes clear that greening strategies were a popular growing discourse during two months in 1998.

While the word indicators are useful for identifying some trends, the word indicator analysis was refined through the analysis of specific themes and

topics because context was deemed necessary for a more accurate analysis of pipfruit industry discourse (see McKee, 2003: 92 ff). The themes and indicator words that made it onto the final list of analysis categories follow.

Growing Today categories of analysis

1. IFP and IPM specific terminology.
2. IFP specific but IPM not specifically mentioned.
3. IPM specified but IFP not mentioned.
4. IPM related but not specifically mentioned (*unlike the first category, this one includes literature that clearly concerns IPM or IFP but the acronyms are simply not mentioned*).
5. Slightly related to IPM (*themes and discussions that did not fit into the other categories but were broadly related to pest management issues*).
6. Organic sprays (*in advertising and/or articles*).
7. Non chemical substitute method(s) of pest control (such as mulching, shelterbelts targeted at reducing pest problems, alternate planting systems, and so forth).
8. Problems with chemicals and/or chemical use (such as spray drift, health issues, cost, availability, disposability, risk, and so forth).
9. Spray residues (*also a contender for the 'problems with chemicals' category, however occurred frequently enough to warrant its own category*).
10. Advertisements: specifically pesticides.
11. Pesticides versus new technology (*such as resistant rootstock products*).
12. Pip fruit arthropods (*insects discussed but their management not discussed*).

The Orchardist categories of analysis

The Orchardist list also included the following categories because it was clear that these categories comprised a large component of the magazine and to omit their frequency analysis would be to misrepresent the general discourse presented by *The Orchardist*.

13. General economics and the global pipfruit market.
14. Pipfruit politics (*often hard to distinguish from the previous category*).
15. Advertisements for chemicals other than pesticides or miticides, such as herbicides, fungicides, fumigants, and nutrients.

This last category serves to illustrate the frequency of pest-targeted advertisements in comparison with other advertisements. In fact, the term pesticide does actually include fungicide. However, for the purpose of this research I have extracted fungicides into a separate category to illustrate more accurately the frequency advertisements concerning pest-targeting chemicals. The only advertisements counted in this research were those concerning the pipfruit industry. Also, nursery advertisements were not counted because their frequency was deemed irrelevant to the parameters of this research.

Locating IPM and IFP discourse

This section details the frequency of which IPM and IFP are mentioned in the magazine and journal, and the contexts in which they occur. There are several locations of IPM discussions that are not specifically described as such. That is, IPM strategies are often evident in general advice sections of articles, even when the focus of the article pertains to common orchard practice (rather than specific pesticide issues, spraying techniques, or pest management, for

example). Furthermore, the term IPM is often absent from both articles and advertisements, despite evidence of IPM philosophy or strategies being present. The same can be said for IFP in a few articles, but for the most part, IFP strategies are labelled as such in both articles and advertisements concerning IFP. In instances where IPM was implied but neither IPM nor IFP were explicated, they were tallied under the fourth category as IPM related but not specific.

Weber reminds us that in content analysis words can be grouped into categories of meaning, whereby words and phrases holding similar connotations are consistently grouped together to indicate shared symbolic content (1990: 12; cf. McKee, 2003: 99-106). While this may prove fruitful in the grouping of spray terminology, it proves somewhat perplexing in the grouping of IPM and IFP terms and meaning because IFP appears to be slowly replacing IPM in terms of symbolic meaning. However, the two growing strategies need to remain as separate groups for the purpose of this content analysis in order to determine the points where meaning blurs between the two strategies. While *Growing Today* consistently depicted the two strategies as different, *The Orchardist* often included both acronyms in discussion of the strategies during the central overlap period in their meaning (1997-1999). This overlap in meaning peaked in 1997, when “IPM and IFP” (category one) appeared in *The Orchardist* five times (four times in August and once in November). Interestingly, this was the same period during massive promotion of the IFP programme in the pipfruit industry. This number dropped off in 2000 and by 2001 the acronym IPM was virtually absent in *The Orchardist*. The few occasions it did appear were in advertisements and even then, usually in conjunction with the acronym IFP. While the frequency of IPM specific terminology appears to double in figure 5, in both accounts IPM

was located in advertisements and as such was on the periphery of the discourse.

Figure 5: *The Orchardist* IPM and IFP specific terminology frequency graph

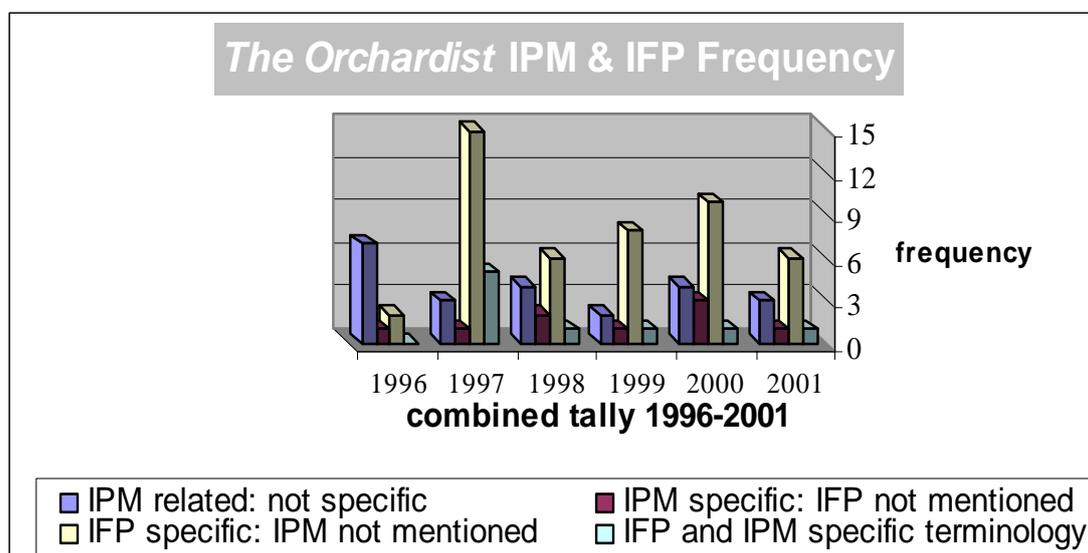


Figure 5 Source: content analysis appendices.

In contrast, 1996 saw IFP and IPM appearing equally as often, however, IFP leaped ahead in appearance frequency during 1997. This was a key year of IFP adoption for many growers. While the number of IFP appearances halved in the following year, it should also be noted that IFP did feature as the focus point of most articles. In 1997 IFP started to appear in advertisements but it was not until 1999 that IFP was commonplace in advertisements. This is probably due to the limited availability of targeting soft chemicals until this time. As more targeting pesticides and miticides entered the market their advertisements mentioned IFP as a selling feature of the products. The 1997 IFP advertisements that did appear either concerned soft miticides (that had already been established through the IMC programme) or sprayer machinery (see for example TO, June 1997: 36-37). By the year 2000, there are virtually no

articles focused on either IPM or IFP; however, IFP is frequently mentioned in articles where the focus is pipfruit marketing or new chemical products.

The frequency of IFP in article text decreased in 2000, and by 2001 IFP had been replaced with the new hot topic - deregulation of the pipfruit industry and export restructuring strategies. When the subject of pipfruit pest management was broached IPM and IFP were used interchangeably by writers of the articles, for example:

Calypso is harmless to bees, predacious mites and spiders; and only slightly harmful to lacewings and hoverflies making it suitable for use in IPM programmes. ...It is important that Calypso is applied according to IFP requirements and not when everything else has failed to work and you are trying to firefight a pest problem (TO, Oct. 2001: 20).

In 2001 virtually every article in the pipfruit section of each issue concerned the export-implications of deregulation. The IFP programme was mentioned seven times but was not the central focus of any article. This indicates that once the IFP programme had been successfully adopted by pipfruit growers *The Orchardist* no longer needed to discuss the pros and cons of adoption, or the technical issues facing newly adopted IFP growers. By this stage technical meetings, an internet forum, and newsletters concerning IFP issues had been firmly established as mediums through which growers could strengthen their knowledge of the IFP programme and aid in refining the IFP manual for the following year. As such, the discussion of IFP issues in *The Orchardist* was seemingly deemed unnecessary. Furthermore, since the programme was adopted by all export pipfruit growers, the continuation of articles concerning IFP issues was somewhat superfluous. With deregulation becoming an increasingly political and contested issue, *The Orchardist's* continued focus on IFP could have been interpreted by its readership as either out-of-touch with current issues or even attempting to cover up the importance of the

deregulation debate with a programme that had already been adopted. The only text concerning both IFP and deregulation in *The Orchardist* appeared as a brief news snippet where it was stated that deregulation would have no effect on the IFP programme (TO, 2000: 23). Other than this minor acknowledgement, the two discourses remained essentially separate.

Figure 6 also demonstrates that in terms of greening strategies, IFP was discussed approximately twice as often as IPM during the period 1996-2001. This is interesting in terms of the typical ebbs and flows of discourse. That is, figure 5 illustrates that the frequency with which IFP appeared in *The Orchardist* mirrors the adoption timeline. The IPM pipfruit strategies started to form in the 1970s and by 1996 IPM was essentially an old idea, indicative of a greener world-view that was not yet facilitated by enough successful greening practices. However, the IPM strategies had been refined and improved upon to create an IFP programme. So the IFP programme held the greening ideologies of the IPM strategies that had been in pipfruit industry discourse for 21 years, while at the same time IFP was introduced with far more institutional support – a programme backed by ENZA and Fruitfed as essential for future success. By 1997 there was a reduction in the appearance of ‘IFP’ because growers had already been made aware of many of the issues surrounding IFP. However, IFP plateaus during the period between 1999 and 2001, which is similar to way IPM frequency was (relatively) consistent in frequency throughout the 1990s. This tells us that while IFP is no longer a ‘hot topic’ it is still an important part of pipfruit industry discourse. Growers are increasingly equipped with successful and sustainable ‘green strategies’ for controlling pests and because the IPM strategies, including the IFP programme, are successful they continue to surface in discourse and appear in literature.

Figure 6: *Growing Today* IPM and IFP specific terminology frequency graph

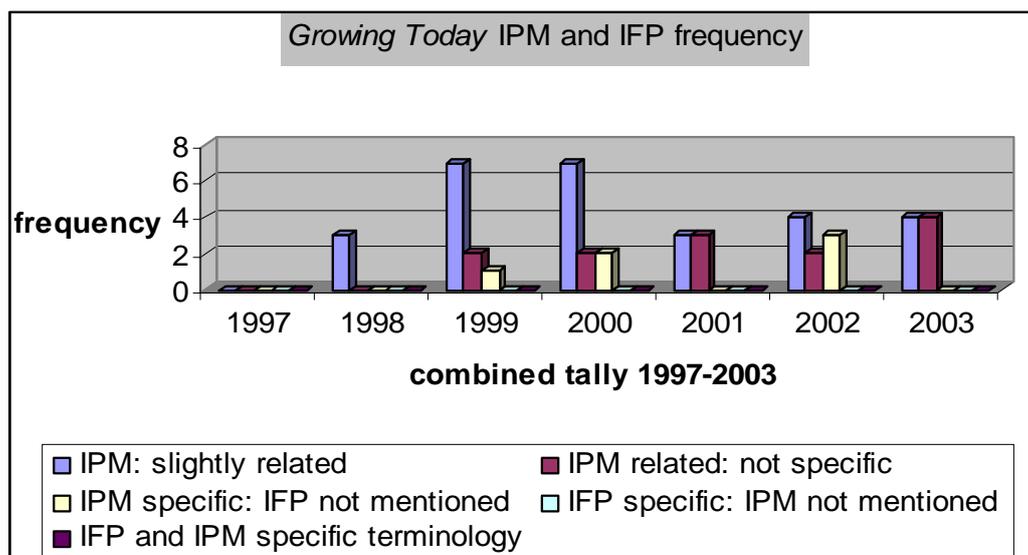


Figure 6 Source: content analysis -see appendices.

In contrast to *The Orchardist*, *Growing Today* frequencies are much lower, so much so that to do a separate graph for each year would say very little. Although content analysis of the words and themes list was executed for 1997, there was no specific mention in any of the journal's 12 issues of either IPM or IFP. This is interesting because 1997 was the key year for frequency of IFP in *The Orchardist*. One possible explanation for this total lack of IFP presence in *Growing Today* is that as a general growing magazine, *Growing Today* presents widely circulating discourses and in 1997 IFP was still in its introductory phase, so it was not yet widely circulating within general growing discourse. In contrast, *The Orchardist's* purpose is to keep New Zealand's orchardists informed on current events, issues and practices. In light of this consideration, it seems plausible and even probable that *The Orchardist* would present IFP discourse sooner and with more vigour than *Growing Today*. Furthermore, the pipfruit IFP programme was hugely important to both pipfruit growers and other orchardists because it is notoriously difficult to maintain high quality in apples with organic or

reduced pesticide programmes. Thus the wider orcharding industry would be interested in the outcome of the programme as indicative of possible IFP success in other fruit industries. Indeed, history supports this argument, as the success of IFP in the pipfruit industry served as a catalyst for the introduction of an IFP programme in New Zealand's stonefruit industry (which is currently in progress).

As the figure 6 graph illustrates, *Growing Today* did not address IPM or IFP as frequently as *The Orchardist* did during the 1997-2001 period. The fact that IPM was occasionally discussed by the magazine, suggests that IPM had been established as part of general growing discourses for long enough to become 'common knowledge' in the growing and lifestyle-blocking community. This establishment of IPM's location in general growing discourse was the result of pioneers such as Wearing who wrote articles concerning IPM in literature that was available to the public during the 1980s. In regard to this observation, it would be interesting to conduct this research project again in ten years time to establish the location of IFP in growing discourse. I would contend that IFP, like IPM would be circulating in general growing discourse at approximately the same frequency as it is now; unless it is replaced with a more refined greening programme (such as organics perhaps). It is highly unlikely that IFP will disappear from pipfruit industry discourse altogether. Indeed, it seems that IFP as a growing strategy is here to stay.

The following graph illustrates how important IPM and IFP discourse was in *The Orchardist* and *Growing Today* between 1997 and 2001 (the years in which the IFP programme was established in the pipfruit industry).

Figure 7: Content analysis comparison between *The Orchardist* and *Growing Today*

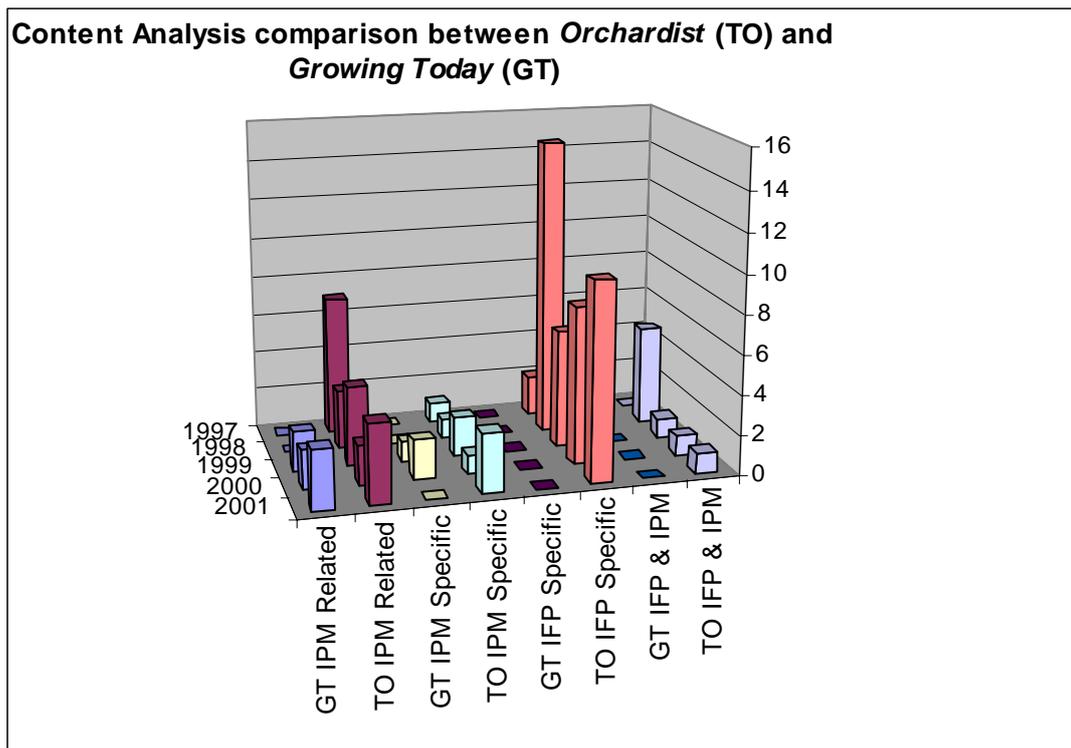


Figure 7 Source: content analysis appendices.

As figure 7 illustrates, IPM was not addressed by *Growing Today* in 1997 or 1998, however, it did consistently appear during 1999 – 2001. While figure 7 does not include data from 2002-2003, *Growing Today* was analyzed during these years also, and the frequency with which IPM related and specific text did appear was consistent with 1999-2001. Also of note is the high frequency with which *The Orchardist* discussed both IPM-related and IFP-specific information during 1997 and 1998. In 1997 IPM-related information surfaced frequently, and the frequency dropped dramatically in 1998, while IFP-

specific terminology was mentioned twice in 1997 then leaped to 15 appearances throughout 1998. IPM-specific text maintained a relatively consistent rate throughout the researched period.

Finally, figure 7 also illustrates an interesting contrast between *Growing Today* and *The Orchardist* in terms of the frequency with which each discussed IPM & IFP terminology simultaneously. That is to say, IPM and IFP specifically appeared in connection with each other in the same article or advertisement, and this happened a number of times in *The Orchardist*, but never happened in *Growing Today*.

We might wonder why this is? Is it because *The Orchardist* (and by extension NZFF) were pushing IFP as an extension of IPM, and as such needed to make the connection between the two strategies explicit in *The Orchardist* text? Regrettably, this question is not answered by the data. However, what the data does suggest is that during 1997 – the year that IFP was widely discussed in *The Orchardist* – both IPM and IFP terminology appeared in connection with each other five times. Over the four years that followed, this only occurred once in any given year and in *Growing Today* it never occurred. If industry leaders were attempting to blur (the already blurred) boundaries between IPM and IFP, this tactic of listing them in connection with each other may have increased such blurring. Alternatively, given that pipfruit IPM strategies and the pest management strategies within the pipfruit IFP programme are in many ways essentially the same, it makes sense that they be textually linked together in order to acknowledge them as such.

Advertisements: content and discourse

The content analysis included articles and advertisements. In fact, much of the IPM and IFP terminology (discussed in the previous section) was located in advertisement text. Thus the text in advertisements is arguably as important as text in articles. By text, I use McKee's (2003) liberal definition that includes any vehicle for meaning:

...whenever we produce an *interpretation* of something's *meaning* – a book, a television programme, film, magazine, T-shirt, or kilt, piece of furniture or ornament – we treat it as text. A text is something that we make meaning from (2003: 4 original emphasis).

In accordance with this understanding, advertisements can be an extremely rich source of meaning as they employ a range of different visual mediums for accomplishing the goal of meaning-consumption. For just as language conveys meaning, so too do photographs and pictures, textures and colours. The focus of this analysis is the use of language in advertisements, the location of meanings and discourse construction.

'Orchard' and 'chemical' are broad terms associated with a wide array of industries and discourses. Their location within the pipfruit industry is often (though not always) labelled specifically as 'pipfruit orchard' or 'insect growth inhibitor pesticide' (see appendix 1.3). 'Chemical' is also replaced with the type of chemical in question such as pesticide, miticide, fungicide, or fumigant. Yet while 'chemical' signals a broad affiliation with pipfruit industry discourse and can be broken down into more specific categories of chemical, those categories can and are often broken down further into specific chemical and product names such as methyl bromide or *Mimic*, for example.

The specificity of these terms indicates a level of knowledge assumed by the writer of the article or advertisement; often a level generally geared towards

the majority of the assumed readership. In *The Orchardist* magazine, for example, many advertisements categorize chemicals under the first level of specificity such as insecticide, while fewer companies advertise the specific chemical compounds that constitute the advertised product. Information that is widely considered as relevant and necessary in such advertisements includes toxicity, compatibility with other chemicals and with IFP programmes, performance, and ecological/environmental impacts. Information that seldom or never appears is the crop/orchard type that the chemical is used on. While this kind of information may seem superfluous and simplistic to growers within the industry, to an outsider or even to people entering the industry, this kind of information can be helpful (and may even prevent application of the wrong chemicals to an orchard!). The crop/orchard type is indicated by the insects or diseases that are controlled by the advertised product. Du Pont's advertisement for Avaunt insecticide states "high performance codling [sic] moth and leafroller control at low rates" (see appendix 1.1). This sentence alone indicates three essential pieces of information to the reader. Firstly, the product apparently has high performance and is effective; second, it is used to control codlin moth and leafroller (pipfruit pests); and finally, relatively low quantities of the product can effectively eradicate the pests in question. This kind of interpretation is indicative of a discourse analysis rather than a content analysis and it is interesting to note that such extrapolations would not have arisen solely from content analysis. In this regard it is clear that both discourse and content analysis are useful and necessary for a more precise interpretation of the kinds of meanings that evolve and circulate within industry literature.

The content analysis split the advertisements in *The Orchardist* magazine into the following categories: pesticides (including insecticides and miticides); fungicides and nutrients; and machinery, nursery, or insurance. The most

common machinery advertisements included tractor and spraying machinery, packing machinery, apple bins, pruning equipment and other orcharding paraphernalia. Insurance advertisements appeared in over half the issues and were often accompanied by a half-page article. Insurance was advertised by various companies as a necessity that should be included in the overheads of a grower's budget (which ties in with risk discourse). This was particularly evident in hail insurance advertisements. Machinery, nursery, and insurance advertisements were not counted in the content analysis. However, the pipfruit related advertisements that were counted fall into one of two categories; either 'pesticide' (insecticide and miticide) or 'other chemicals' such as fungicides and nutrients.

Because 'pesticide' includes fewer products within its parameters than the second category, it appears that pesticide advertisements have a lower frequency than fungicides and nutrients. However, pesticides did appear more often than other agri-chemical advertisements. Nursery advertisements were also not counted but it should be noted that nursery advertisements outweigh the other categories combined. Nursery advertisements appear in every issue of both *The Orchardist* and *Growing Today* and it is safe to say that the magazine/journals are successful advertising mediums for nurseries. This statement is validated by the sheer number of nursery advertisements in both magazines (see for example; *Waimea Nurseries* advertisement, TO, Feb. 1998: 33).

Figure 8: Growing Today (GT) and The Orchardist (TO) advertisement trends

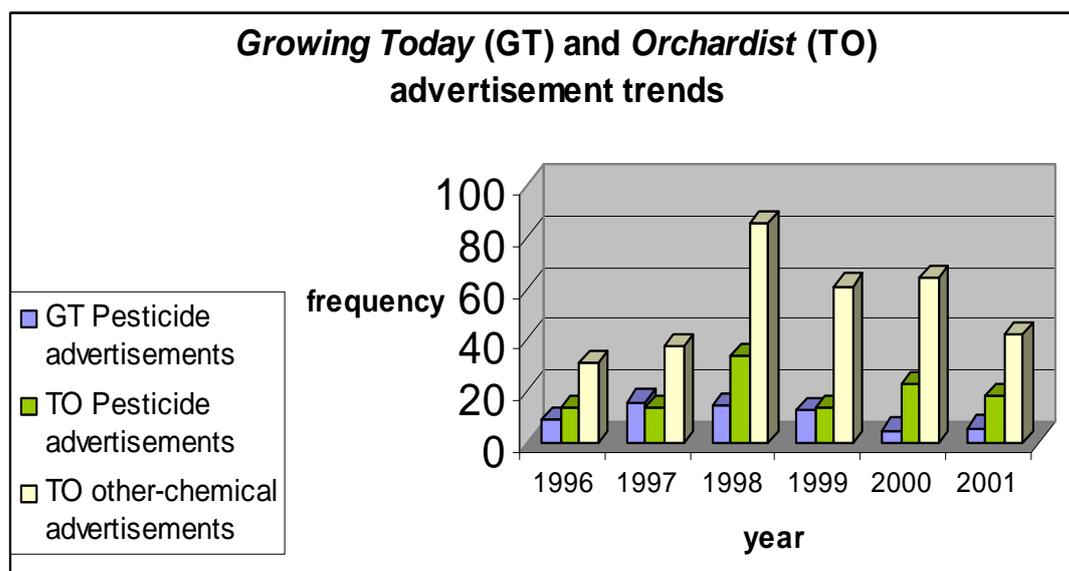


Figure 8 illustrates pesticide advertisement frequencies of both *The Orchardist* and *Growing Today* during 1996-2001. During 1996 and 1997 *Growing Today* and *The Orchardist* held a similar number of pesticide advertisements but in 1998 *The Orchardist* held more than double the number of pesticide advertisements than *Growing Today*. This is interesting in the context of the IFP adoption because 1998 was the key year in IFP adoption. The jump in figures might be indicative of chemical companies attempting to reassert their products' IFP-friendly targeting capabilities during a period where IFP-friendly chemicals are necessary for successful IFP adoption. The company Novartis, for example, advertised its chemical product Match as being “soft on beneficials, IPM/IFP compatible and gives excellent fruit finish” (TO, Sept. 1998: 23). Here we can see that not only is its compatibility with the IFP programme pushed, but also evident is the blurring between IFP and IPM terminology that was discussed earlier in this chapter.

Unfortunately, the data does not fully support the argument that because 1998 was an important year in terms of the IFP programme agricultural companies placed more IFP related advertisements. There was an equally

large jump in frequency of other chemical product advertisements during 1998. The increase in chemical advertising may be in relation to 1997's poor crop yields:

Climatic conditions in the early part of the 1997 apple harvest had been disastrous, with 15 hailstorms between December and March, reducing the crop by eight percent to 285,000 tonnes compared with the previous season. Without the hail, an export crop of 340,000 tonnes had been expected. ...MAF tipped an export crop of 375,000 tonnes for next season, up 32 percent on the hail-ravaged crop for 1997, and a decline in returns to \$7 per carton for export, local market and processed fruit (TO, July 1997: 3).

While 1997's crop was smaller than anticipated, the cause was hail damage, not pest damage. The hail damage could be a factor in the increase of fungicide and disease products (related to climactic conditions); however, it hardly accounts for the increase in pest control advertisements. The random surge in all categories of advertising during 1998 in *The Orchardist* is not conclusively accounted for in the research data. What the data does show, however, is that pesticide-specific advertisements appeared at least twice as often in *The Orchardist* as in *Growing Today*, and that both *The Orchardist* and *Growing Today* contain far more advertisements for non-pesticide products and services than for pesticides (see appendices 2.1 and 2.2).

Another important point that is not accounted for in the data is the size and type of advertisements in the two sources. While *Growing Today* may have contained a similar number of pesticide advertisements, the size of such advertisements were usually approximately less than one tenth the size of those found in *The Orchardist*. Furthermore, such advertisements were predominantly comprised of words (language text) in *Growing Today*, rather than the photographs or pictures that were common in *The Orchardist* advertisements. So while *Growing Today* and *The Orchardist* did contain a

similar number of pesticide advertisements in some issues, the size and detail of such advertisements varied significantly.

Finally, pesticide advertisements in *Growing Today* advertised predominantly broad spectrum non-targeting chemicals that were comprised largely of organic compounds. Furthermore, such products were geared towards gardeners and lifestyle blockers rather than large-scale growers, and as such the products were advertised and sold in small quantities. The company Betta-Crop Organic regularly advertised in *Growing Today*:

After months of research working from a 100 year old formula Bettacrop have succeeded in producing a truly organic pesticide that will eliminate whitefly, mealy bugs, spider and two-spotted mites. But what is more important, it is not dangerous to warm blooded animals and can be used without the need to dress or mask up. For more details and free product guide -"How To Have A Bug Free Garden" contact Betta-Crop Organic... (GT, March 2000: 47).

The main qualities in this advertisement that can be said to be typical of the kind of pesticide advertisements in *Growing Today* issues are as follows: the advertisement is comprised simply of separated advertisement-text (as opposed to McKee's (2003) 'text') from article-text (by a thin border); there is no picture/photograph. When there is a photograph it is small and does not fill the entire advertisement area; the text is in size 10 'times new Roman' fonts, and as such does not stand out from the page; the text explains which insects are targeted by the pesticide; and the text implies that the product is 'safe' or 'low risk'.

In comparison, most advertisements in *The Orchardist* are half-page or full A4 size (see appendix 1.1 - 1.3). Such advertisements contain full-colour pictures or photographs, with advertisement-text superimposed onto the picture/photograph. If the advertisement does not fill an entire page it too is separated from article-text by a thin border. Such half-page advertisements

are often accompanied by an article concerning the advertised product; so we may interpret the associated article to be an extension of the advertisement, or vice versa. The advertisement-text comes in a variety of shapes and sizes but seldom contains font smaller than size 12. Indeed, the size and font type are key textual indicators that the text is an advertisement. However, where *Growing Today* and *The Orchardist* advertisements do meet, is in the advertisement-text information that is usually present, the text always explains which insects are targeted by the insecticide or miticide; and the text usually implies that the product is 'safe' or 'low risk'. *The Orchardist* advertisements also tend to assert whether the product is or is not compatible with IFP regulations (whereas *Growing Today* advertisements do not).

So, what does content and discourse analysis of pesticide (insecticide/miticide) advertisements in *Growing Today* and *The Orchardist* tell us about the pipfruit industry? To begin with the blatantly obvious; targeted chemical products are advertised through the mediums that are most likely to be read by people who are most likely to use such products. Larger chemical companies such as Du Pont or Novartis do not bother to advertise in general growing and gardening magazines/journals such as *Growing Today* because most of *Growing Today's* readers are not large consumers of such products. Similarly, smaller companies such as Betta-Crop Organic are geared towards smaller land owners, lifestyle blockers, and keen gardeners, and do not advertise in *The Orchardist*. While there are a number of textual differences between the two types of advertisements found in the two sources, these differences are not as relevant as the differences in content.

Textual content that is common to both sources includes which insects are in question, and issues concerning risk and safety. The fact that the advertisements contained within *Growing Today* and *The Orchardist* are very

different in appearance and textual-content serves to verify that where they do meet in textual meaning is indicative of wider industry discourses. That is to say, the fact that such different advertising mediums can contain vastly different advertisements, which contain some of the same issues, indicates that such issues are key to the discourse represented by the advertisements in question. In this case the discourse operates at a broad level that includes all kinds of growing strategies, fauna, and insects. It is a generic discourse that all kinds of growers, lifestyle blockers, and gardeners can enter into and while each of these groups of people signify other more specific industries and discourses, they also hold some issues in common. Each group encounters problems with pest control. While the pest species is often very different, common ground remains within the rubric of pest control.

More importantly and perhaps more obviously, is the common ground that resides in the location and influence of risk. Each of the groups represented by *The Orchardist* and *Growing Today* are affected by risk in terms of either economic risk, risks to health, or environmental/ecological risk. However, each group experiences such risks in different ways and to different extents. Gardeners, for example, negotiate economic risk through the purchase of plants that may not flourish in their gardens. When deciding on which plants to purchase the gardener takes into consideration their previous experiences with plants and with their garden, soil, environmental factors, and so on. While such considerations can reduce risk or perceived risk, the risk of the purchased plants dying (for whatever reason) remains. Such issues arise for pipfruit growers too, who factor in similar considerations in their decision-making processes of fruit trees purchasing. While the economic risks are exponentially higher for growers than gardeners, the two groups can still identify with advertisements or articles concerning risk.

In the pipfruit industry economic or financial risk is arguably the most important type of risk with which growers are concerned. Advertisements geared towards pipfruit growers address this issue by explicitly asserting that the advertised product has low overall risk and that the growers need the product in order to reduce financial risk. The product Match (see appendix 1.3) is “IPM/IFP compatible”, which implies that growers can safely use the product to manage pest control without increasing the risk of their fruit not meeting with export regulations. In fact, to use the product reduces this risk because not only does it eliminate the pests that would otherwise cause financial losses, but it also complies with IFP regulations because it consists of soft chemicals that do not harm beneficial insects, and needs few applications to ensure success. So even though the word ‘risk’ does not appear in the advertisement, the notion of risk is implied by the information that does appear. We can see that risk, as a key notion or aspect of the pipfruit industry, is accounted for in pipfruit industry advertisements.

The Orchardist: success stories

Personal grower achievement stories featured in more than half the issues analysed (TO, Feb. 1998: 10; TO, Feb. 1998: 22; see also TO, April 1998: 17). Each article begins with a brief history of the grower’s journey into the industry, his hardships, achievements, and his struggle to survive in the turmoil of change. The protagonist in approximately 95% of these articles is male. However, occasionally women feature in articles alongside their husbands. Women do not play a visible role in the pipfruit industry and this is evident in *The Orchardist* articles. Women feature more often in *Growing Today* articles; however these too are usually in connection with jamming or preserving rather than pruning or export marketing, for example. What is

interesting to note in connection to *The Orchardist* articles is that despite most of the protagonists being male, many of the authors of the stories are women. Furthermore, although the focus of the articles is predominantly on men and their individual contribution to the industry, women or family are often cited in connection with that success;

Joe is a firm believer in the family orchard, a husband and wife team. The orchards on Norton Road on the outskirts of Hastings with his wife Sally and their three children. Sally assists during the packing season. Many wives make a major contribution at harvest time. This 'latent skill' hibernates over the winter and is available during the harvest (TO, April 1998: 17).

This description of the role of women in the industry may indicate a general understanding that people within the industry have that is reasserted through various mediums such as *The Orchardist*; that women have a peripheral role in the industry. Thus women are mentioned in articles, but are seldom positioned as the protagonist. Likewise, women are rarely photographed in doing anything useful or work-related in *The Orchardist*. They usually appear beside their husband (sometimes with children) in the orchard admiring the crop or pretending to eat an apple for the photo. However, occasionally a token photo appears (usually once in any given year) where a woman is photographed 'at work' in the orchard. The token photograph in 1999, for example, was of Kay Morgan from Riwaka, clipping a pear stem (TO, April 1999: 41). I would contend that this location of women within the articles and photographs serves to reassert the dominant gendered discourse to its predominantly male industry (see also, TO, June 1998: 10-11). It also promotes the message that men manage and bear risk (while women supervise and eat apples). While gendered discourse is not a key point of analysis in this body of work, it is included as exemplary of other discourses that also connect with the key discourses discussed in this thesis.

Moreover, many story articles have an element of political perspective from the protagonist where they assert their opinions (usually positive) about various aspects of the industry. A typical example of this is as follows:

Jos believes the New Zealand Apple and Pear Marketing Board has come a long way since its inception in 1948, and growers have made many gains through this time. New Zealand pipfruit growers have two strengths: they control the channel to get their fruit to international markets; a united front of producers. "If we lose either, our competitiveness will be severely eroded". He firmly believes the opportunity to supply the board should be available to every grower in New Zealand – "big, small, only just in it or in it for generations" (TO, April, 1998: 17).

Here the power monopoly of the NZAPMB surfaces in a positive light. Between 1996 and 2001, discourse concerning single-desk structure and the power of individual growers on the international export stage was evident in most issues of *The Orchardist* magazine. This section of Mannering's article resonates with the then-current dialogue that constantly renegotiated the location of the NZAPMB within the industry. Jos' opinion on the role of the board clearly advocates for the Board's continued role in representing all growers and their produce on a level platform. However, other articles published during the period between 1996 and 2001 advocated for deregulation of the NZAPMB. *The Orchardist* included articles supporting both sides of the debate; indeed, the magazine kept growers well informed on the issue of deregulation.

Economics and politics

It became apparent that the content analysis of *The Orchardist* required more categories for analysis than *Growing Today*. Two topics that were represented on most pages of most issues of *The Orchardist* were economics and industry politics:

World apple production was estimated at 37 million tonnes for the year ended June [1996]. New Zealand production, at 550,000 tonnes, represents one percent of world production. However, only 6 percent, or 2.2 million tonnes, of world production is exported (excluding trade within the European Union) so New Zealand accounts for about 14 percent of that. China is the biggest apple producer, with 12.2 million tonnes and 33 percent of world production, followed by the European Union with 8.2 million tonnes and the United States with 5 million (TO, July 1996: 3).

Statistics such as these appear throughout most issues of the magazine and they indicate the extent to which the industry is governed by economics. While economics clearly play a substantial role in directing the decisions and practices of pipfruit growers, the average pipfruit consumer may be unaware of just how influential the pipfruit industry is in New Zealand's export economy and in the global economy (see HortResearch, 2003). However, based on the frequency with which specific economic figures appear and are explained in each issue of *The Orchardist*, it is safe to assume that the average pipfruit grower is vastly more aware of this facet of the industry than consumers are. In short, economics governs the pipfruit industry and this governance is illustrated in *The Orchardist* through the sheer wealth of information that is saturated with statistics and dollar signs.

Furthermore, such statistics often imply or are specifically related to issues concerning risk, which is of course expected, given that economics and risk are arguably the two most salient dynamics of New Zealand's pipfruit industry. On organic pipfruit production, Mannering writes:

Risk Greater

Organic production is inherently more risky than conventional production, but the rewards may warrant the extra effort. ENZA has quoted prices for the 2000 season for Braeburn, Fuji and Royal Gala of \$23.00 a carton for "conversion" fruit, and \$31 for fully certified organic product. ...Bruce believes growers need to change the way they look at their orchard under an organic system. "Weeds under trees look really bad, but is it really a problem? Should the orchard look like a bowling green, is it economical?" he asks. "We are pioneering organics, there is a risk of pest and disease blow-out, especially during the 36 month conversion period," he says. It takes time for beneficial

insects to establish. His biggest threat comes from a grower trying to cheat the system. (TO, March 2000: 46).

The issues addressed in this extract from an article illustrate how risk, fruit production, politics, organics, and economics can be linked together through discourse. Organic production methods are inherently more risky in terms of economics, fruit production, and politics, than conventional production because it is more difficult to manage pests and disease, and because fruit production is more expensive. However risk relating to mode of production is counterbalanced with high potential economic earnings, with organic fruit fetching prices two or three times higher than conventionally grown fruit. The final sentence in the quote hints at a political issue that surfaces regularly in organics discourse: some growers “try to cheat the system” by labelling conventional fruit as organic. The mislabelling of fruit as organic causes economic problems for organic growers whose fruit may have to compete with larger, blemish-free fruit that is also labelled as organic. Furthermore, when mislabelled fruit is discovered as not being organic consumers may lose confidence in the organics industry, which can lead to lowered consumption of organic produce. Thus organic pipfruit production is clearly affected by risk and economics, arguably even more so than conventional pipfruit growing.

Concluding food for thought

The content and discourse analysis of *Growing Today* and *The Orchardist* has illuminated key discourses on which the pipfruit industry is based. The key identified discourse is risk, which underpins many of the messages contained within the two sources. Other discourses that connect with and overlap risk include economics, politics, gender, and greening strategies, including

organics. Some of these discourses are further explored in the general literature analysis that follows in chapter six.

This chapter has also illustrated the socio-political context of pesticide (insecticide and miticide) use in New Zealand during the late 1990s and early 21st century (although, not as much as chapter two). The socio-political context was turbulent during this time period, with the rise in greening strategies in politics and practice. Both *The Orchardist* and *Growing Today* illustrate this rise simply through mentioning (and sometimes explaining) the three main growing strategies employed by pipfruit growers at that time; IPM, IFP and organics.

Pipfruit Industry Discourse

This chapter offers further exploration of the key discourses operating within pipfruit industry literature. Risk has been identified in chapter four as the central discourse or episteme, however, there are other discourses that also operate as frames that impact on grower decision making. Miller (2000) identifies 'the market' and 'quality' as central discourses that growers incorporate in their world-making. Similarly, Marsden et. al. (2000) identify free trade, (and by extension – free trade discourse) as a major contributor to global changes in power and agency within the FFV industry. This project identifies greening strategies such as IPM and IFP, 'clean and green' nature ideologies, and organics as other discourses that frequently appear in pipfruit industry literature (especially during the past fifteen years). What follows is the application of discourse analysis focusing on risk, power and agency in relation to pipfruit industry literature, followed by a brief discourse analysis of greening strategies, the clean and green ideology, and organics.

Discourse examples in industry literature

In regards to the breaking down of discourse into words, Foucault would remind us that the study of semiotics and enunciation may illustrate the ways in which words serve to manifest discourse and simultaneously negotiate changes within it (see McHoul and Grace, 1993: 35). Foucault writes that such study:

...[C]an see the appearance of a new discursive practice through verbal formulations that remain linguistically equivalent. ...Inversely, it may ignore different vocabulary, it may pass over semantic fields or different deductive organizations, if it is capable of recognizing in each case, despite their heterogeneity, a certain enunciative regularity... (Foucault, 1969: 162-3).

While Foucault's focus in this quote pertains to enunciation, we should note that most of his analysis concerns written historical data and the ways in which history discursively operates through semantics. It seems appropriate that this research also focuses on semantics (since the analysis concerns written language and history).

So let us now examine some of the aforementioned identified categories in terms of the words that create, represent and reinforce dominant discourse. The words 'Integrated Fruit Production' can conjure up a wealth of meanings and signals several discourses operating within, or in connection with, New Zealand's pipfruit industry. Two such discourses are the greening of the industry and risk, since the IFP programme explicitly addresses both. However, such discourses are not always explicitly addressed in literature and advertisements containing reference to IFP. Rather, IFP serves to signal such discourses for those with a general knowledge of the industry. This would suggest that when various actors and institutions associated with the pipfruit industry create textual messages in magazines, journals, or other literature, they either assume a certain level of knowledge from intended receivers of their messages or deem further explanation superfluous to the given context.

Much of pipfruit industry literature tends to gloss over the basic knowledge necessary for a newcomer's adequate participation in pipfruit industry discourse. This observation is certainly true for *The Orchardist*. I also found it to be the case in discussions with my four informants, and perhaps most

notably in discussions on an Internet forum – where newcomers to the forum were essentially welcomed or shunned and ignored by other participants in the discussions based on the level of technical knowledge the newcomers exhibited. In contrast, because *Growing Today* caters for a wide audience it assumes the reader knows very little about the given topic of discussion. The magazine provides an important window on how IPM and IFP operate and how they are constructed as objects within discourse. Because *The Orchardist* is directed at growers it assumes a higher level of knowledge and this is also true for the forum. While actors in the discourse use generalised terms such as *spray* (meaning chemicals) or *cosmetics* (meaning fruit aesthetics), they more frequently use specific terms and acronyms without explanation, such as *pack-out rates*, *sufficient parasitism*, *IFP thresholds*, *MRLs*, and *WAA*. Within the industry these terms are apparently considered basic knowledge; however, to the outsider, they signify a foreign code that can effectively prevent outsider participation in, or even understanding of, the discourse.

Moreover, for the outsider, differentiating between IPM and IFP can be a perplexing task. The reason for this, I would contend, is that both IPM and IFP signify knowledge of both fruit production methods and the greening discourse in which they have arisen. Their composition is constantly renegotiated by individuals within the discourse. Moreover, these renegotiations occur in accordance with knowledge and power held by the parties entering into related discourse, such as the orchardists, consumers, professionals, marketing agents, pesticide companies, food processors, and so forth. The different knowledge held by each of the contributors to the discourse reconfigures meanings associated with IPM and IFP strategies. The historically located spaces in which each discourse arises will come to signify meaning and this meaning will be translated through various forms; written

and visual media, everyday conversational discourse, labels, literature, and so forth (Hall, 2001: 73; cf. Foucault, 1969).

In regards to such negotiations of meaning, some sources indicate that IPM programmes were either abandoned and replaced with IFP programmes, or are still being pursued in spite of more effective IFP techniques (OT Feb. 2003: 51; McKenna et al. 1999). However, as illustrated in chapters one and three, IPM and IFP are distinguishable through their policy parameters if we trace their definition and practice far enough back. Moreover, current literature still tends to address either or both IPM and IFP as separate strategies (this is especially true for advertisements in *The Orchardist*). We may wonder why it is that current professionals refer to IFP as a refinement of IPM when literature continues to portray them as different? I would contend that IPM is currently in a state of intersubjective re-narrativisation by agents within the industry who are 'ontically dumping' constructions of meaning that do not fit with their current views on IPM and IFP (see chapter four; see also Rapport, 1997: 14). It would seem that the term IPM is currently being discursively negotiated as the basis for IFP and could perceivably be entirely replaced with IFP in future pipfruit discourse, including literature and advertisements.

Agency and change

The key elements of Rapport's position with which this discussion is primarily concerned are essentially the creative capabilities and agency of the individual who enters a narrative (and by extension discourse), and re-narrativizes it to suit his or her needs. It is the grower who absorbs information from various sources (consultants, other growers, literature) and re-narrativizes it to place himself at the centre of it, to apply that knowledge to his everyday workings and decisions – his world making. At first glance Rapport seems a perplexing

choice of theorist for this project, since this research is concerned solely with literature analysis, and Rapport is concerned with the individual, agency and narrative. However, throughout this thesis I have attempted to illustrate the ways in which agency is accounted for in pipfruit industry literature. Previous work by Stiefel (1999) and Miller (2000) have provided information about the thoughts, discussions, and doings of various individual growers (see section 6.4), and this thesis includes discourse analysis of some of their work in an attempt to cater for the limitations of pure literature analysis. As a result of the methodology of this thesis the issue of agency is addressed here on a more abstract level than in research based on interview and fieldwork material.

According to Rapport, agency is always held by the creative individual, who:

...makes himself or herself *ex nihilo* [from nothing] and in an originary fashion – who comes to be, who achieves a consciousness, outwith [sic] and beyond the socio-cultural environment in which he or she was born and has been socialised/enculturated (1997: 3).

In contrast to the position that social structure shapes individuals and governs their actions, Rapport emphasises individual agency. Drawing on his own experiences, Rapport attempts to demonstrate how the choices and actions of individuals allow them to rise above enculturation, shaping past, present, and future social life (1997: 7ff.). In *Random Mind* (2001), Rapport writes: “[by] thinking, saying and doing things they have never done or said or thought before, individuals’ ideational processes cause them to be free even possibly from *their own pasts*” (2001: 195 my emphasis). If we apply this to what we know of the pipfruit industry, we can see that the creativity and agency employed by individuals – such as Dr Wearing, Dr Walker, and Dr Manktelow – in their introduction and refinement of IFP programmes for New Zealand’s pipfruit industry, created new ways for New Zealand growers to think, say, and do things they had never thought, said, or done before. Indeed, the transfer to IFP

has enabled individuals, and the industry as a whole, to be 'free' from their past history of unsustainable practices through changing discourse concerning the understanding and use of chemicals. The changes in discourse (as discussed in chapter one) provided a platform from which IFP could emerge.

Where Rapport's theoretical position falls short, however, is in his unbalanced attention to the individual and in his account of power dynamics.²⁷ For while we can argue that the individual grower, for example, may choose not to adopt the IFP programme, the result would be the loss of the ability to export pipfruit. Similarly we might contend that the power monopoly of the NZAPMB – that was formed as a consequence of many individual growers demanding it in the 1940s – resulted in individual growers being largely unable to negotiate their own export fruit contracts and prices. Growers were in many ways unable to make a world for themselves *ex nihilo* under the single desk system because individual power had been largely transferred to an institution. Rapport would argue that even in this situation, the individual maintains agency and power through their ability to re-narrativize situations and their position within them, and to essentially ignore aspects of a given scenario (to 'ontically dump' as Rapport puts it) power-less aspects of the situation (Rapport, 1997: 14). I fail to see, however, how re-narrativisation and 'ontic dumping' changes an individual's ability to negotiate private export contracts.

²⁷ Rapport does actually discuss mechanisms of social life such as gossip (1997:98) but focus remains on the individual's autonomous and transcendent abilities (through their randomness and their ability to narrativize and re-narrativize). He fails to address the influence of gossip on people who are involved indirectly and does not address to my satisfaction all the power dynamics at play in gossip. I would argue that it is often those who hold power over other individuals that govern the production of esteemed social understandings and control their communicative diffusion. In saying that, I am aware that Foucault's theoretical position on power may be interpreted as conflicting with my theoretical positioning of power within individuals that manifests through agency. However, I use Rapport's theory of agency through narrative merely as a tool for comprehension of the influence that power has over autonomy and agency of individuals (see also Foucault, 1980).

In short, I would contend that Rapport's notion of agency can provide insight into large-scale changes in the pipfruit industry, such as those resulting from regulation and deregulation of the NZAPMB and the industry-wide adoption of ENZA-IFP, and is also insightful when applied to literature concerning individuals, such as the works of Stiefel (1999) and Miller (2000). Furthermore, I would suggest that each of the authors who have published literature concerning New Zealand's pipfruit industry have utilised agency as a concept in doing so. Moreover, regardless of whether the author intends it or not, their literature serves to create and reinforce the key discourses that come to signify the pipfruit industry. Here we can see how agency and discourse are inextricably linked through their creative capacities as significations of knowledge. When we combine Rapport's insights on agency with Foucault's insights on history as discourse, it becomes clear that Rapport and Foucault are deconstructing two pieces of the same pie. Discourse works through agents to reinforce to the pipfruit industry exactly what the pipfruit industry is – what it includes within its rubric as important, factual, and changing.

Power and the ubiquity of risk

Power... is not that which makes the difference between those who exclusively possess and retain it, and those who do not have it and submit to it. Power must be analyzed as something that circulates, or rather as something which only functions in the form of a chain. It is never localized here or there, never in anybody's hands, never appropriated as a commodity or piece of wealth ... individuals are the vehicle of power, not its points of application (Foucault, 1980: 98).

Returning again to the theoretical framework established in chapter four, we can apply Foucauldian theory concerning power to risk theory and provide a discourse analysis of socio-political and economic happenings in recent years. This chapter concerns discourses identified by Miller (2000) regarding

regulation and deregulation of the pipfruit industry, combined with previously identified influential factors behind such happenings – such as power, agency, and risk. The location of power and risk within New Zealand’s export pipfruit industry early in the 20th century ‘resided’ in individuals who had private export contracts. Growers demanded export regulation from the New Zealand government who passed the Apple and Pear Marketing Act and formed a marketing arm (ENZA). ENZA represented growers and effectively shifted both power and risk from individuals by institutionalizing it. Private individual grower contracts were largely replaced by contracts between buyers and ENZA. Economic power and risk resided in the NZAPMB, whose job it was to obtain good economic returns for growers. As ENZA’s ability to fulfil this role deteriorated in the 1990s many growers wanted to obtain private contracts. Private contracts meant the possibility of higher economic returns for exports, individualized economic risk, and more autonomy and agency for the grower.

This desire for deregulation coupled with (and/or influenced by) global neo-liberalism movements resulted in the deregulation of the Board and consequently a shift in the location of power and risk (*cf.* Culpitt, 1999: 53). Several analysts and growers have warned in *The Orchardist* that deregulation of the Board may eventually result in power and economic success being concentrated in fewer individuals; that survival of the fittest may find many growers unable to secure economically viable contracts and consequently be unable to make ends meet. Over time deregulation may result in fewer growers, fewer orchards, and fewer locations of concentrated power.²⁸

²⁸ This has been the case in several other deregulated countries such as Chile and Italy (Walker, per comm).

Growing and selling pipfruit: a risky business

Horticultural risk is considered most seriously by growers when it involves economics because, as Miller asserts; “It’s all about getting apples into boxes” (2000: 5). This phrase encapsulates a wealth of socio-cultural and political meanings, but essentially refers to the reason for growing pipfruit orchards in the first place—to sell apples at a profit. When risks threaten that profit they are taken very seriously. Consequently we may assume that economic risk is the most important risk impacting on the pipfruit industry. There are, however, other risks that factor into decision-making processes of growers such as health, global socio-political relations, and environmental risks. These other risks are in many cases more important than economic risk in terms of global ecological impacts. For the grower, however, they often play a less important role in decision-making processes. These combined risks are so influential in grower decision-making processes that publicly available literature tends to address risk prolifically. Risk, in its many forms, is raised in every issue of *The Orchardist* and in a great deal of industry literature. While it is not always labelled as such it is easily identifiable. This section addresses the kinds of industry-specific risk discourse concerning greening strategies that circulates in publicly available literature.

Pipfruit industry literature that broadly addresses risk is remarkably prolific. For example, on a MAF (Ministry of Agriculture and Forestry) website addressing insecticide use in apples, we read:

Overall the IFP programme has resulted in large reductions of OP [organophosphate] use without compromising the levels of pest control. However insecticide loadings remain relatively high and grower confidence to reduce the use of fungicides is relatively low (www.maf.govt.nz).

The risk of compromised pest control was adequately controlled by the IFP programme but growers continued to feel that risk of disease was too high to lower their use of fungicides. Here we can see that while the word 'risk' does not appear in these two sentences, it is still implied and addressed (*cf.* Cowan and Gunby, 1996. see also Miller, 2000: 20*ff.*). Similarly, after describing the 1998 "season from hell" Miller writes:

A number of factors threaten the process of getting apples into boxes. The weather, of course, plays a dominant role. Drought, frost, and hail can all do immense damage to fruit. A few minutes of hail can destroy an entire year's work for growers – an absolute disaster if the crop is not insured for hail. Intense heat and lack of rain for long periods of time can cause internal disorders that are difficult to detect before the fruit reaches the market place (and then becomes all too obvious). Growers must also wage an incessant war against pests, and guard against disease (2000: 37).

Here too we can see that Miller addresses the risks faced by growers, though she does not use this term. These kinds of illustrations can be found practically anywhere in pipfruit related literature.

In contrast, risk that is specifically labelled as such is usually identified in relation to one of the key risk discourses, which includes environmental/ecological, economic and market, identity, and health risks. Economic and identity based risk discourse, for example, is discussed by Stiefel in the following way: "The non-IFP growers were more concerned about the risks associated with adopting the IFP than the IFP growers. The key risk perceived was increased crop failure from increased pest and disease damage" (Stiefel, 1999: xvi). What is also interesting about an example such as this one is that the participants represented in the discourse (Stiefel and the growers) draw on two key industry discourses simultaneously by implication. Perceived risk is identified as essentially economic because if crops fail growers will face economic losses, but Stiefel and the growers also intrinsically allude to the jeopardy of grower identity as 'good farmers' such

as crop failures. This illustrates the multi-faceted nature of discourse in general and of pipfruit industry discourses in particular (*cf.* Miller, 2000: 51; see also [www.fruitgrowers.org.nz/orchardist/ articles](http://www.fruitgrowers.org.nz/orchardist/articles)).²⁹

Stiefel (1999) analysed the IFP programme during its adoption phase and noted that many early adopters of the programme were more concerned with environmental and health risks that would be minimized through adoption than they were with economics:

...at least seven of the IFP growers had young families, and four commented in particular that a benefit of adopting the IFP programme was providing a better environment for their children to live and play in. It is hypothesised that younger families are attracted to sustainable programmes such as IFP for environmental and health reasons (Stiefel, 1999: ix).³⁰

Again, there is no explicit mention of risk but it is insinuated through the links between IFP and reduced chemical use, and health (both environmental and personal). In contrast, Lockie writes, “Thus, without necessarily using the word ‘risk’, chemicals, fertilisers and drugs are represented as products that help to ensure safe returns and a healthy environment” (2001: 152)! Stiefel (1999), Lockie (2001) and Miller (2000) illustrate (explicitly or otherwise) some of the ways in which risk discourse continues to be overtly and covertly legitimated in pipfruit pesticide discourse. I would also add that the industry-wide transfer to IFP is in the process of changing the specific pipfruit industry meanings and ‘truths’ associated with risk discourse (this issue will be returned to later in this chapter under the headings Risky discourse and Foucauldian discourse).

²⁹ Stiefel discusses risks in other ways throughout her thesis, however, this thesis does not explore them all (see Stiefel, 1999).

³⁰ Stiefel interviewed thirteen of the eighty-eight growers, of which seven commented on health aspects as influential in their uptake of the IFP programme (Stiefel, 1999: 70).

Stiefel also addressed a distinction between perceived and 'real' risk. Many growers who were not early adopters of IFP cited perceived economic risk as a factor in their decision-making processes. Stiefel writes:

Perceived risk was identified as a factor influencing the decisions of many of the growers to not adopt the IFP programme. Six of the growers perceived IFP to have associated risks. The main perceived risk was increased pest and disease damage at harvest, especially black spot, resulting in financial loss for the grower. The perception that IFP increased the risk of black spot identified misconceptions some growers had about the programme. ...Even though the majority perceived some risks associated with the programme, five out of eight acknowledged that there were risks to their business and to the industry if they remained conventional. ...The key risks identified were loss of market access, trade barriers, increasing pressure from the local community and local bodies over issues such as spray drift, and increasing pest control failures due to pesticide resistance (Stiefel, 1999: xi).

It is interesting to note that both perceived risk and actual or 'real' risk were identified as issues that needed to be addressed for successful technology transfer. The wealth of informative IFP-related articles that appeared in *The Orchardist* during 1997-1999 played a large role in reducing perceived risk. As Stiefel notes, there were a number of information-networking mechanisms in place for reducing perceived risk such as grower meetings with technical experts, an internet forum, refined grower manuals, and so forth (see also Wiltshire, 2003).

The major risk hurdle to jump with the introduction of IFP in the pipfruit industry was, for growers, more about perceived risk than actual risk. Stiefel writes:

The perceived risk is in the form of increased crop loss from pest damage due to reducing agrichemical use and consequential financial loss. Wearing (1988) and Wardlow (1991) concluded that it was very important to reduce perceptions of risk in order to achieve adoption. They identified that consultants and other advisors played a role in reducing risk, as did providing education and support and promoting the tangible benefits. In the ENZA-IFP example, the growers had the support of other growers, specialist IFP scientists, and facilitators in the first season which provided a good source of information, helped give the growers confidence, and probably helped reduce perceived risk (Stiefel, 1999: 112).

One year into the IFP programme only two growers who had been a part of the programme during the twelve months thought IFP had 'increased risk'. Most of the other growers involved in the programme "thought [economic] risk was minimized if the monitoring and the programme were followed correctly" (Stiefel, 1999: 112). "Growers also commented" writes Stiefel, "that the risks of not adopting IFP were greater than the risks in adopting it. The risk of non-adoption was the future loss of market access. These growers felt IFP was inevitable if they wanted to continue exporting apples in the future" (1999: x). Lockie takes this observation one step further by noting that both traditional calendar spraying and the greening strategies pivot on the same 'risk management' axis (2001: 151-155). Furthermore, the management of risk or control that growers can maintain over pests and disease, links risk inextricably to power.

Clean, green, and natural discourses: ideologies and identity

Both IPM and IFP strategies serve not only to maintain export market accessibility, but also to reaffirm one of New Zealand's key ideologies.

Claudia Bell writes:

A powerful concept of New Zealand is based on nature: clean, green and beautiful. The dramatic natural landscape, varied and picturesque, is a source of national pride. Unique flora and fauna feature as the dominant motifs in identity imagery (Bell, 1996: 28).

Indeed, New Zealanders grow up surrounded by nature and are inculcated with ideologies concerning nature. In particular, it is this ideology of New Zealand as the 'clean and green' country which surfaces in the export marketing of New Zealand FFV produce. The 'clean and green' ideology incorporates notions and images of an environment essentially untainted and untouched by humans. In the FFV industry, it implies 'natural', 'unpolluted' and 'organic', and as such

adds value “to products and services recognised as morally and politically superior for consumers. Through ‘green’ marketing, conservation values are commodified” ((Bell, 1996: 51; cf. Beck, 1995: 33ff.).

These ‘commodified conservation values’ can form the basis of what Halkier calls a ‘political consumerism’ (Halkier, 2004: 22-23).

This ideology has been salient since New Zealand’s colonial beginnings. What is surprising, however, is the seemingly constant perpetuation of the ‘clean and green’ ideology during times when the environment was heavily polluted. Bell argues that the ‘beautiful New Zealand’ myth leaves no room for mention of the extreme pollution caused by the very same humans perpetuating this myth:

In an economy that relies on agriculture and forestry, water and landscape abuse, erosion and contamination by toxic substances is widespread. Many pesticides banned elsewhere are in common usage here. Information from the Ministry of the Environment shows that over 10,000 sites in New Zealand might be affected by toxic wastes” (1996: 52).

While Bell’s observations are based on the period before IFP was implemented, they illustrate the strange dichotomy of identity imagery used by New Zealanders at that time. On the one hand there is a ‘clean and green’ ideology manifest in New Zealand identity construction and tourism; while on the other, there is behaviour that contradicts the very essence of that same ideology.³¹ “We are able to sustain this ‘clean and green’ image”, writes Bell, “far better than we sustain land use” (1996: 53).

³¹ The ‘clean and green’ slogan actually arose specifically during New Zealand’s nuclear-free activities; after the bombing of the *Rainbow Warrior* and during New Zealand’s stand against France on nuclear testing issues (Bell, 1996:53). However, before the clean and green slogan was formed, notions of a clean and green beautiful New Zealand were already set firmly in New Zealand identity imagery.

Did New Zealand's pipfruit industry leaders realize the irony here when they began introducing more sustainable horticultural practices? This is hard to know, however, the IFP programme for kiwifruit certainly played a role in reducing this contradiction. In the kiwifruit industry IFP was arguably more needed in terms of implications for New Zealand's identity construction; not only because kiwifruit is closely tied to the 'clean and green' ideology, but also to one of two key signifiers of New Zealand's identity, the kiwi bird.³² The success of the kiwifruit industry's transfer to an IFP programme led the way for other FFV to follow in lowering chemical use, which reinforced the legitimacy of New Zealand's identity constructions. With the pipfruit industry hot on the heels of the kiwifruit industry, FFV marketers could once again legitimately claim that New Zealand's FFV industry was turning towards greening strategies (*cf.* Campbell, 1996).

Integrated Fruit Production was not the only successful greening strategy employed during this time. In 1996 the IPM based *eco2000* project began. The focus of the *eco2000* project was economical and ecologically sustainable land management practices. Director of the project, Joan Pollock, was careful to clarify that this does not mean no sprays, rather, a change in chemical use to make it more effective. The *eco2000* project was positive and non-judgemental of growers practising 'unsustainable' land management such as using large quantities of chemicals. Instead the consumer-driven focus pertained to the clean and green image that New Zealand was promoting. "Mr Salmon [a participant in the project] said New Zealand's clean green image was still potent, but increasingly it was becoming more vulnerable. A survey in Japan showed New Zealand products were not seen as safe as those from

³² The other key signifier according to Bell, is the New Zealand fern (1996:28).

Switzerland, Canada, or Australia" (TO, June 1996: 22). Despite the problems with IPM adoption, the *eco2000* project was remarkably successful.

This wider industry imagery was presumably transferred down to the local grower level, where growers could legitimately base their grower identity in 'clean and green' imagery through their greening strategies. During the initial adoption phase of IFP a pipfruit grower said:

'Hopefully we'll still be able to sell our crop. That's what it boils down to, doesn't it? I don't think there'll ever be any premiums in it [ENZA-IFP], but if that's what the market wants, then we're going to have to do it. We don't actually like going out there and spraying, people seem to think we do. The less we can use the better. I would think in the long term it would probably be important. We've got to keep that, or try to get that clean, green image' (Stiefel, 1999: 92-93).

Not only is the imagery salient in marketing New Zealand FFV, but it is also salient in grower identity construction. Indeed, the identity construction of growers is intersubjectively negotiated through the salient meanings inherent in such iconic imagery as the 'clean and green' ideology (*cf.* Jackson, 1998).

Similarly, the terms 'nature' and 'natural' are also both contested and ironically dichotomised through the meanings that emerge in social discourse. Beck (1995) poses the questions – what is nature and is anything truly natural anymore? The irony, it seems, is that:

Upon closer inspection, all who talk of 'nature' in the sense the word pretends to, namely that which is untouched, free of human creation and destruction, have always refuted themselves. To speak thus presupposes amnesia – of the fact that talk of nature conjures up the whole dichotomy, the history of nature's subjugation, cultivation and destruction, the history of concepts of nature – and it also begs the question of the sense in which the word 'nature' is used, when the subject under discussion is the shaping of life in society and the provision of social norms. ...There are manifold reminders of the fact that the meanings of 'nature' do not grow on trees, but must be constructed (1995: 39).

Like 'clean and green', 'nature' is a social construction legitimated through discourse while supposedly existing apart from that discourse. Let us take for example the assumed dichotomy of traditional pesticides and greening strategies. If an IFP programme encourages the introduction of beneficial foreign insects into an environment to combat pest problems, how much more 'natural' are these strategies than using a combination of chemicals that 'naturally' occur in the environment? Beck (1998) would argue that the answer to such a question is socially gauged – and while agreeing with him, I would also suggest that while 'natural' (if I may use that problematic term) untainted environments may still exist in various parts of the world, there is very little that is 'natural' about pipfruit orcharding. Almost every aspect of pipfruit orcharding (or any form of orcharding for that matter) is contrived, controlled, and unnatural. Yet, through greening strategies associated with the current IFP programme orchardists actively negotiate these kinds of socially constructed issues in order to form and locate their identity as New Zealand pipfruit growers. They may even adopt such strategies with the intention of bettering the environment; of making it 'more natural'.

Organics discourse

The increase in knowledge of organic growing systems contributed to a complex organics discourse that continues to this day, with a driving question behind it: can organic growing systems effectively replace 'conventional agriculture'? (Stanhill, 1990; Campbell 1996; McKenna and Campbell, 1999). While this question continues to circulate in organics discourse, it seems that organic growing systems will continue to exist in opposition to popular growing systems, despite programmes such as IFP that could be used as a bridge to organics. Lockie (2001) contends that organics is conveyed through

print-media as the 'other' to the globally perceived norm – agrichemical pesticide management schemes. This apparent inversion of logic locates the use of chemicals as the normal behavior for orchardists; “due to its ability to be incorporated into constructions of risk management and control” (Lockie, 2001: 155). It is equally feasible however, that this question has historically served to increase numbers of organic orchards while also influencing a general greening environmentalism of the industry.

In 1997 *The Orchardist* included several articles in the 'News and Letters' sections on a number of issues connected to organics. The main point of concern was growers selling fruit they claimed was organic when in fact it was only spray-free for one season. *The Orchardist* strongly urged growers to stop misleading their consumers because it “is unfair to the certified organic growers and might even be in opposition to the Fair Trading Act” (TO, Feb. 1997: 5).³³ However, the other focus point of discussion was the international opportunities for certified organic growers. It seems that a number of growers recognised higher economic benefits attributed to organic growing and accordingly decided to advertise their fruit as organic. In effect, those growers were exhibiting a grower identity that was not warranted by their actual growing practices, or by the organic certification agencies. In this regard it becomes apparent that growers' identity constructions exist intersubjectively with growing discourse (see Burch et. al. 1996; *c.f.* Jackson, 1998).

Despite the increase in greening strategies over the past 15 years, organics itself is seldom addressed in New Zealand's leading FFV journal, *The Orchardist*. *Growing Today* magazine includes more articles directly concerning

³³ The three governing authorities that certify in organics today and are recognised in export are *BIO-GRO New Zealand*, *Agriquality (Certenz)*, and *Demeter*.

organics than *The Orchardist*, but fewer articles indirectly concerning organics (through IPM or IFP strategies that are compatible with organics philosophy, for example). This may indicate that *The Orchardist* is more concerned with discourse concerning and impacting on greening of the pipfruit industry, whereas *Growing Today* is more concerned with discourse concerning and effecting transfer from conventional agriculture to organic agriculture simply because organics is not mainstream.

In 2003 organics accounted for nine percent of the pipfruit industry (Pipfruit New Zealand, 2004: 2) and approximately ten percent of pipfruit industry literature concerned organics. While content analysis of *Growing Today* and *The Orchardist* found *Growing Today* to contain more articles concerning organics than *The Orchardist* it also signalled that organics related articles in *The Orchardist* contained more industry-specific and specialised knowledge. During the introduction period of the IFP programme IPM and organics discourse appeared in *The Orchardist* less often than before, whereas in *Growing Today* it remained reasonably consistent. After the introduction period organics discourse regained its earlier frequency in *The Orchardist* literature. This would suggest that organics discourse remains an important and influential aspect of the pipfruit industry. Before the introduction of IFP organics was positioned discursively as the 'other' to traditional spray programmes and while it remains largely so, the gap between organics and the newly incorporated IFP programme has closed considerably. This is because IFP management requires more attention to pest to predator ratios in the orchard and the use of soft chemicals for controlling pests, and as such holds a similar philosophy to organic growing systems. I would contend that it is this link that signals the necessity of addressing organics discourse in relation to one of the focal points of this thesis - IFP. Furthermore, the IPM and IFP programmes that surface throughout the agricultural industry may

even be indicative of the discursive nature of the organic, natural, and 'clean and green' discourses. Indeed, as Wardle writes; "With its emphasis on constant and careful monitoring, IFP subsequently prove[s] a tremendous stepping stone to organics" (TO, 2001: 20).

Food for thought

This chapter has explored how the theory addressed in chapter four can be applied to some of the key discourses that comprise New Zealand's pipfruit industry literature. It has also illustrated some of the dynamics at play within the industry concerning the negotiation of locations of discourse, power, agency and risk. Power, agency, and risk are not always equally accounted for in specific discourses, such as organics. Moreover, they are not always explicitly discussed in these terms. Risk in particular has been identified as the central discourse that saturates the pipfruit industry both explicitly and implicitly in public literature. Also discussed are two discourses operating simultaneously with risk; the 'clean and green' 'natural' discourse and organics. While risk is clearly more ubiquitous of these discourses, I would contend that the ideologies on which natural and organic discourses operate are central to the world-making capacities of growers and consumers alike. Furthermore, since this project is primarily concerned with greening strategies, it follows that the discourse analysis should address a variety of discourses that operate within that rubric. I would contend that the clean and green ideologies and organics discourse are equally as important as IPM and IFP since they all combine to provide a generalised greening of the pipfruit industry and of pipfruit industry discourse.

Conclusion

This thesis has discussed some key socio-political issues connected with pesticide use in the pipfruit industry and how industry discourse both reflects and shapes changes in pesticide use. Two current industry discourses that have dominated this thesis are greening strategies and risk. While I have argued that risk is the most diverse and *constant* discourse that prevails throughout the history of pesticide use in the pipfruit industry, I have also acknowledged the existence and influence of other discourses in eliciting changes in pesticide use. Greening discourse is *increasingly* influential in decision-making processes of growers. It also influences the identity of both pesticides and New Zealand's pipfruit industry. Changes in pesticide discourse have arisen in conjunction with greening discourse and the two have contributed to a space in which the lowering of pesticide use could come to fruition.

Reductions in pesticide use have been widely discussed in electronic and print media. *The Orchardist* has been identified as a key literature source of industry-specific information for growers to draw on, and has also been identified as a contributor to and producer of pipfruit industry discourse. This discourse includes substantial attention to the seemingly endless role that risk plays in daily orchard processes, and to the introduction of greening strategies. *The Orchardist* and other widely available industry-specific literature (such as the *Fruited Facts* newsletter, or *Growing Today* magazine), illustrate ways in which growers can manage risk, while also reflecting grower identity ideologies, such as the 'good farmer'. Other industry-specific literature has been used throughout the thesis in order to illustrate dominant

discourses that shape the pipfruit industry. In doing so, the thesis itself not only reflects, but also creates and reinforces aspects of industry discourse that I – the individual agent – interpret as influential and note worthy.

Risk and greening issues

There are several objects of knowledge through which the notion of risk arises; market quality, politics, economics, health and environmental sustainability. I suggest that risk may be interpreted as the central episteme that links all pipfruit pesticide discourses, and as such the pipfruit industry may also be interpreted as what Heller calls 'riskocentric' (Heller, 2004: 82; see also 92-93). The extensive discourse concerning pesticide-related risk in terms of environmental sustainability, health, trade and economics has provided a space in which reduced pesticide management or 'greening' strategies could emerge. The most prominent are IPM, IFP, and organics. This thesis has focused on IFP in particular because when the IFP programme was introduced by the NZAPMB and The NZFF, the adoption rate was remarkably high, and because it has been widely discussed in pipfruit industry literature over the past eight years. While organics has also increased in popularity over this period – both in production and consumption – it has not been promoted to producers to the same extent as the IFP programme. Similarly, IPM has not been discussed as much as IFP (except IMC, which has been both well promoted and successful in terms of managing mite populations), and has been largely replaced by IFP. While promoters of the IFP programme have maintained that IFP is merely an extension of IPM, this thesis has addressed the general IPM strategies separately from the IFP programme. The reason for this has been to illustrate some of the ways in which discourse operates on a practical level.

The content analysis of this project signals a lowering frequency of pipfruit industry-specific IPM discourse and an increasing frequency of IFP-specific discourse. I would suggest that IFP is currently being discussed as an extension of IPM, and that in the near future the use of the term IPM in pipfruit industry discourse may be entirely phased out. Current discourse dictates an emphasis on IFP as a *refinement* or *extension* of IPM. While the research material points toward trends in the phasing out of IPM terminology and the rise in IFP terminology, it is 'open ended', which is to say it is not a completed project. This is because discourses are not 'complete', in the sense that they are continually transforming through re-negotiations by various actors interacting within.

What is undeniable is that the rise in greening discourse over the past fifteen years in particular has created an industry where traditional spray programmes and heavy pesticide use are no longer acceptable. In a short period of time (relative to New Zealand's pipfruit industry history) there has been a dramatic shift away from market acceptance of the use of organochlorines and organophosphates. This shift in discourse has been matched by the industry's move away from the use of these hard chemicals.

On a cautious note, however, I suspect that the lowering of pesticide use does not necessarily equate to a lowering of pesticide dependence. At first glance, the IFP programme appears to cater for the lowering of pesticide dependence, but growers may not be actively encouraged to reduce their dependence on pesticides through this programme, rather they are being taught ways in which their dependence can be further secured. Growers are encouraged by the industry to rotate chemicals in order to avoid pest resistance to pesticides. On the other hand, New Zealand now boasts some of the lowest pesticide use

in the global pipfruit industry, and the IFP programme is one of the most successful in the world. New Zealand has managed to maintain IPM programmes on crops such as kiwifruit and tomatoes and has maintained a successful IFP programme that has resulted in pesticide consumption halving in the past ten years. Growers are predominantly satisfied with their lowered insecticide use because economic and market risks are effectively managed through the IFP programme and produce continues to meet export MRL standards. Likewise, consumer demands are satisfied because pesticide use has dropped markedly and perceived threats to health have presumably been alleviated without the cost of fruit increasing. In a short time then, IFP has emerged and become the norm for New Zealand's pipfruit growers.

Production of knowledge

Discourse is concerned with significations and categorisation of objects of knowledge, and in the pipfruit pesticide industry the primary categories identified in this research project include history, greening strategies (such as IPM, ENZA-IFP, and organics), transfer of technology, sources of old and new knowledge, economics, global pipfruit industry/market, politics and regulation, and risk. Chapter two illustrates both the ways in which pipfruit pesticide discourse produces and maintains these categories, and also how dominant discourse and power serves to influence changes in the industry. The discussion concerning deregulation of the NZAPMB, for example, led to industry changes that continue to impact on New Zealand's growers today, and dominant discourse currently reaffirms the inability to return to a regulated market (Walker, 2005a). Similarly, consumer discussion of agrichemical over-use initiated huge changes in modes of pipfruit production and supported the introduction of IPM and IFP programmes (see Carson,

1962; see also Cowan and Gunby, 1996). The discussion continued in grower meetings and technical discussions (held during the introduction of ENZA-IFP) that created a feedback loop resulting in growers aiding refinement of the programme, which in turn impacted on the consequent actions and agency of growers (Walker, 2005d: 17). The meetings and technical discussions provided a space where growers could scrutinize and refine the IFP programme. In this way the growers were perhaps most significantly able to manifest individual agency within the IFP programme. In contrast, growers had less choices regarding which pesticides they could use in the implementation of the programme, initially because few IFP-friendly 'soft' pesticides were available during the introduction phase of ENZA-IFP, but also because the agency of the grower was essentially limited to a choice of whether and when to spray (see Walker, 2005b; *cf.* Vanclay and Lawrence, 1992). The increase in pesticide options over the next few years secured more influence of growers over the chemical companies due to increased consumption choices.

Final food for thought

New Zealand pipfruit growers are today part of a complex industry. Tangible manifestations of discourse exist in one form as publicly available literature that both reflects and reaffirms somewhat intangible locations of power, agency, and risk. This content and discourse analysis of such literature has also illustrated the complexity of the pipfruit industry by highlighting various discourses that have arisen throughout (predominantly recent) history. The overwhelming impact and success of greening strategies in the FFV sector over the past fifteen years in particular, has strengthened New Zealand's claim to the clean and green image.

Will we ever see pesticides in a negative-nostalgic discourse in which they feature as an almighty evil that swept over the 20th century and have since been eradicated? I don't think so. But they are slowly becoming symbolic of many things that healthy living does not condone. As McKenna (1997) and others have stated, it seems that pesticides may always be a 'necessary evil'. What I find interesting is the ways in which discourse relocates and renegotiates meanings inherent in pesticide use in order to recreate pesticide use (albeit in dramatically smaller quantities) as an acceptable and accepted necessity.

Appendices

Appendix 1.1

Source: *The Orchardist*, November 2001: 9



DUPONT

**KICK 'EM
in the
GUTS**

- Unique mode of action
- Relatively low mammalian toxicity
- Ideal product for use in I.F.P. programmes
- No cross-resistance to existing insecticides
- Selective to beneficial insects and pest predators
- High performance codling moth and leafroller control at low rates of product
- Rapid halt of feeding effect provides excellent crop protection
- Excellent building block for resistance management strategies
- Very good ecotoxicological and environmental profile
- Very Rainfast

Avaunt
30WG INSECTICIDE
PIPFruit

FREEPHONE 0800 65 80 80
www.dupont.co.nz/ag

Appendix 1.2

Source: *The Orchardist*, December 2000: 1

The 
friendliest
pest solution
in IFP 



Mimic is target specific. It controls leafroller and codling moth while keeping your beneficial insects safe.



 Fruited Supplies
 Dow AgroSciences

Appendix 1.3

Source: *The Orchardist*, September 1998: 23

Leaf Roller & Codling Moth - Gone. First Ball.. Clean Bowled... MATCH[®]

Now get targeted and effective pest control with MATCH.

New MATCH insect growth inhibitor sets a new standard in selective control of Leafroller and Codling Moth in apples.

MATCH is rainfast and longer lasting, so a second application is not necessary for a further 28 days.

MATCH is soft on beneficials, IPM/IEP compatible and gives excellent fruit finish.

MATCH - the obvious choice for your opening attack this spring.

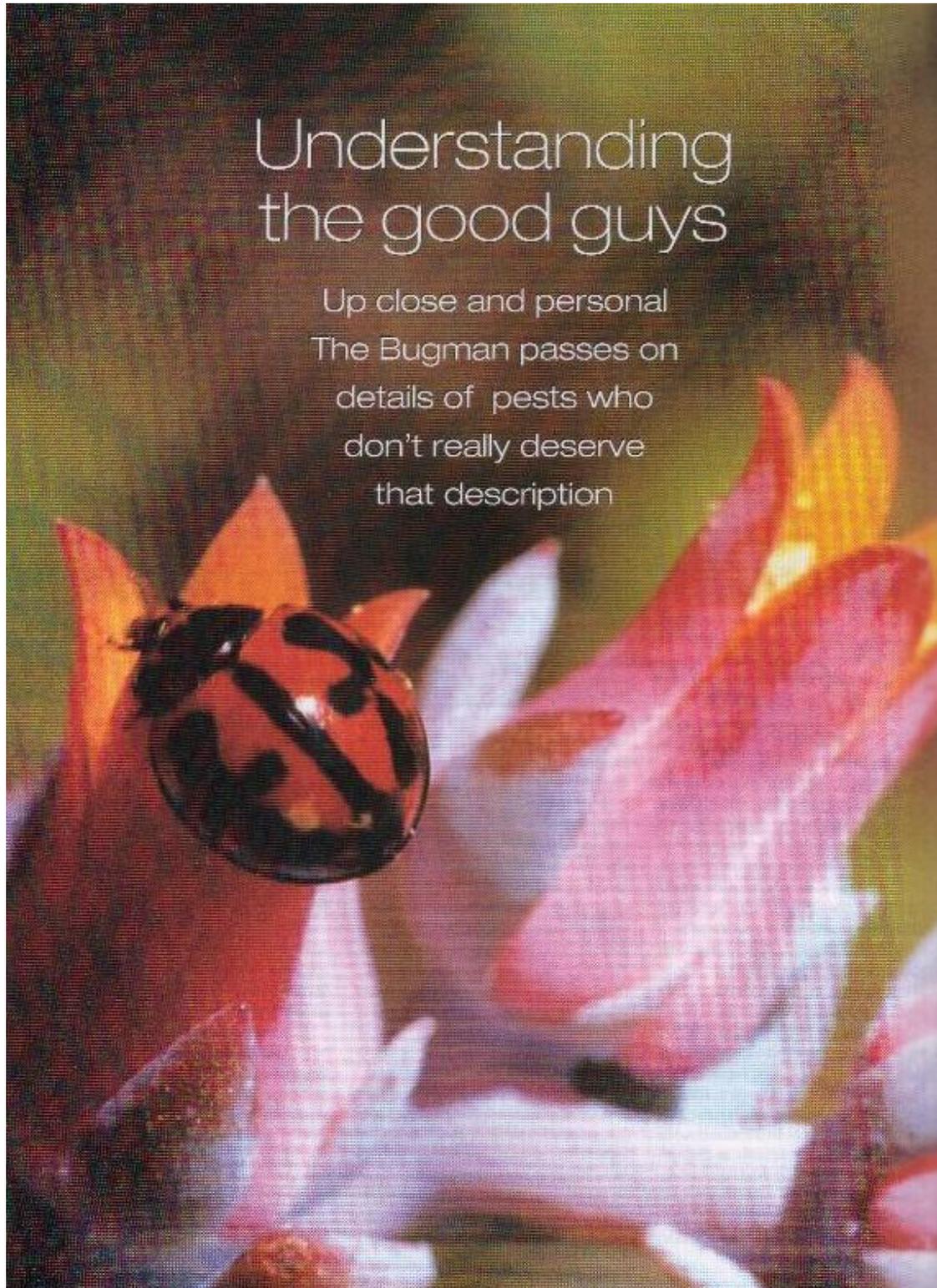
CAUTION
MATCH

NOVARTIS

MATCH is a registered trade mark of Novartis AG, Basel, Switzerland.
CAUTION: Keep out of reach of children.

Appendix 1.4

Source: *Growing Today*, December 2003: 46



Appendix 2.1

Combined Tally 1996-2004

Growing Today Magazine	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total
1=slightly related to IPM	0	0	3	7	7	3	4	4	0	28
2=organic sprays	0	0	5	1	2	0	0	0	0	8
3=organic subst. method of pest control	0	0	4	0	2	1	1	1	0	9
4=problems with chemicals	0	0	1	1	0	1	1	1	0	5
5=spray residues	0	0	0	1	1	2	0	2	0	6
6=advertisements (chemical or IPM)	0	9	16	15	13	5	6	4	0	68
7=pesticides vs. new technology	0	0	1	6	0	1	2	0	0	10
8=IPM related - IPM not specifically mentioned	0	0	0	2	2	3	2	4	0	13
9=IPM specific : IFP not mentioned	0	0	0	1	2	0	3	0	0	6
10=pipfruit arthropods	0	9	1	1	4	3	7	3	0	28
11=IFP specific but IPM not mentioned	0	0	0	0	0	0	0	0	0	0
12=IFP and IPM specific terminology	0	0	0	0	0	0	0	0	0	0
No. of Pages	958	938	1042	984	976	960	960	960	880	
Percentages	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total%
1=slightly related to IPM	0	0	10	20	21	16	15	21	0	15
2=organic sprays	0	0	16	3	6	0	0	0	0	4
3=organic subst. method of pest control	0	0	13	0	6	5	4	5	0	5
4=problems with chemicals	0	0	3	3	0	5	4	5	0	3
5=spray residues	0	0	0	3	3	11	0	11	0	3
6=advertisements (chemical or IPM)	0	50	52	43	39	26	23	21	0	38
7=pesticides vs. new technology	0	0	3	17	0	5	8	0	0	6
8=IPM related - IPM not specifically mentioned	0	0	0	6	6	16	8	21	0	7
9=IPM specific : IFP not mentioned	0	0	0	3	6	0	12	0	0	3
10=pipfruit arthropods	0	50	3	3	12	16	27	16	0	15
11=IFP specific but IPM not mentioned	0	0	0	0	0	0	0	0	0	0
12=IFP and IPM specific terminology	0	0	0	0	0	0	0	0	0	0
Totals (100%)	100	100	100	100	100	100	100	100	100	100

Appendix 2.2

Combined Tally 1996-2004

Orchardist Magazine	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total
1=slightly related to IPM	5	9	8	4	-	-	-	-	-	26
2=organic sprays	2	3	5	1	-	-	-	-	-	11
3=organic subst. method of pest control	0	4	3	6	-	-	-	-	-	13
4=problems with chemicals	5	5	8	4	-	-	-	-	-	22
5=spray residues	9	8	2	2	-	-	-	-	-	21
6=advertisements :pesticides	14	14	34	14	23	18	-	-	-	117
7=pesticides vs. new technology	2	5	4	5	-	-	-	-	-	16
8=IPM related - IPM not specifically mentioned	7	3	4	2	4	3	-	-	-	23
9=IPM specific : IFP not mentioned	1	1	2	1	3	1	-	-	-	9
10=pipfruit arthropods	10	22	15	7	-	-	-	-	-	54
11=IFP specific but IPM not mentioned	2	15	6	8	10	6	-	-	-	47
12=IFP and IPM specific terminology	0	5	1	1	1	1	-	-	-	9
13= economics and international market	22	39	47	37	-	-	-	-	-	145
14=pipfruit politics	29	32	52	46	-	-	-	-	-	159
15=advertisements for other chemicals	31	38	85	61	64	42	-	-	-	321
No. of Pages	616	651	722	705	723	700	745	745	723	
Percentages	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total
Orchardist Magazine	1996	1997	1998	1999	2000	2001	2002	2003	2004	
1=slightly related to IPM	4	4	3	2	-	-	-	-	-	3
2=organic sprays	1	1	2	1	-	-	-	-	-	1
3=organic subst. method of pest control	0	2	1	3	-	-	-	-	-	1
4=problems with chemicals	4	2	3	2	-	-	-	-	-	2
5=spray residues	6	4	1	1	-	-	-	-	-	2
6=advertisements :pesticides	10	7	12	7	22	25	-	-	-	12
7=pesticides vs. new technology	1	2	1	3	-	-	-	-	-	2
8=IPM related - IPM not specifically mentioned	5	1	1	1	4	4	-	-	-	2

9=IPM specific : IFP not mentioned	1	0	1	1	3	1	-	-	-	1
10=pipfruit arthropods	7	11	5	4	-	-	-	-	-	5
11=IFP specific but IPM not mentioned	1	7	2	4	10	8	-	-	-	5
12=IFP and IPM specific terminology	0	2	0	1	1	1	-	-	-	1
13= economics and international market	16	19	17	19	-	-	-	-	-	15
14=pipfruit politics	14	21	16	19	-	-	-	-	-	16
15=advertisements for other chemicals	22	19	31	31	61	59	-	-	-	32
Total (100%)	100	100	100	100	100	100	-	-	-	100

Dashes indicate that these categories were not analysed because they were deemed superfluous

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