20 Years of Pest Management

The Past, the present and (maybe) the future

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In British Columbia, the first meeting "IPM in Landscapes" was held in 1994

INTEGRATED PEST MANAGEMENT IN LANDSCAPES: Making the Transition

February 16 & 17th 1994
TSAWWASSEN INN, Tsawwassen, B.C.

REGISTRATION FORM

Pre-registration deadline: February 1, 19

Photocopy and return by mail

Surname: _____
Dr. / Mr. / Mrs. / Ms. / Miss

First Name: _____
(as you would like it to appear on your name tag)

Title: _____ Company : _____

Street Address / P.O. Box No.: _____

City: _____ Prov. / State: _____ Postal Code / Zip Code: _____

Telephone (Work): _____ (Fax): _____ Telephone (Home): _____

Fee Payment Cheque____Money Order____

Fees are payable by cheque or money order in Canadian dollars made payable to Good & Co.

CONFERENCE DINNER FEBRUARY 16, 1994
- Guest Speaker Jim Taylor, Sports Writer

Enjoy a total change of pace at the IPM Conference dinner. Guest speaker Jim Taylor is one of North America's most entertaining sports columnists. His column runs five times a week and his radio sports editorials have been heard three times a day for the past sixteen years. No stranger to organic fertilizer of the written and verbal kind, Jim's insights are usually right on and funny too.

INTEGRATED PEST MANAGEMENT IN LANDSCAPES: Making the Transition

In BC Interior, the first meeting was organized by BC Ministry of Environment in 1995

IPM in Landscapes Conference : Trends for Interior Climates
Program for Wednesday, March 15,1995

 Printed 3/6/95

8:00 AM - 9:00AM	*Registration & Badge Pick Up*	
9:00 AM	*Moderator*	**Dr. Linda Gilkeson** BC Environment, Pesticide Management Victoria,B.C.
9:00 AM - 9:15AM	*Introduction & Welcome*	**Councillor Robert Hobson** City of Kelowna
9:15 AM - 10:15AM	*Keynote: Least Toxic IPM: Effective Solutions for Landscape Pest Problems*	**Dr. Sheila Daar** Bio-Integral Resource Centre Berkeley,CA
10:15 AM - 10:45AM	*Coffee Break*	
10:45 AM - 11:35AM	*Questions & Answers from Keynote Speaker on IPM in Landscapes*	**Dr. Sheila Daar** Bio-Integral Resource Centre Berkeley,B.C.
11:35 AM - 12:00PM	*BC Environment's IPM in Landscapes Initiatives*	**Dr. Linda Gilkeson** BC Environment, Pesticide Management Victoria,BC
12:00 PM - 1:00PM	*Delegate Buffet Lunch*	
1:00 PM	*Moderator*	**Mike Wan** Environment Canada N. Vancouver,B.C.
1:00 PM - 1:30PM	*Xeriscaping for the Interior*	**Brian Stretch**

From 1996 to 1998, the IEPMA co-sponsored the meeting with the BC Ministry of Environment

Urban Landscapes - Integrated Pest Management Workshop

February 12 and 13, 1998
Sandman Motor Inn, Penticton

Sponsored by the *Interior Environmental Pest Management Association (IEPMA)*, in cooperation with *The Ministry of Environment, Lands and Parks.*

Encouraging and promoting Integrated Pest Management (IPM) strategies within British Columbia is one of the primary goals of BC Environment and the member companies of the Interior Environmental Pest Management Association. Reviews of IPM activities throughout the province have revealed the approach is widely and successfully practiced in landscape management. Initiated in 1993 on Vancouver Island, this requirement was extended to the Southern Interior Region in 1996. Since 1996 it has been a requirement that public sector Service Licencees (e.g., municipalities, school districts, parks departments, colleges, hospitals, etc.) and/or their landscape contractors have approved Pest Management Plans (PMP's) for all pesticide use on public land. There are currently 205 approved PMP's in the Southern Interior Region.

The Pesticide Control Act and Regulation has now been changed to allow the authorization of pesticide applications to public land provided PMP's are in place and approved. For the last two years, annual Service Licence Endorsements have placed an additional administrative workload on licencees and BC Environment staff. It is the intention of BC Environment to pursue the replacement of endorsements by reviewing and approving new or revised existing PMP's in the public landscape sector for up to a 5 year period. For the PMP process to mature, it is hoped that this workshop will provide an opportunity for new licencees, and those already involved in the preparation and execution of PMP's, to share their experiences with pest identification and damage potential, sampling methods, treatment thresholds, alternatives, and program evaluation during this two day workshop. Landscape companies may find this workshop useful in providing their customers with service based on the principles of integrated pest management.

February 12

8:30 am - 9:00 am	Registration
9:00 am - 9:15 am	Welcome and Opening Remarks Dudley Gordon, President, IEPMA
9:15 am - 10:00 am	Dr. Linda Gilkeson and Stuart Craig, BC Environment ***Promoting IPM, PMP development - Where have we come since 1996, and where are we going?***
10:00 am - 10:15 am	Coffee (courtesy of IEPMA)

February 13

8:30 am - 12:00 noon — **INFORMAL WORKSHOP**

1. Jerry Vakenti, BC Environment
   Overview of Existing PMP's
   (The Good, the Bad and the Ugly)
2. Don Stolz, IPM Coordinator, City of Kelowna Parks Department
   PMP Experience in a Public Facility
3. Mario Lanthier, Crop Health Advising and Research, Kelowna
   When to Treat - When to Let It Go- Thresholds for Landscape Pests

Discussions and Questions from

This talk is about events outside of BC that impacted our work in the past 20 years

1- The London conference of 1964

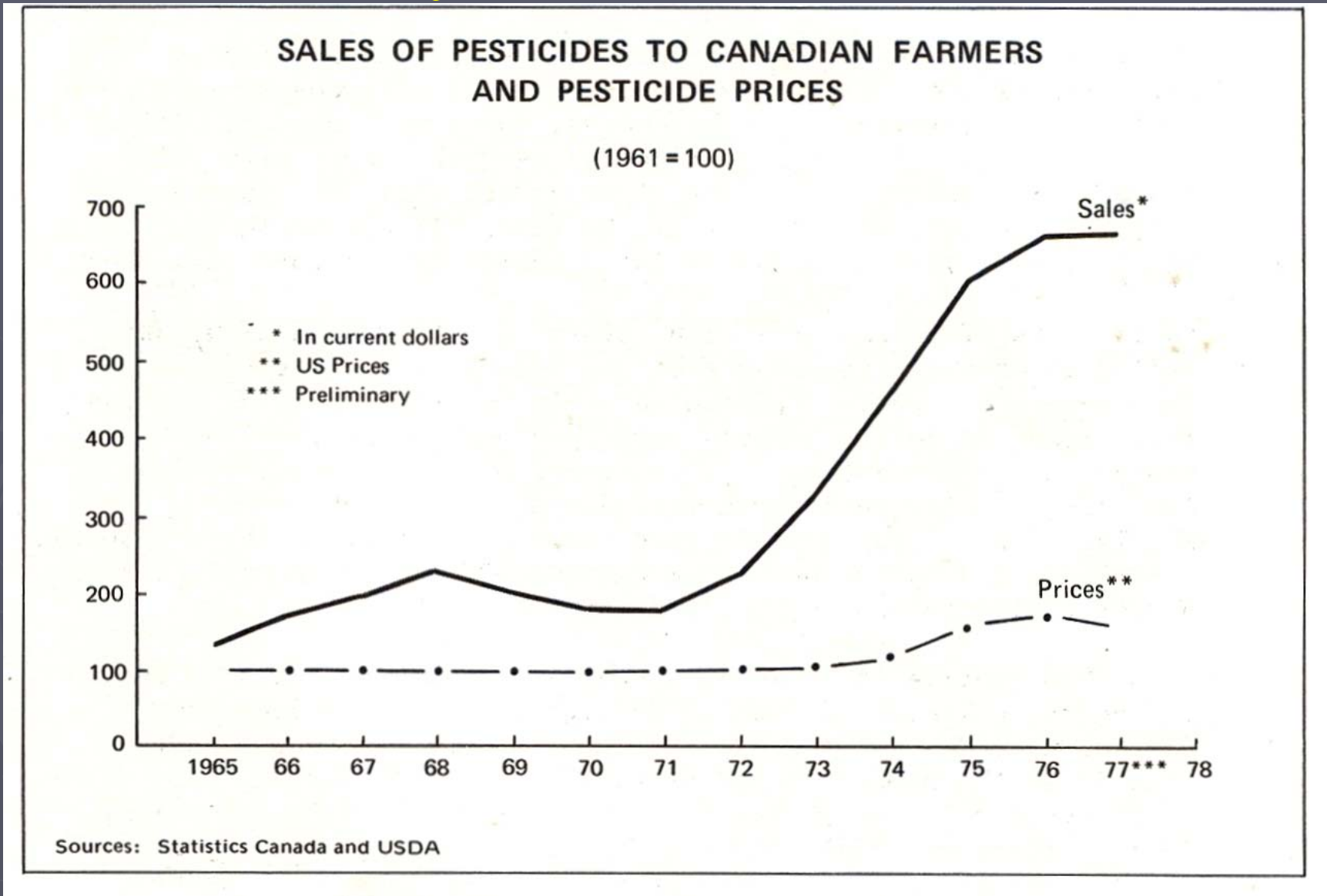
2- The MAMP activation

3- The Industrial Biotest Laboratories

4- The Mendenhall glacier

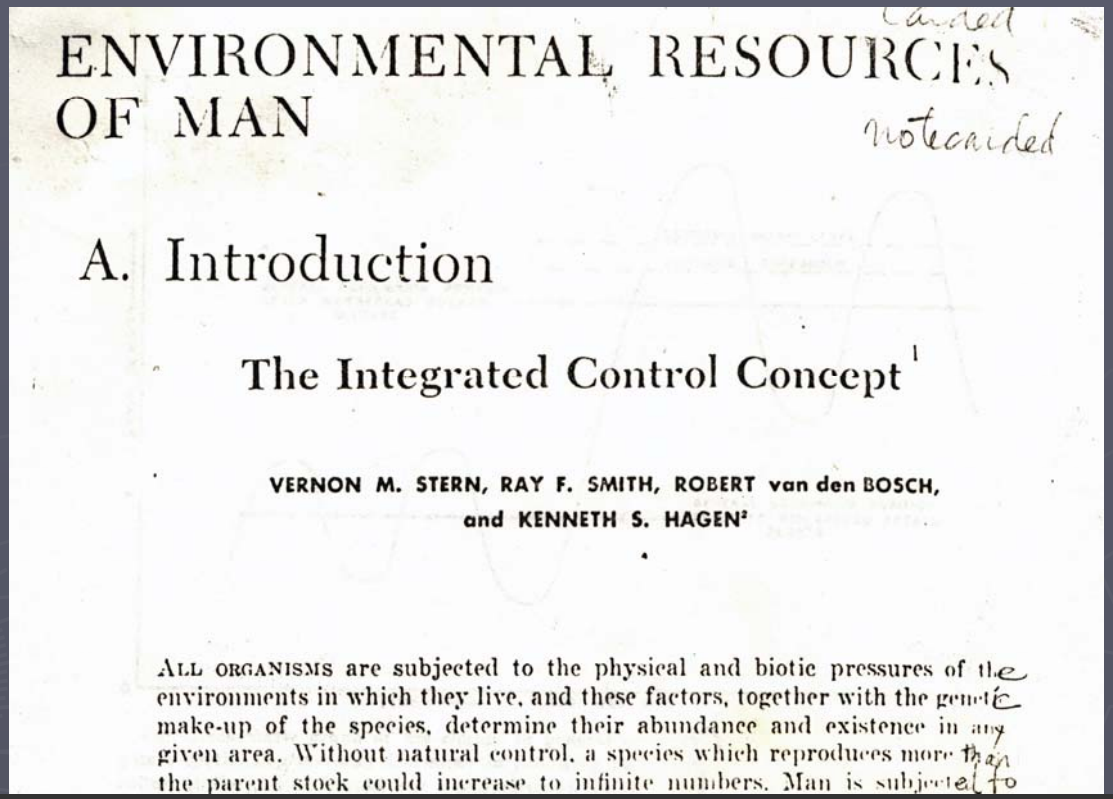
Commercial spraying started in the 1950s mostly in agriculture crops

The sales of pesticides increased in the 1960s and really exploded in the 1970s



Scientists promptly examine this use of pesticides 1959: a landmark paper on "integrated control"

Stern, Smith, van den Bosh, Hagen. 1959. Hilgardia. 29:81-101



ENVIRONMENTAL RESOURCES OF MAN

A. Introduction

The Integrated Control Concept[1]

VERNON M. STERN, RAY F. SMITH, ROBERT van den BOSCH, and KENNETH S. HAGEN[2]

ALL ORGANISMS are subjected to the physical and biotic pressures of the environments in which they live, and these factors, together with the genetic make-up of the species, determine their abundance and existence in any given area. Without natural control, a species which reproduces more than the parent stock could increase to infinite numbers. Man is subjected to

"Integrated control is defined as:
Applied pest control which combines biological and chemical control.
Chemical control is used as necessary and in a manner
which is least disruptive to biological control."

1964: Entomologists working in fruit orchards notice spider mite outbreaks after the sprays

Strategy and Tactics of Insect Control[1]

By D. A. CHANT[2]
Research Laboratory, Canada Department of Agriculture,
Vineland, Ontario

Abstract

Canad. Ent. 96: 182-201 (1964)

The background against which decisions on control strategy and tactics are made is explained and general approaches to pest control are discussed at length. Canadian work on population dynamics that involves research on the processes that regulate numbers is reviewed. The author's conviction that this work provides the best avenue yet explored to the solution rather than temporary alleviation of pest problems is explained. A pest-control strategy for the insects attacking peach in the Niagara Peninsula, in which a logical progression of research, the assignment of priorities, and the concentration of staff and facilities on problems of major importance are advocated, is outlined. Finally, weaknesses in administrative strategy are discussed and it is suggested that the findings of basic

"Integrated control is a program of arthropod population management designed to keep populations below economic tolerance levels by maximizing environmental resistance and supplementing this by the use of selective pesticide applications when economic levels are exceeded."

The words “integrated control” were accepted at the Congress of Entomology in London in 1964

Picture credit: University of Kansas Natural History Museum

1969: The thinking continued and "pest control" became "pest management"

Integrated control, or pest management, does not imply the use of any particular kinds of control agents or procedures. It is the use of the best combinations of controls in organized ways that are designed to avoid harm to anything but pests. Most controls are applied with one objective: to control the harm that pests cause. To apply pest management is to apply controls with two additional objectives: not to harm factors, either other controls or natural regulatory factors, that themselves assist in controlling the harm that pests cause; and to utilize those factors as much as possible as participants in the total control process.

An important scientific paper for urban plants

Raupp et al. 1992. Annual Review of Entomology

Annu. Rev. Entomol. 1992. 37:561–85

ADVANCES IN IMPLEMENTING INTEGRATED PEST MANAGEMENT FOR WOODY LANDSCAPE PLANTS

M. J. Raupp

Department of Entomology, University of Maryland, College Park, Maryland 20742

C. S. Koehler

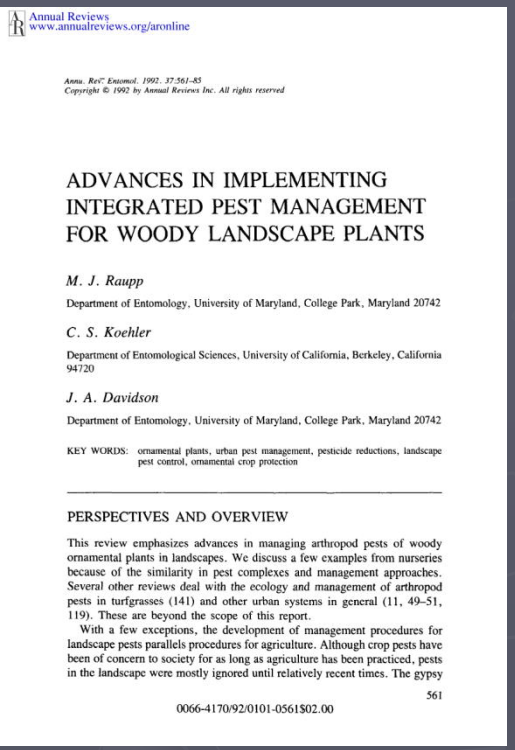
Department of Entomological Sciences, University of California, Berkeley, California 94720

J. A. Davidson

Department of Entomology, University of Maryland, College Park, Maryland 20742

KEY WORDS: ornamental plants, urban pest management, pesticide reductions, landscape pest control, ornamental crop protection

The authors outline the concept of "Key plants" and "Key pests"



Annual Reviews
www.annualreviews.org/aronline

Annu. Rev. Entomol. 1992. 37:561–85

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PERSPECTIVES AND OVERVIEW

This review emphasizes advances in managing arthropod pests of woody ornamental plants in landscapes. We discuss a few examples from nurseries because of the similarity in pest complexes and management approaches. Several other reviews deal with the ecology and management of arthropod pests in turfgrasses (141) and other urban systems in general (11, 49–51, 119). These are beyond the scope of this report.

With a few exceptions, the development of management procedures for landscape pests parallels procedures for agriculture. Although crop pests have been of concern to society for as long as agriculture has been practiced, pests in the landscape were mostly ignored until relatively recent times. The gypsy

0066-4170/92/0101-0561$02.00

In a study of 30,000 plants in Maryland, *Malus* represented only 2% of the plants yet 100% of the trees showed a pest problem.

Thus, for any region, pest management should focus on the plants most likely to have a pest problem and no spraying on plants not likely to have a pest problem.

20 years of Pest Management

The past:
The start of Integrated Pest Management

What is the impact today?

Does it help predict the future ?

What is the status of monitoring today ?

A cross-Canada survey by our company in 2008

Pest management practice	% of companies
True IPM Regular monitoring / Uses non-pesticide methods	
Part IPM and part traditional Some components / Little monitoring, no records	
Traditional pest management Calendar-based spraying / Use broad-spectrum products	
No pest to manage Very few pests / Managed by pruning or pest destruction	

I suggest over 50% of pesticide sprays today are not based on monitoring, but on calendar dates

Pest management practice	% of companies
True IPM Regular monitoring / Uses non-pesticide methods	21 %
Part IPM and part traditional Some components / Little monitoring, no records	36 %
Traditional pest management Calendar-based spraying / Use broad-spectrum products	27 %
No pest to manage Very few pests / Managed by pruning or pest destruction	15 %

Monitoring is very important in IPM.
I suggest it is the most important part of IPM.

Will technology help us with monitoring ?

The plant is “wired” to detect the level of stress proteins

The plant sends a signal via Wi-Fi

You wake up in a panic… your plant is sick !

Program for this talk

1- The start of Integrated Pest Management

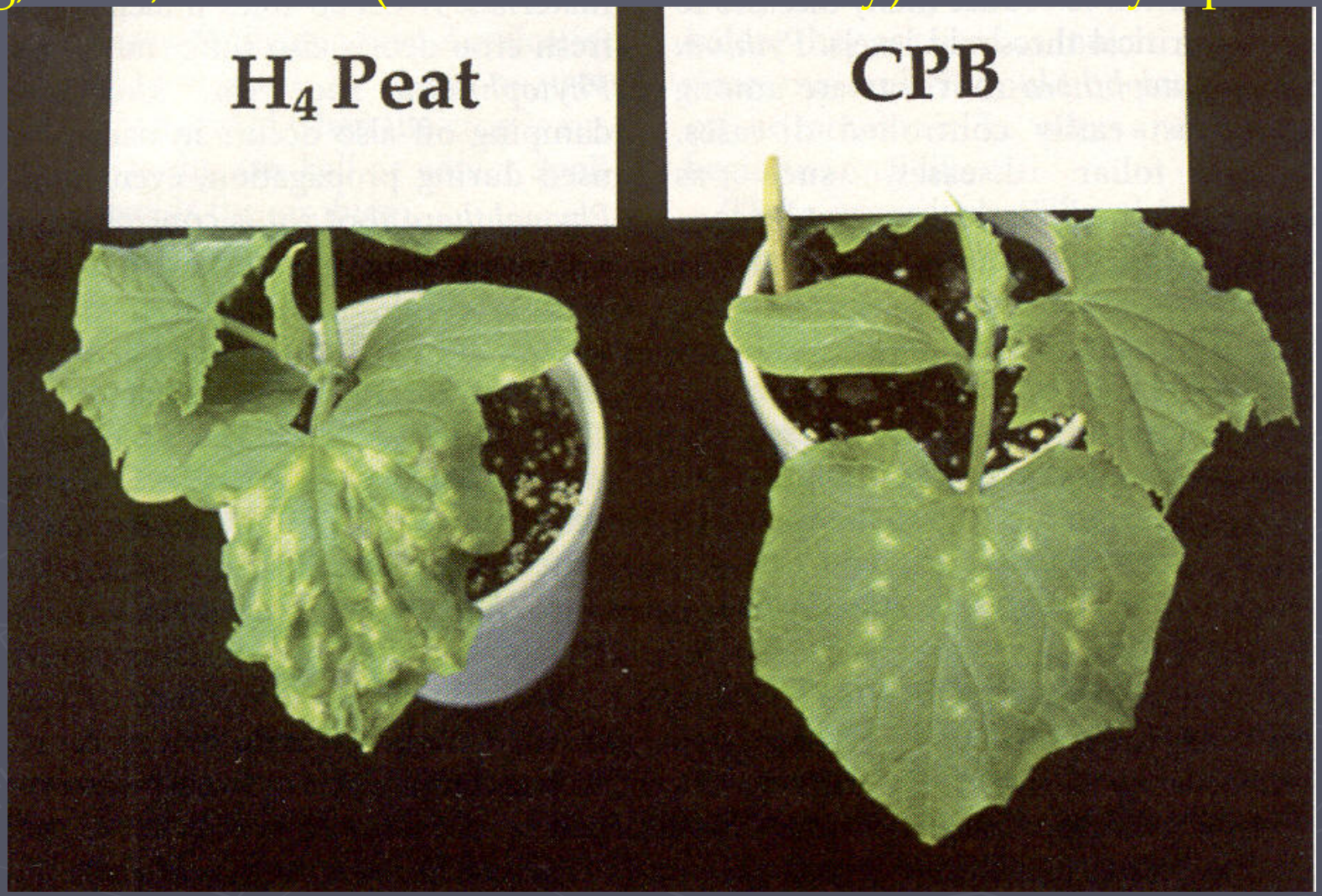
2- The MAMP activation

3- The Industrial Biotest Laboratories

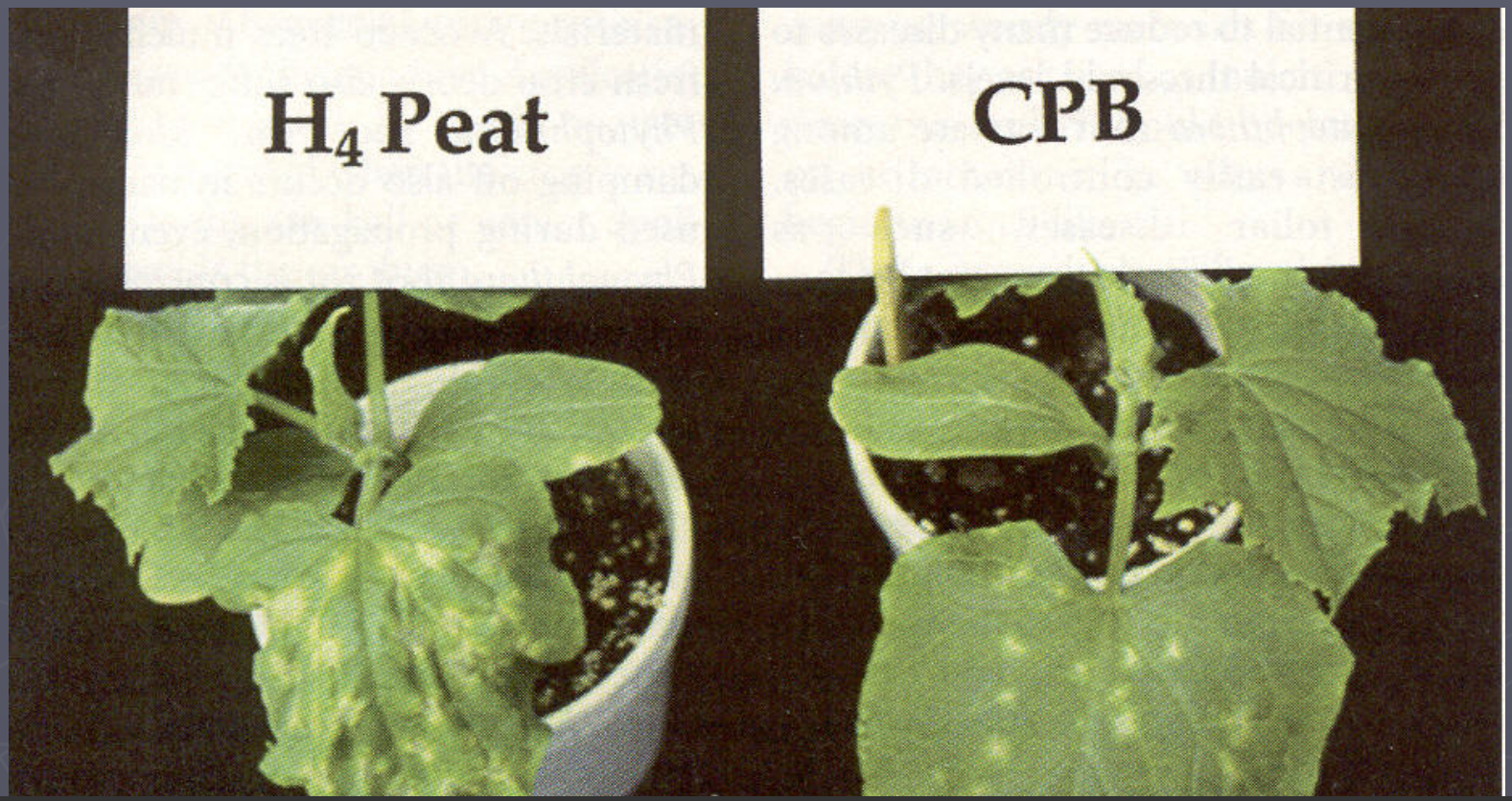
4- The Mendenhall glacier

A landmark paper, the first time scientists clearly demonstrated the quality of soil is important

Zhang, Dick, Hoitink (Ohio State University). 1996. Phytopathology

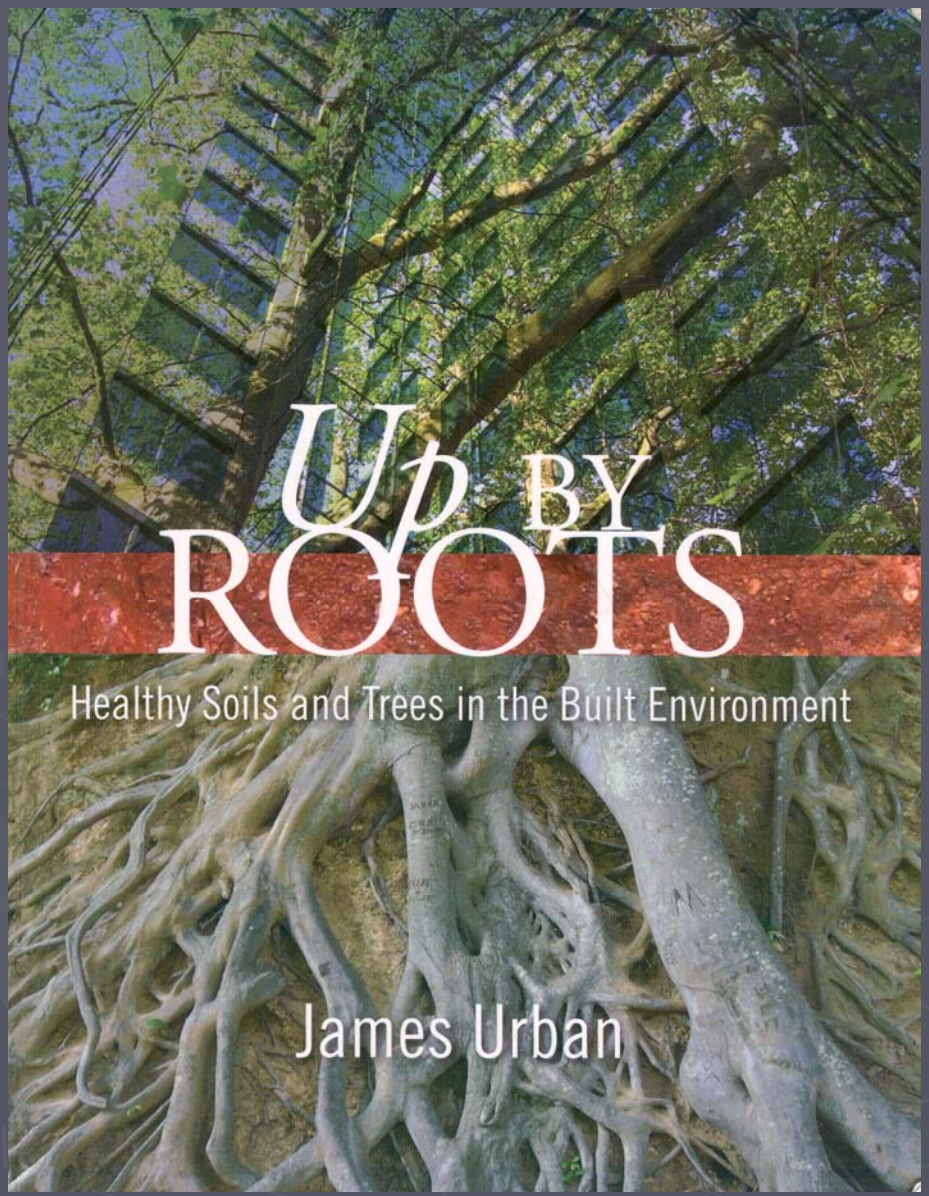


Plant roots growing in healthy soils trigger "immune systems" inside the plant



Cucumber plants were grown from seeds then the pathogen causing anthracnose disease was injected in the front leaf of each plant.
Left: Plants grown in peat moss show much disease symptoms.
Right: Plants grown in composted pine bark show very little disease.

Composts help prevent plant diseases !
In this region, we do a good job with mulching.



Published 2008

Available from
ISA
(International Society
of Arboriculture)

www.isa-arbor.com/webstore

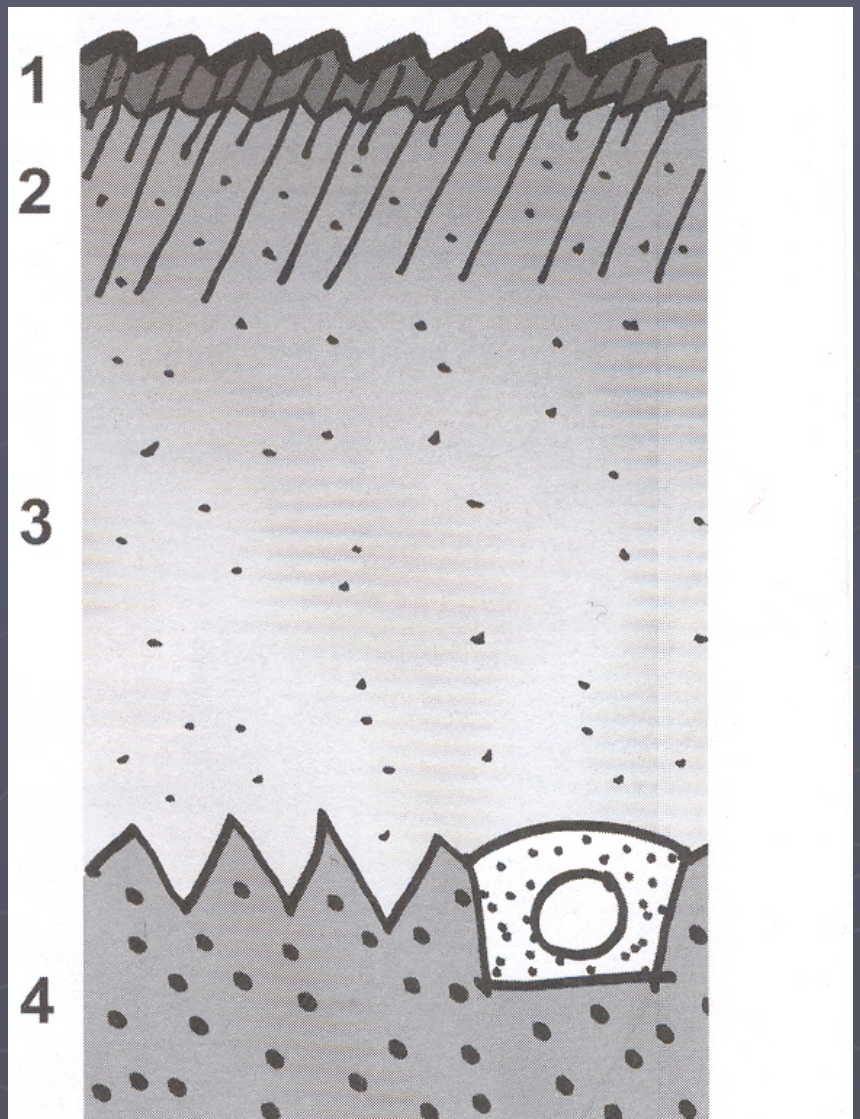
The author suggests compost in the planting hole for difficult urban sites (sidewalks, poor soil)

1 is “O horizon” (surface)
Surface: 5 to 7.5 cm of mulch

2 is “A horizon” (top layer of soil)
Mix 10-cm compost in top 15-cm

3 is “B horizon” (planting hole)
Mix compost 10 - 15% by volume

4 is “C horizon” (below planting hole)
Scarify to ensure water drainage



How does compost trigger healthy plants ? Scientists use molecular biology (it gets complex)

INDUCED RESISTANCE AS A STRATEGY FOR VINEYARD PROTECTION

E. STEIMETZ[1], A. ECHAIRI[2], S. TROUVELOT[1], B. POINSSOT[1], A. CHILTZ[1], C. GUILLIER[1], E. BERNAUD[1], A. KLINGUER[1], M.C. HELOIR[1], X. DAIRE[1], M. ADRIAN[1]

[1] UMR 1347 Agroécologie AgroSup/INRA/uB - Pôle IPM - ERL CNRS 6300 - BP 86510 - 21065 Dijon cedex - France
[2] Wellence – Agroenvironnement – Parc technologique de la Toison d'OR, 28 rue L. de Broglie - BP66517 - 21065 Dijon cedex - France

State of the art

As plants possess an immune system to defend themselves against potentially pathogen microorganisms, disease is finally an exceptional outcome in plant-pathogen interactions.

Compounds called "elicitors" mimick pathogens and their perception by the plant triggers plant defence reactions [1], (Fig. 1). General elicitors belong to various biochemical classes: carbohydrates, lipids, (glyco)peptides and (glyco)proteins. They are active in different plant species and induce a protection against various pathogens. Most of them are secreted by the pathogen or derived from its cell wall during interaction with the plant and are called MAMPs (Microbe Associated Molecular Patterns) [2].

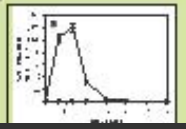
Our research is focused upon oligosaccharidic elicitors and both grapevine / *Plasmopara viticola* (downy mildew) and grapevine / *Botrytis cinerea* (gray mold) pathosystems.

Our objective is to understand the key mechanisms associated to induced resistance (IR) in order to develop the use of elicitors in strategies of crop protection.

Fig.1: Elicitor-induced cascade of events in plant cells.

Methods to screen and study elicitors

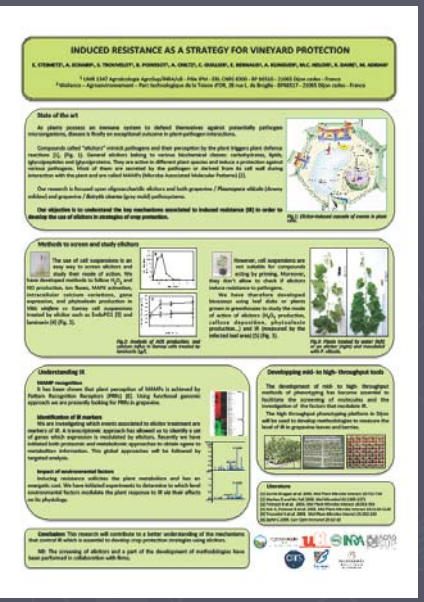
The use of cell suspensions is an easy way to screen elicitors and study their mode of action. We have developed methods to follow H_2O_2 and

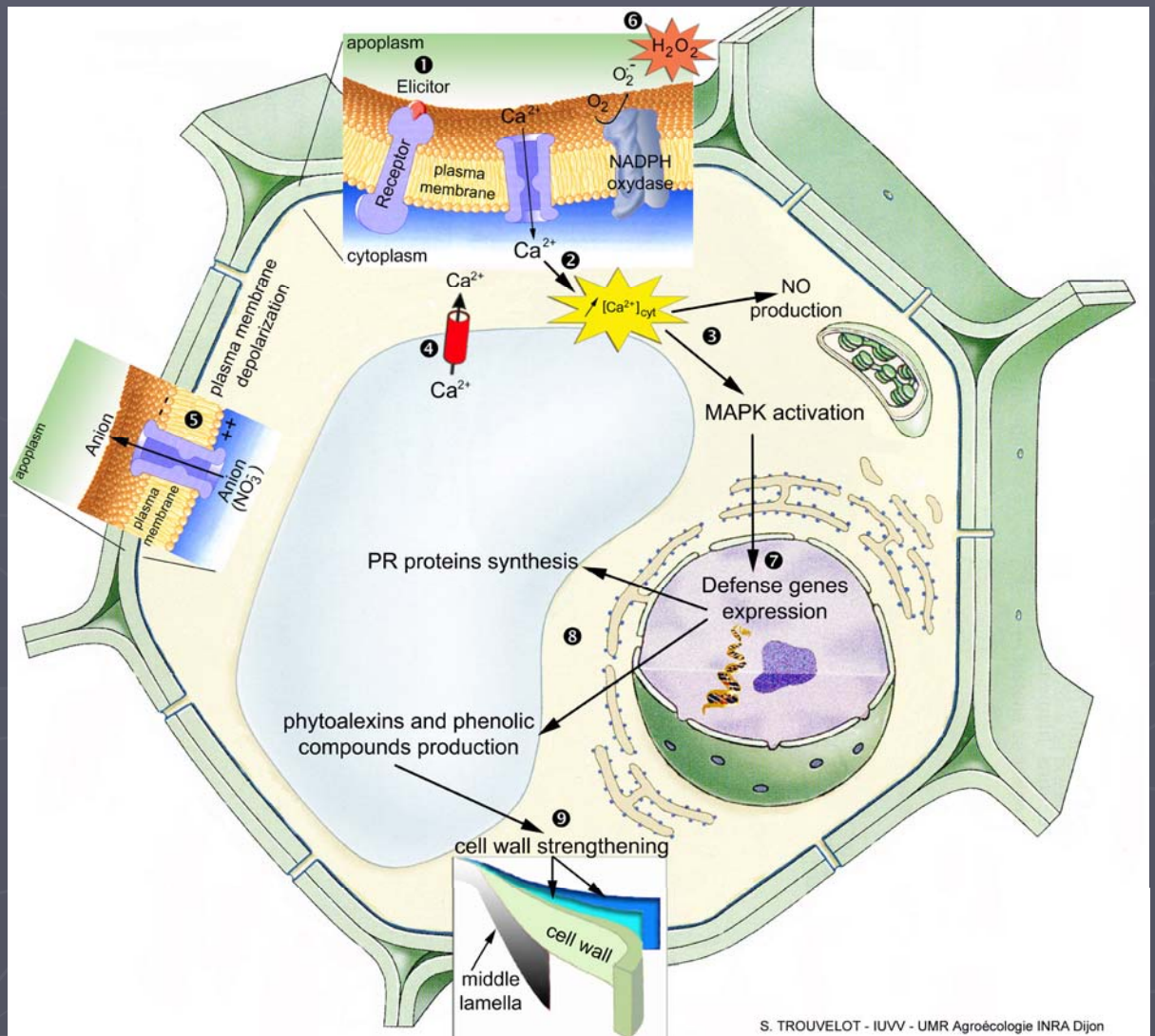


However, cell suspensions are not suitable for compounds acting by priming. Moreover, they don't allow to check if elicitors

"Compounds called 'ellicitors' mimick pathogens
and their perception by the plant triggers plant defence reactions.
Ellicitors are active in different plant species
and induce a protection against various pathogens.
Most are called MAMP (Microbe Associated Molecular Patterns)."

For example, compounds that mimic pathogens trigger the production of proteins that are associated with disease resistance





20 years of Pest Management

The past:
Using composts to stimulate plant health

What is the impact today?

Does it help predict the future ?

A conference in 2012 in France

Attendance: 705 persons from 50 countries

Humic acid, Kelp, Fish fertilizer, Amino acids are now called “biostimulants”

Seaweed extracts are biostimulants

Extensive research by B. Prithiviraj, Dalhousie University, NS

There are many, many products in Europe

A-109

Cytoplant®-400: a natural biostimulant for increase yield and quality on fruit trees

Daymsa

E. Martin[a], C. Solans[a], D. Bernad[a]
[a]Daymsa, Camino de Enmedio 120, 50013 Zaragoza (España) mail@daymsa.com

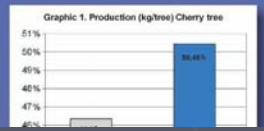
INTRODUCTION

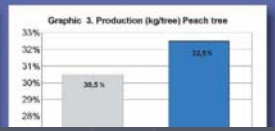
Cytoplant® -400 is a natural biostimulant manufactured and marketed by DAYMSA. **Cytoplant® -400** is certified for its use in Organic Agriculture by different European certification bodies.

The activity of **Cytoplant® -400** is due to the combination of several active substances contained in the natural extracts. This activity is determined and controlled by bioassay of what is called equivalent cytokinin activity. By means of this bioassay, the activity of a product can be compared with the activity that a synthetic cytokinin would have, as kinetin is, at a determined concentration. **Cytoplant® -400** possess a cytokinin activity equivalent to 400 ppm of kinetin.

Cytoplant® -400 is used in several crops: in table grapes is shown an effective tool for seedless cultivars, improving size without a reduction in color and improving the fertility of buds; in vegetables the product increase the number of marketable fruits, etc.

Two foliar applications of **Cytoplant® -400** were made at phenological stage G (petals fall) and second at fruit set. Graphic 3 show an increase of 6.6% in total production. 56% of total yield was harvested on the first pick compared to a 47.5% nº 4, in control, as it is shown in Graphic 4.





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Centro di Trasferimento Tecnologico - Unità Viticoltura

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COME VISIT US AT BOOTH no. 9

SUNRED®, A BOTANICAL EXTRACT-BASED BIOSTIMULANT, ENHANCES POLYPHENOLS ACCUMULATION AND IMPROVES QUALITY OF MUSTS

Vanina Ziosi[1*], Duilio Porro[2], Franco Vitali[1], Giulio Giovannetti[1], Antonio Di Nardo[1]

INTRODUCTION

SUNRED® is a biostimulant containing phenylalanine, methionine, monosaccharides and botanical extracts rich in oxylipins, cyclopentanonic compounds involved in several ripening-related processes. **SUNRED®** has been shown to be effective in improving fruit colour and anthocyanin and soluble sugar accumulation in apple, cherry, table grape, and tomato. In the present work, the effect of **SUNRED®** on grapevine polyphenol accumulation and quality parameters of must was investigated.

MATERIALS AND METHODS

Trials were carried out on grapevines (*Vitis vinifera* L.) cv Cabernet Sauvignon, Prosecco, and Pinot grigio grown in

RESULTS AND DISCUSSION

1. SUNRED® IMPROVES FRUIT COLOUR AND RIPENING UNIFORMITY

In all cultivars, **SUNRED®** improved fruit colour development and ripening uniformity (Fig. 1).

Fig. 1 – Effect of **SUNRED®** application on colour development and ripening uniformity (cv Pinot grigio). The picture was taken 17 days after the 2nd **SUNRED®** treatment.

2. SUNRED® STIMULATES POLYPHENOL ACCUMULATION

In Cabernet Sauvignon, **SUNRED®** significantly enhanced anthocyanin and total polyphenol accumulation in must. A similar trend was observed in Prosecco, though not statistically significant (Table 2).

IRTA
RESEARCH & TECHNOLOGY FOOD & AGRICULTURE
Generalitat de Catalunya Government of Catalonia

A seaweed biostimulant effect on fruit set and fruit yield on two pear cultivars in Spain

Luis Asín and Estanis Torres
IRTA-Estació Experimental Lleida
Avda. Rovira Roure 177, E-28196 Lleida, Spain
luis.asin@irta.cat

INTRODUCTION

One of the main problems around the world on pear production is a poor fruit set.

One solution is biorregulator sprays during the blossom period and initial fruit development, to avoid flower, fruitlet or fruit fall.

Although there are different biorregulators, its efficacy is widely conditioned by cultivar. For instance, Blanquilla show an important increase on fruit yield with GA3 sprays at full bloom, or Abate fetel can doubled final fruit yield with Prohexadione-Ca spray after petal fall.

Conference and Abate fetel are two cultivars which present a poor fruit yield. It seems there is a fruit set problem, which it is not always resolved with biorregulator sprays.

The aim of the study was to increase fruit set and subsequently yield in Conference and Abate Fetel

MATERIAL AND METHODS

During 2007 and 2008, three trials on Conference and Abate fetel cultivars were carried out. Rootstock was quince M-A and Sydo, tree density was 1,667 and 2.150 trees/ha on Conference and Abate fetel, respectively.

Dosage of active ingredients and spray moment is shown in Table 1. Spray volume was 1,000 L/ha.

Experimental design was a randomized block with 4 repetitions. Each elemental plot had 4 threes, and all determinations were done on two central ones.

It were evaluated the following parameters:

- Evolution of fruit set on marked branches
- Final fruit set at harvest
- Fruit yield parameters (kg/tree, fruits/tree, fruit weight and fruit size distribution)

Table 1.- Treatments and dosage

Treatments	Conference		Abate fetel	
	Spray moment	Dose	Spray moment	Dose
Control	-	-	-	-
Goëmar BM86	E**, F_2 and G	2.50 l/ha	E, F_2 and G	2.50 l/ha
Goëmar BM86	E, F_2 and G	2..0 l/ha	E, F_2 and G	2.50 l/ha

EFFECTS OF THE SPECIFIC SEAWEED EXTRACTS ON GROWTH, YIELDING AND FRUIT QUALITY OF SWEET PEPPER GROWING IN NON-HEATED TUNNELS

InHort

AIM: „From seedlings to fruit" - determine the effect of the *A. nodosum* filtrate by Göemar on pepper cultivation under cover

Agnieszka J. Stepowska
Research Institute of Horticulture

MATERIALS and METHODS: 2007-2008

I. seedlings treated with 0,1% GA142 (Göemar Goteo) *April*

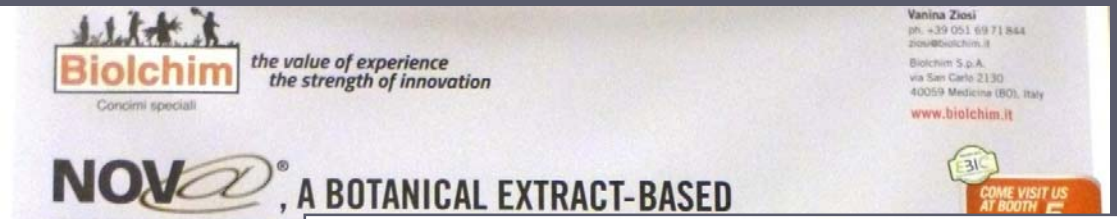
a1 -„control„ (watering)
a2 – applied to roots 2 times during production
a3 - applied to roots 4 times during production

II. plant treatment in non-heated tunnel following I.a1

A1 -„control„ (watering)
A2 - 0,1% GA142 (Göemar Goteo 3x to roots, *V-VI*)
A3 - 0,1% GA142 (Göemar Goteo 3x to roots, *V-VI*) +0,1% GA14 (Göemar BM86 3x foliar, *VI-VII*)
A4 - 0,1% GA14 (Göemar BM86 3x foliar, *VI-VII*)

RESULTS

An example of a commercial biostimulant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NOV@®, A BOTANICAL EXTRACT-BASED
BIOSTIMULANT F
ROOT DEVELOPM

Vanina Ziosi*, Giulio Giovannet

INTRODUCTION

NOV@® is a biostimulant contair
vitamins, chelated micronutrients,
in phytosaponins, polysaccharides
ine. Phytosaponins are naturally oc
they also have biological activity,
tion of root growth. Phytosaponin
and organic acids act synergistic
growth, nutrient uptake and soil
charides, amino acids, vitamins a
nutrients complete the action by
metabolism.
The aim of present work was to in
of NOV@® application on post-tra
velopment, plant growth and crop

MATERIALS AND METHODS

NOV@® was applied on Alba, Can
dor strawberries. Alba and Cando
open field in Emilia Romagna and
respectively. Splendor was grown u
in Larache (Morocco).
In Alba, NOV@® treatments were
transplanting stage (27, 34, and 4
planting, dose: 20 L/ha; plot size:
ed at pre-flowering, petal fall, and
stages (dose: 15 L/ha; plot size: 1
In Candonga, NOV@® (20 L/ha) w
42, and 65 days after transplantin
In Splendor, NOV@® (15 L/ha) was
ing and fruit enlargement (plot size

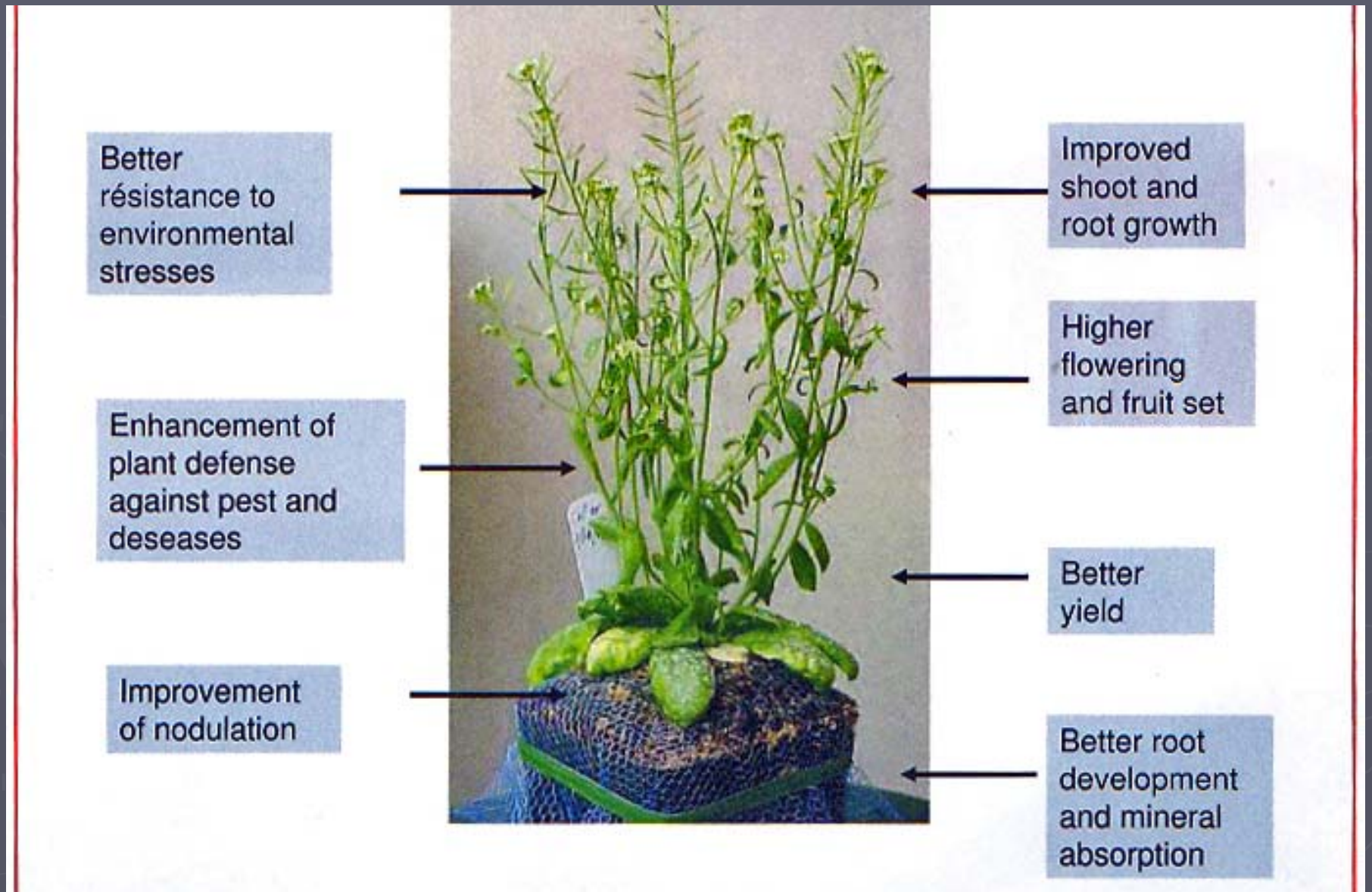
CONCLUSION

INTRODUCTION

NOV@® is a biostimulant containing organic acids, vitamins, chelated micronutrients, plant extracts rich in phytosaponins, polysaccharides and glycine betaine. Phytosaponins are naturally occurring surfactants; they also have biological activity, including stimulation of root growth. Phytosaponins, glycine betaine, and organic acids act synergistically improving root growth, nutrient uptake and soil structure; polysac-

Biostimulants help plants in different ways

Picture credit: J.F. Morot-Gaudry, INRA, Versailles France



Excellent review on the science of biostimulants

Available on the web, 32 pages

The Science of Plant Biostimulants – A bibliographic analysis

Prof. Patrick du Jardin

CONTRACT 30-CE0455515/00-96, « AD HOC STUDY ON BIO-STIMULANTS PRODUCTS »

April 2012 – Final report

Program for this talk

1- The start of Integrated Pest Management

2- Using composts to stimulate plant health

3- The Industrial Biotest Laboratories

4- The Mendenhall glacier

A newspaper article in 1981

The Globe and Mail

NATIONAL EDITION

MONDAY, APRIL 27, 1981

Safety tests faked, but 79 pesticides left on market

By MICHAEL KEATING

The federal Government is allowing 79 pesticides to be used across Canada even though a U. S. laboratory that claimed the chemicals were safe is known to have faked some tests.

The deception was discovered in 1977 and it will take as long as four more years before all the chemicals will be cleared of suspicion of causing such things as cancer, birth defects, reproductive problems, mutations or harm to major organs.

The chemicals under suspicion are used by householders, farmers, foresters and public health officials for everything from killing weeds and insects to sterilizing drinking water and swimming pools.

Dr. Trevor Hancock, a Toronto public health official, says Ottawa's decision to leave the suspect chemicals on the market creates "a new Canadian principle of erring on the side of danger."

Dr. David Penman, a senior environmental health official of the Saskatchewan Government, says: "I think the situation medically is absolutely scandalous."

No one in the federal Government will accept responsibility for allowing the chemicals to stay on the market despite doubts about the U. S. tests. Nor will Ottawa release details of the faulty tests — even to provincial governments, which share with it the responsibility for protecting public health and the environment.

The spurious test results uncovered by U. S investigators in 1977 had been submitted by Industrial Biotest Laboratories, a suburban Chicago company that until then had a large share of the business of testing products for chemical companies.

The IBT recommendations had been accepted by both the U. S. and Canadian governments as proof the chemicals were not dangerous. So far the United States, like Canada, has left the suspect chemicals on the market until they are proved unsafe.

Now, while 16 Canadian and 75 U. S. researchers try to decide what is safe, farmers and homeowners are heading into another spraying season without knowing if some of the chemicals they are handling have passed tests.

Despite assurances by Canada's Agriculture Department that the list of IBT-tested chemicals used in this country has been widely circulated, few people know how to get a copy. (And despite federal statements that the list of suspect chemicals now stands at 79, the latest list that the Health Department would give The Globe and Mail contains 89.)

Peter Lindley, an Ancaster fruit farmer who was once a member of Ontario's pesticides advisory committee, said recently: "I'm likely using lots of them (IBT-tested

SUSPECT — Page 9

When pesticides are registered, the manufacturer submits independent tests to show the product is reasonably safe to humans

The Globe and Mail
NATIONAL EDITION
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A 1991 document from Agriculture Canada

Agriculture Canada

Food Production and Inspection Branch

Pesticides Directorate

Direction générale, Production et inspection des aliments

Direction des pesticides

Canada

91-02

Note to CAPCO

CRAVEN LABS

Craven Laboratories of Austin, Texas has conducted residue chemistry studies for pesticide registrants. The U.S. Environmental Protection Agency (EPA) has received information alleging that Craven may have falsified residue and environmental fate studies which were conducted for pesticide companies in support of tolerances and registrations in the U.S. It has been alleged that Craven improperly manipulated data in studies of pesticides listed in the attached table. A criminal investigation has ensued which precludes EPA from revealing details of some of the information that has been obtained on the Craven Laboratories issue.

EPA is currently taking a series of immediate steps in response to the allegations that Craven Laboratories manipulated data that was submitted to EPA. These actions include the following:

1) EPA is conducting a comprehensive internal inventory of all regulatory actions based on Craven data. EPA is reviewing its data chemical-by-chemical and use-by-use and is focusing on those decisions made solely on Craven data as well as decisions relying on a partial Craven data base.

JUNE 12, 1991

This bulletin is published by the Pesticide Information Division of the Pesticides Directorate. For further information, please contact:

Pesticides Directorate
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(613) 993-4544

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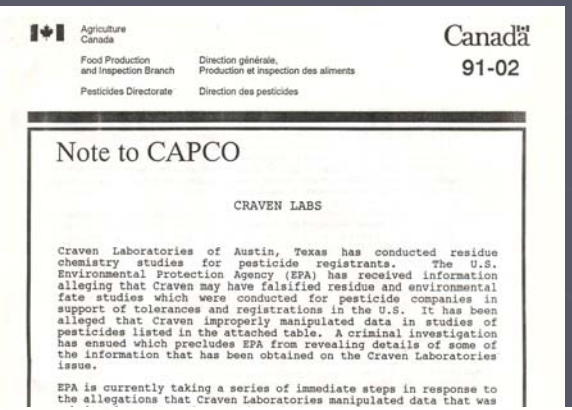
Telex: 053-3282
Envoy 100: Pesticide
National Pesticide Call-Line: 1-800-267-6315

When pesticides are registered, the manufacturer submits independent tests to show the product is reasonably safe to the environment



Agriculture Canada
Food Production and Inspection Branch
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Direction générale, Production et inspection des aliments
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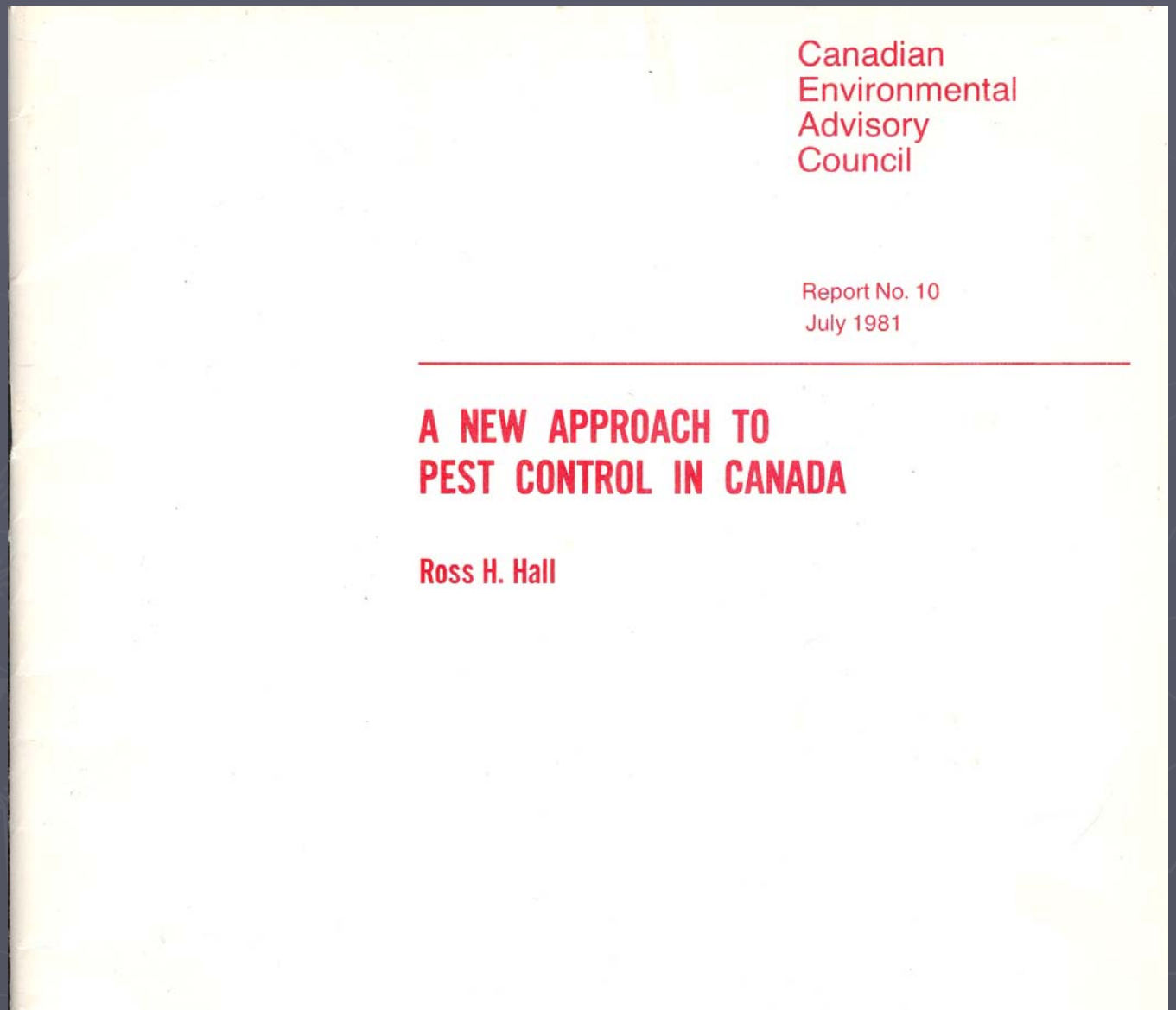
The problem was serious. It triggered a review of the registration process for pesticides.



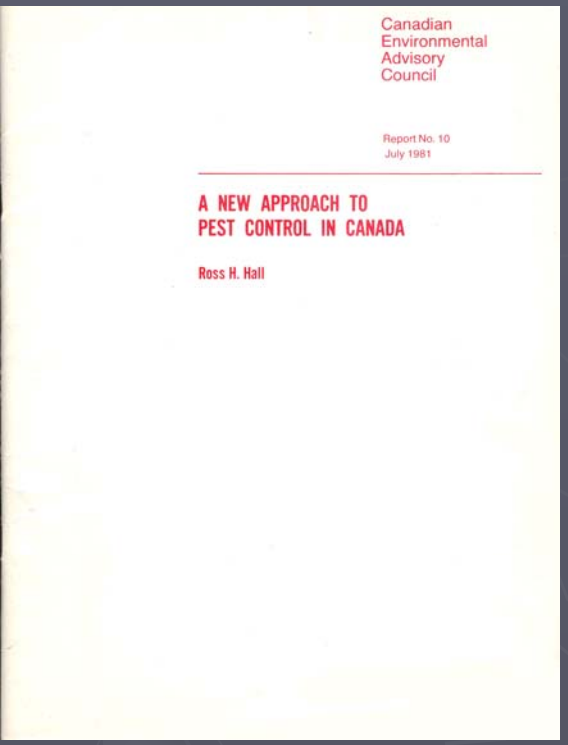
Canadian
Environmental
Advisory
Council

Report No. 10
July 1981

A NEW APPROACH TO PEST CONTROL IN CANADA

Ross H. Hall

“pesticides identified by Health and Welfare (…) being supported by studies by IBT laboratories”



Canadian Environmental Advisory Council

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Ross H. Hall

PESTICIDES IDENTIFIED BY THE U.S. ENVIRONMENTAL PROTECTION AGENCY AND THE HEALTH PROTECTION BRANCH, CANADA NATIONAL HEALTH & WELFARE AS BEING SUPPORTED BY ONE OR MORE STUDIES PERFORMED BY THE INDUSTRIAL BIOTEST LABORATORIES INC.

Acephate
Alachlor
Alanap
Alar
Allidochlor
Ametryn
Antor
Atrazine
Azodrin
B. Thuringiensis
Barban
Bifenox
Binapacryl
Bromofenoxim
Bux
Captan
Captafol
Carbofuran
Chlorbromuron
Chlorpropham
Chlorpyrifos
Chlorathalonil
Ciodrin
Cyanazine
Cyprazine
Dacthal
Delnav
Desmedipham
Dialifor
Diallate
Diazion
Dibrom

Difenzoquat
Dinitramine
Dinoseb
Diquat
Disulfoton
Dyanap
Edifenphos
Embar
Endosulfan
Endothall
Ethiolate
Ethion
Fenamiphos
Fenitrothion
Fensulfothion
Fentin Hydroxide
Fenvalerate
Folpet
Formetante
hydrochloride
Glyphosate
Glyphosine
Harvade
Metobromuron
Methamidophos
Methidathion
Methiocarb
Methoprene
Metolachlor
Metribuzin
Norea
Nicotine Sulphate

Oxydemeton methyl
Paraquat
Penncap E
Penncap M
Permethrin
Phenmedipham
Phosphamidon
Picloram
Polyram
Profenofos
Propham
Profluralin
Propachlor
Propoxur
Prowl
Pyrethrins
Simazine
Sumithrin
TCMTB
Terbufos
Terbuthylazine
Terbutryn
Tedion
Tetrachlorvinphos
Thiofanox
Toxaphene
Triallate
Trivax
Vapona
Vegadex
Vendex
Vitavax

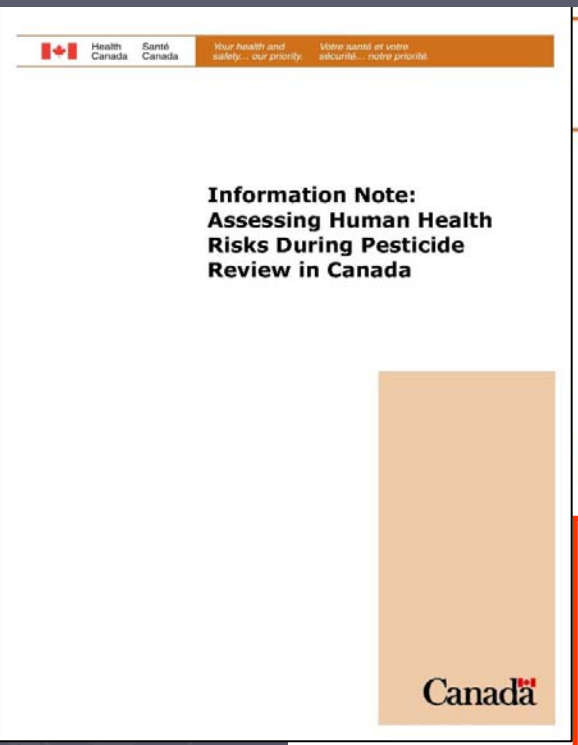
A 2006 document from Health Canada

Health Canada Santé Canada

Your health and safety... our priority. *Votre santé et votre sécurité... notre priorité.*

Information Note: Assessing Human Health Risks During Pesticide Review in Canada

Health Canada is reviewing the "old" pesticides


Health Canada Santé Canada

Your health and safety... our priority. Votre santé et votre sécurité... notre priorité.

Information Note: Assessing Human Health Risks During Pesticide Review in Canada

Canada

Health Canada Santé Canada

Your health and safety... our priority. *Votre santé et votre sécurité... notre priorité.*

August 14, 2006

This Information Note is intended to provide Canadians with an overview of how potential effects to human health are assessed during the review of pesticides. It also includes information on the measures put in place to protect Canadians.

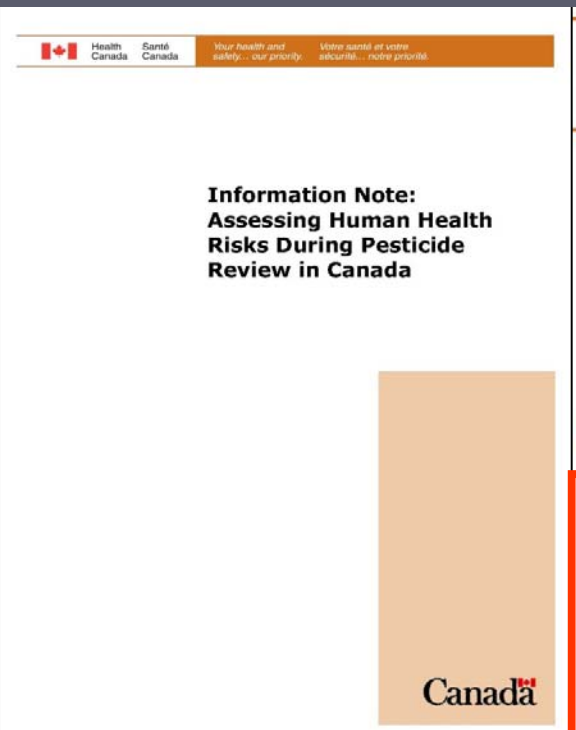
Pesticide Regulation in Canada

Pesticides are stringently regulated in Canada by Health Canada's Pest Management Regulatory Agency (PMRA). Before a product is approved for use in Canada, it must undergo a thorough science-based risk assessment and meet strict health and environmental standards. If the use of a product poses unacceptable risks to human health or the environment, it is not registered for use in Canada. Furthermore, all pesticides registered prior to 1995 are being re-evaluated using the most modern scientific risk assessment approaches to ensure they meet current safety standards.

A science-based risk assessment includes the following:

- a health assessment that looks at the potential for a pesticide to cause adverse health effects such as cancer, birth defects and endocrine disruption;
- an examination of all sources and routes (oral, dermal, inhalation) of potential exposure to a given pesticide, including exposure through diet, from drinking water and from contact with treated areas like lawns and gardens;
- an estimation of the amount of pesticide that people, including children, may come in contact with, both during and after a pesticide application;
- a human health risk assessment that determines the toxicity in relation to the

“It is good practice to reduce or eliminate…”



Health Canada Santé Canada

Your health and safety… our priority. Votre santé et votre sécurité… notre priorité.

Information Note: Assessing Human Health Risks During Pesticide Review in Canada

Canada

The PMRA also sets the maximum residue limits (MRLs) on food commodities, which are enforced by the Canadian Food Inspection Agency. An MRL is the likely maximum pesticide residue on a food. It is set only after the PMRA has confirmed that any pesticide residues that could be consumed are acceptable.

Responsible Use of Pesticides

It is good practice to reduce or eliminate any unnecessary exposure to pesticides. Canadians can and should seek opportunities to minimize their exposure to and reduce their reliance on pesticides. As such, the PMRA supports integrated pest management practices, an approach combining biological, cultural, physical and chemical tools to manage pests. In doing so, pest control benefits are maximized, while health and environmental risks are minimized.

If Canadians choose to use pesticides, they should use products only for their intended and approved use while following the directions on the label. These directions specify how you must use the product so that it poses no health or environmental concerns. To prevent accidents, pesticides should always be stored safely, in clearly marked containers and out of the reach of children.

Need More Information?

The following links on the PMRA website provide further information on the topics discussed in this document:

Pesticide Risk Assessment Process

20 years of Pest Management

The past:
Some pesticides were registered using fraudulent testing

What is the impact today?

Does it help predict the future ?

These pesticides were sprayed on urban plants…

endosulfan / diazinon / dimethoate / phosalone

No longer. That registration was removed.

endosulfan / diazinon / dimethoate / phosalone

The “newer” pesticides we use instead…

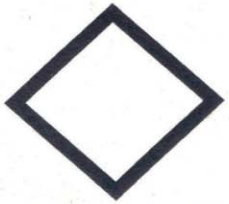
spinosad / chlorantranilitrole / flonicamid / spirotetramat

Pesticide labels display a "precautionary shape"

Applicator Core Manual, BC Ministry of Environment, 2012

Meaning of Precautionary Shapes as Indication of Hazard Risk Level

An octagon on the label indicates an **extreme hazard risk**. The signal word is "**danger**".



A diamond indicates a **moderate hazard risk**. This has the signal word "**warning**" associated with it.

An upside-down triangle indicates a **low hazard risk**. This has the signal word "**caution**" associated with it.

The "shape" is based partly on acute toxicity

Handbook for pesticide applicators, BC Ministry of Environment, 2005

POISON HAZARD SYMBOL — the shape indicates one (or more) characteristics below	 DANGER POISON	 WARNING POISON	 CAUTION POISON
acute oral LD_{50}	less than 500 mg/kg	500—1,000 mg/kg	1,000—2,500 mg/kg
acute dermal LD_{50}	less than 1,000 mg/kg	1,000—2,000 mg/kg	2,000—5,000 mg/kg
respirator	required	advisable in confined spaces	advisable in confined spaces
eye effects	corrosive/irreversible	severe/reversible	irritant
chronic effects	fatal / irreversible	non-fatal/irreversible	non-fatal/reversible
petroleum distillates	10% or more (Domestic products)		

The older products are “extreme hazard risk”

The newer products have no shape.
The toxicity is lower than the low limit.
I like these new products ! They are much safer.

spinosad / chlorantranilitrole / flonicamid / spirotetramat

Program for this talk

1- The start of Integrated Pest Management

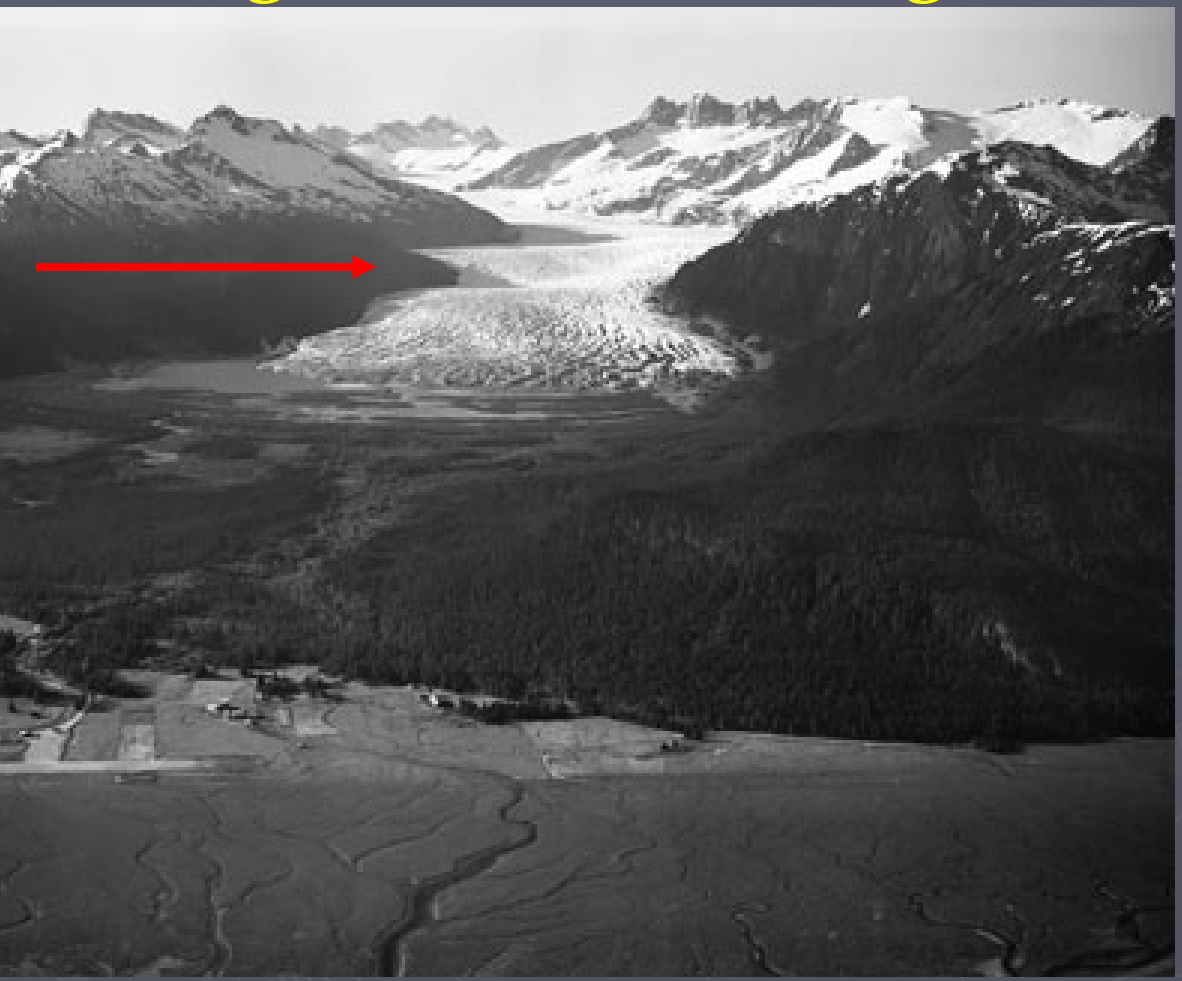
2- Using composts to stimulate plant health

3- Some pesticides were registered using fraudulent testing

4- The Mendenhall glacier

The Mendenhall Glacier over Juneau, Alaska

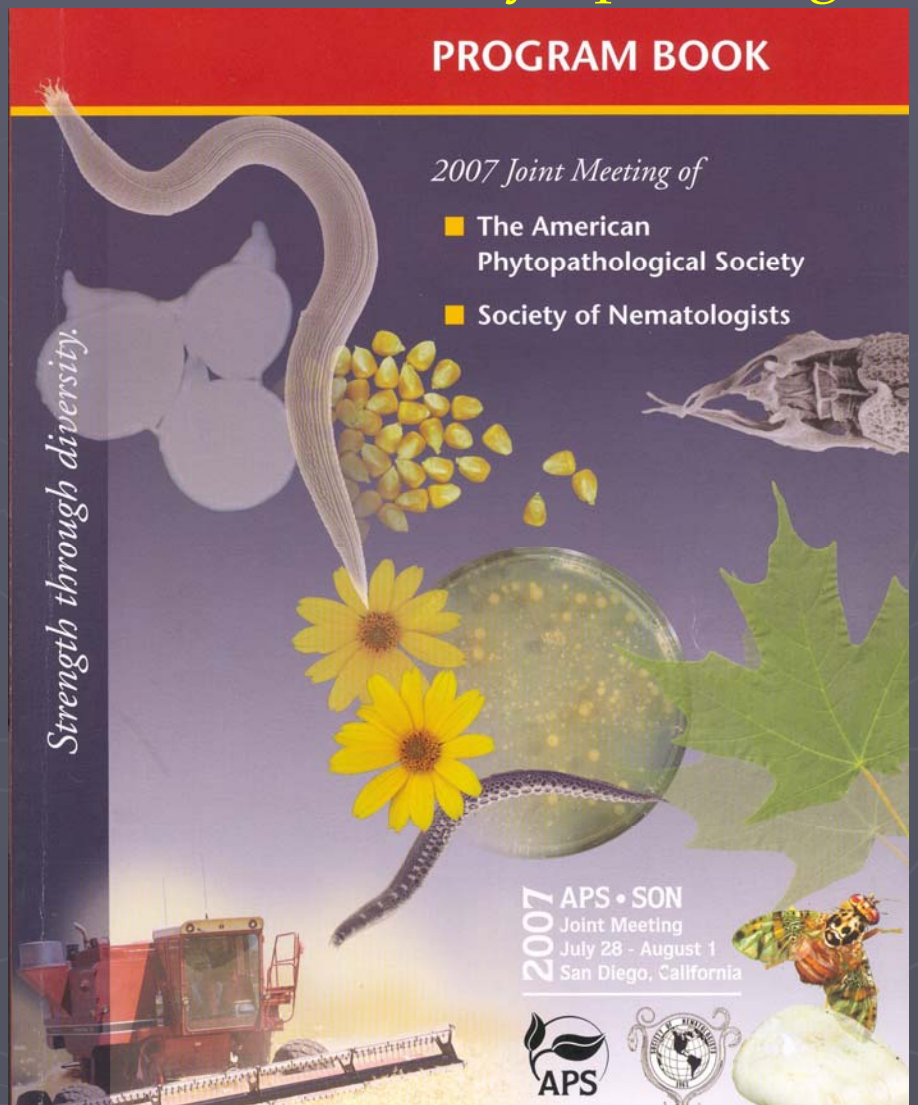
Here are 2 pictures taken by 2 different persons…
This glacier is melting. Red arrow is a landmark.



Left: picture from 1937 Right: picture from 2006

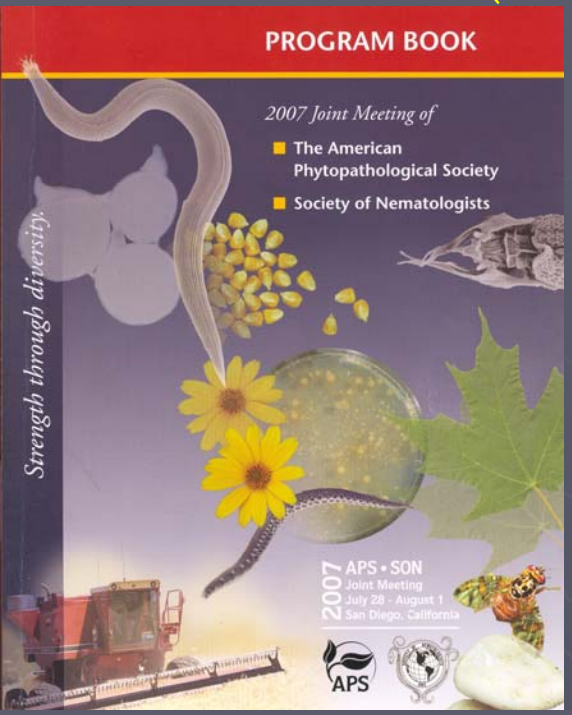
Pictures credit: Archives, University of Alaska

2007 was the first time
I heard of climate change from scientists
Annual meeting of the American Phytopathological Society in San Diego



Speaker Diana Wall, Colorado State University

Member of the Intergovernmental Panel on Climate Change
(under the auspice of the United Nations)



The 2007 report
was prepared in 2004 by 12 experts,
reviewed in 2005 by 600 scientists,
then a second draft in 2006
was reviewed by another 600 scientists.

The conclusion:
"Most of the global warming measured since the 1920s
is very likely due (90% confidence)
to increases in CO_2 emissions (greenhouse gases)".

Warmest years since 1880 were 2014, 2010, 2005

Globe and Mail, January 17, 2015

CLIMATE

2014 was hottest year in recorded history

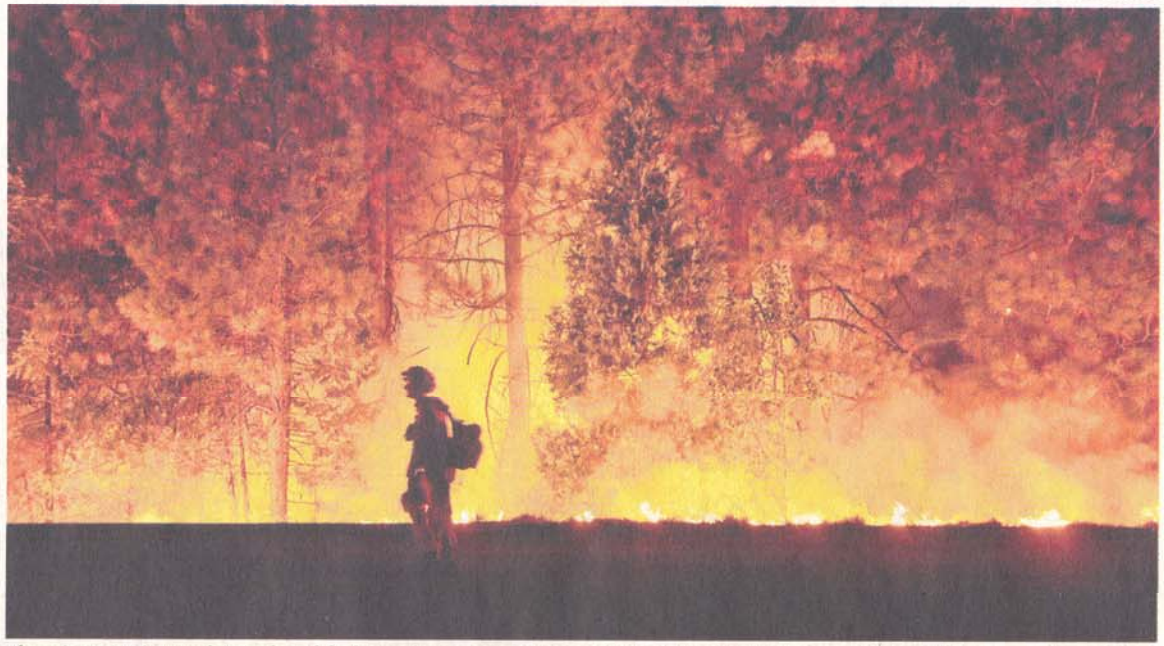
Last year's temperatures highlight scientific warnings about risks of global warming, which many say is caused by human activity

JUSTIN GILLIS

Last year was the hottest in Earth's recorded history, scientists reported Friday, underscoring scientific warnings about the risks of runaway emissions and undermining claims by climate-change contrarians that global warming had somehow stopped.

Extreme heat blanketed Alaska and much of the western United States last year. Several European countries set temperature records. And the ocean surface was unusually warm virtually everywhere except around Antarctica, the scientists said, providing the energy that fuelled damaging Pacific storms.

In the annals of climatology, 2014 now surpasses 2010 as the warmest year in a global temperature record that stretches back to 1880. The 10 warmest years on record have all occurred since 1997, a reflection of the relentless planetary warming that scientists say is a consequence of human emissions and poses profound long-term risks to civilization and



The King Fire in Fresh Pond, Calif. charred more than 11,500 acres in September, 2014. The state's severe drought has left some small towns without water. Scientists fear water shortage will become common. NOAH BERGER/REUTERS

GLOBAL TEMPERATURES

LAND AND OCEAN TEMPERATURE PERCENTILES, Jan. to Dec. 2014

mate-change skeptics that global warming has stopped, seized on

system analysis at the Potsdam Institute for Climate Impact Research in Germany. "However, the fact that the warmest years on record are 2014, 2010 and 2005 clearly indicates that global warming has not 'stopped in 1998,' as some like to falsely claim."

Such claims are unlikely to go away, though. John Christy, an atmospheric scientist at the University of Alabama in Huntsville who is known for his skepticism about the seriousness of global warming, pointed out in an interview that 2014 had surpassed the other record-warm years by only a few hundredths of a degree, well within the error margin of global temperature measurements.

NASA and the other U.S. agency that maintains long-term temperature records, the National Oceanic and Atmospheric Administration, issued separate data compilations on Friday that confirmed the 2014 record. A Japanese agency had released pre-

Is this "normal" or "caused by human activity"?
I suggest we forget about it, because we disagree.
Let's stick to the facts, where we can agree.

CLIMATE

2014 was hottest year in recorded history

Last year's temperatures highlight scientific warnings about risks of global warming, which many say is caused by human activity

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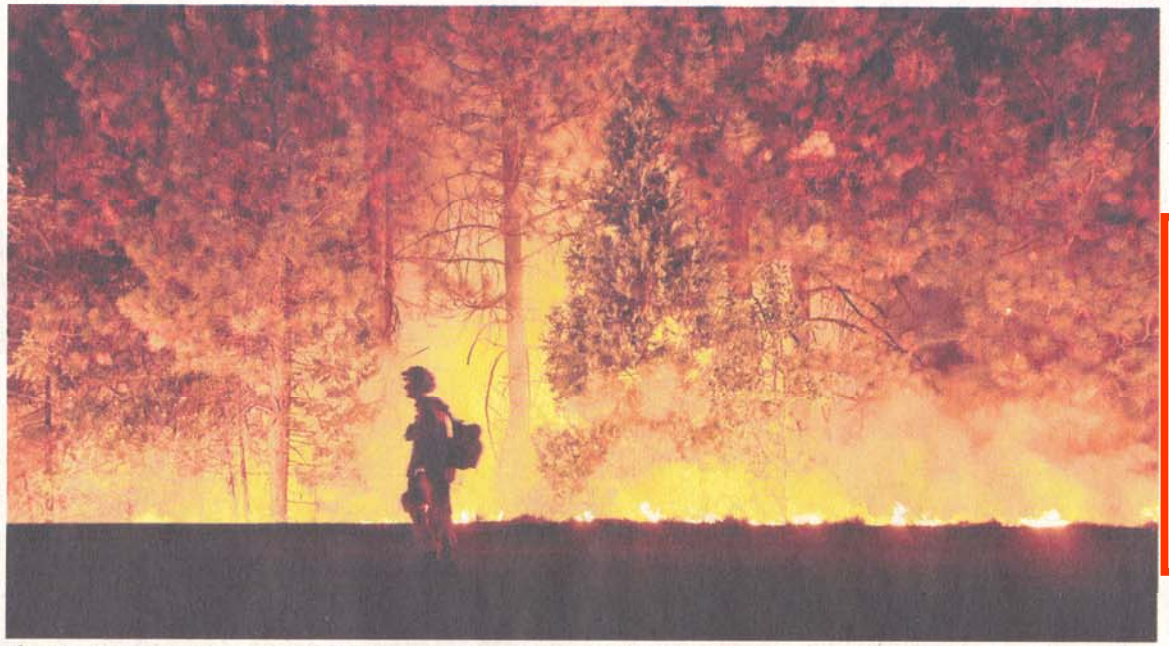

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20 years of Pest Management

The past:
The climate is changing

What is the impact today?

Does it help predict the future ?

Here is an example of a discussion we can have. Warmer weather is changing hardiness zones.

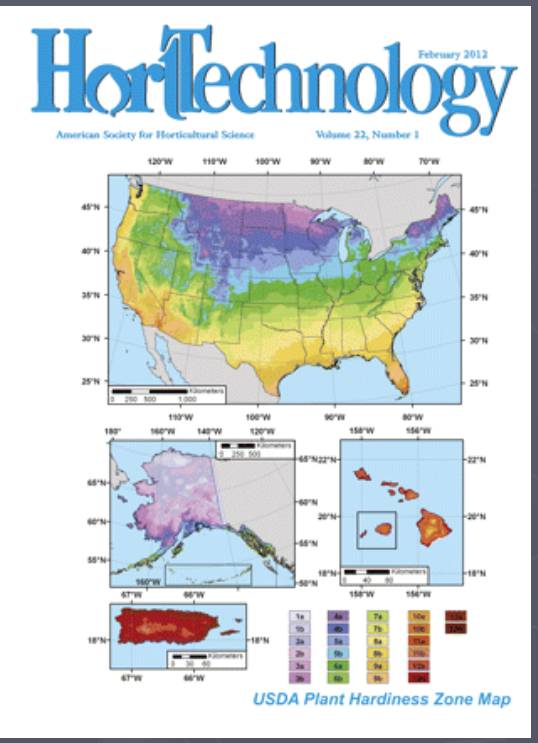
Journal "HortTechnology" of February 2012

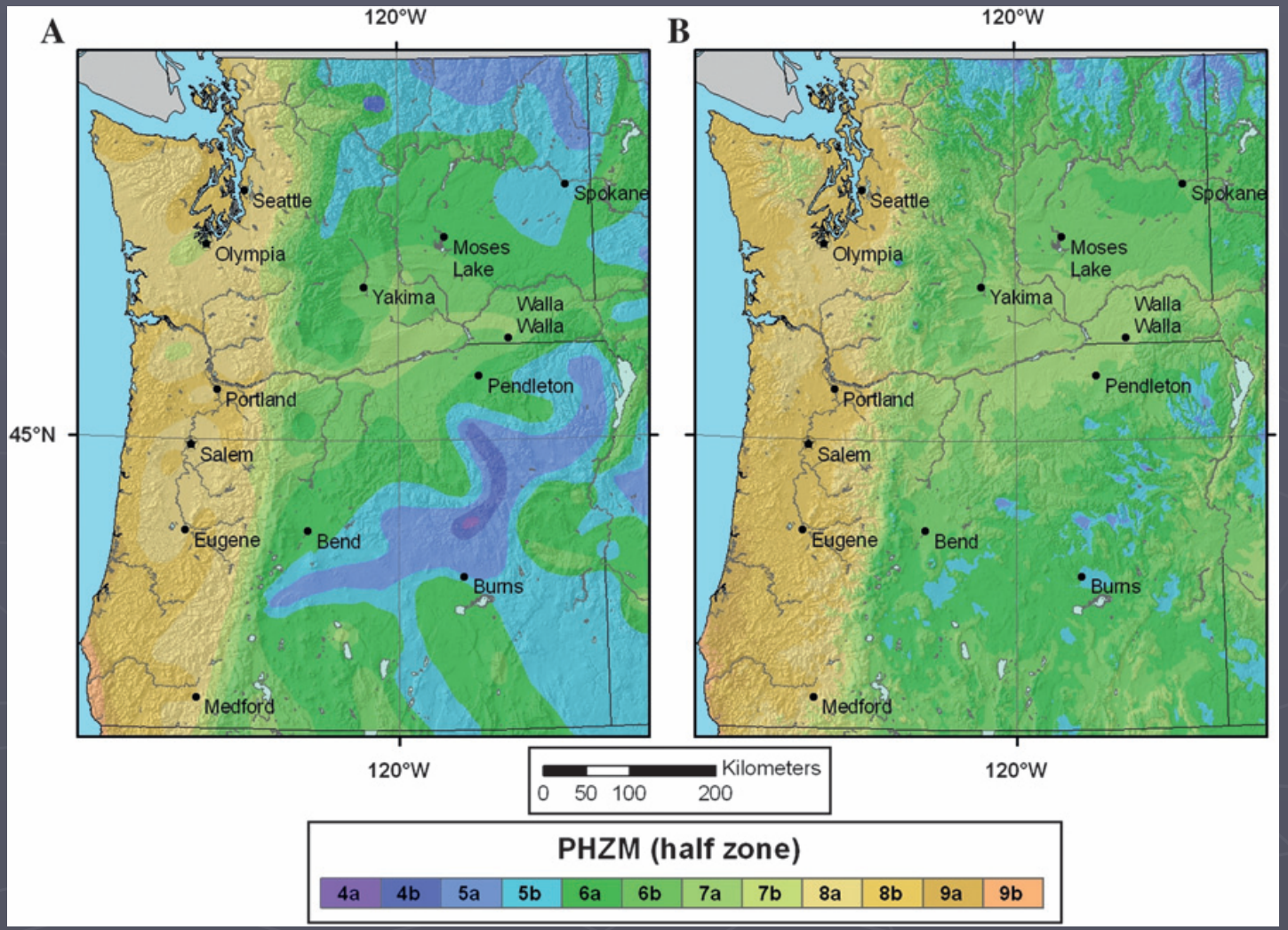
The hardiness zone is based on minimum winter temperature and last spring frost. The higher the number, the more plants we can use.

City	Hardiness	Suitable plants
Calgary	Zone 3	Poplars, Spruces
Kelowna	Zone 5	Norway maples, Magnolia also poplars and spruces
Vancouver	Zone 8	Japanese pieris, Palms also Magnolia and spruce

Hardiness Zone Map for Oregon and Washington

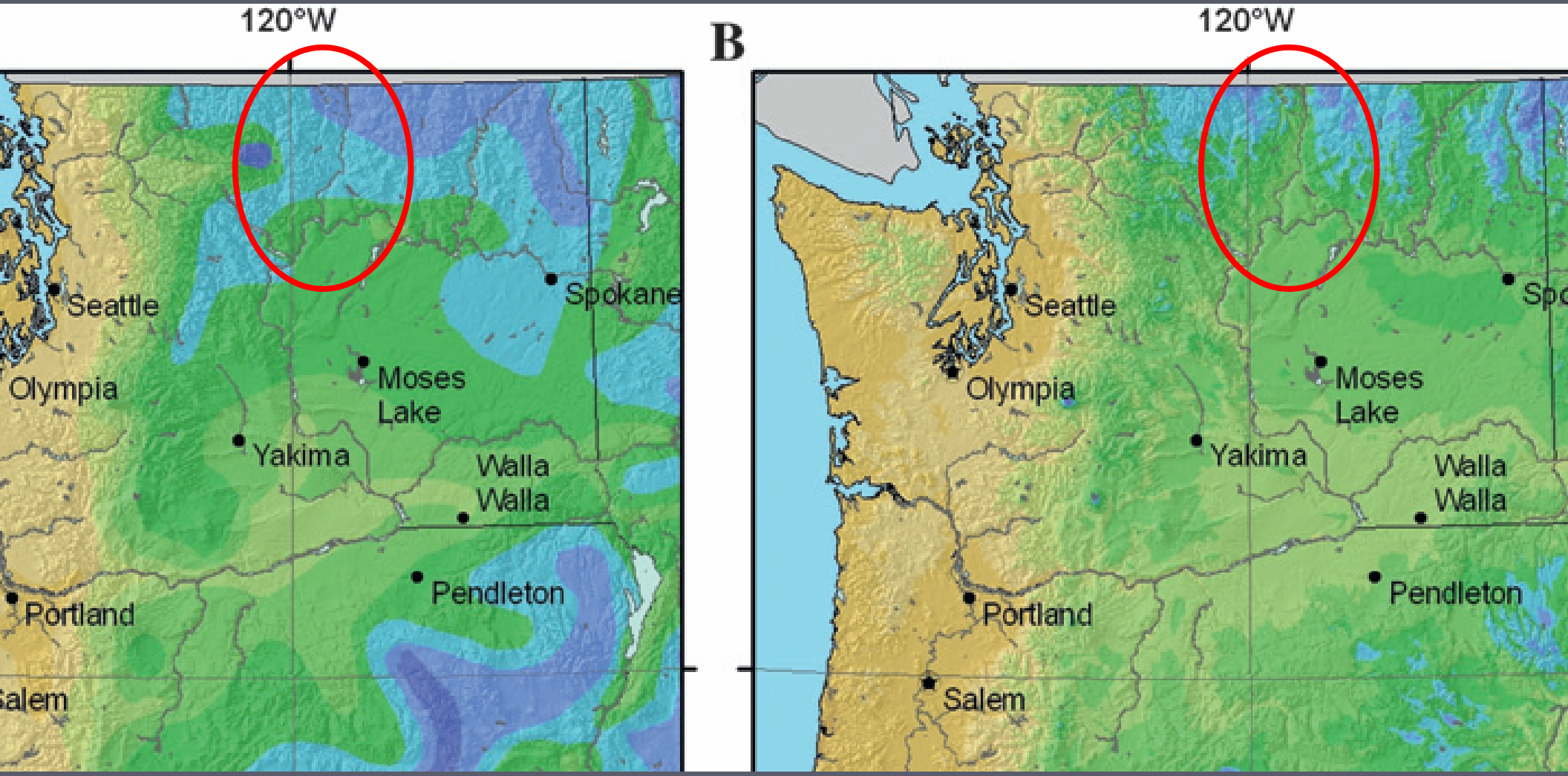
Left: 1990 Right: 2005





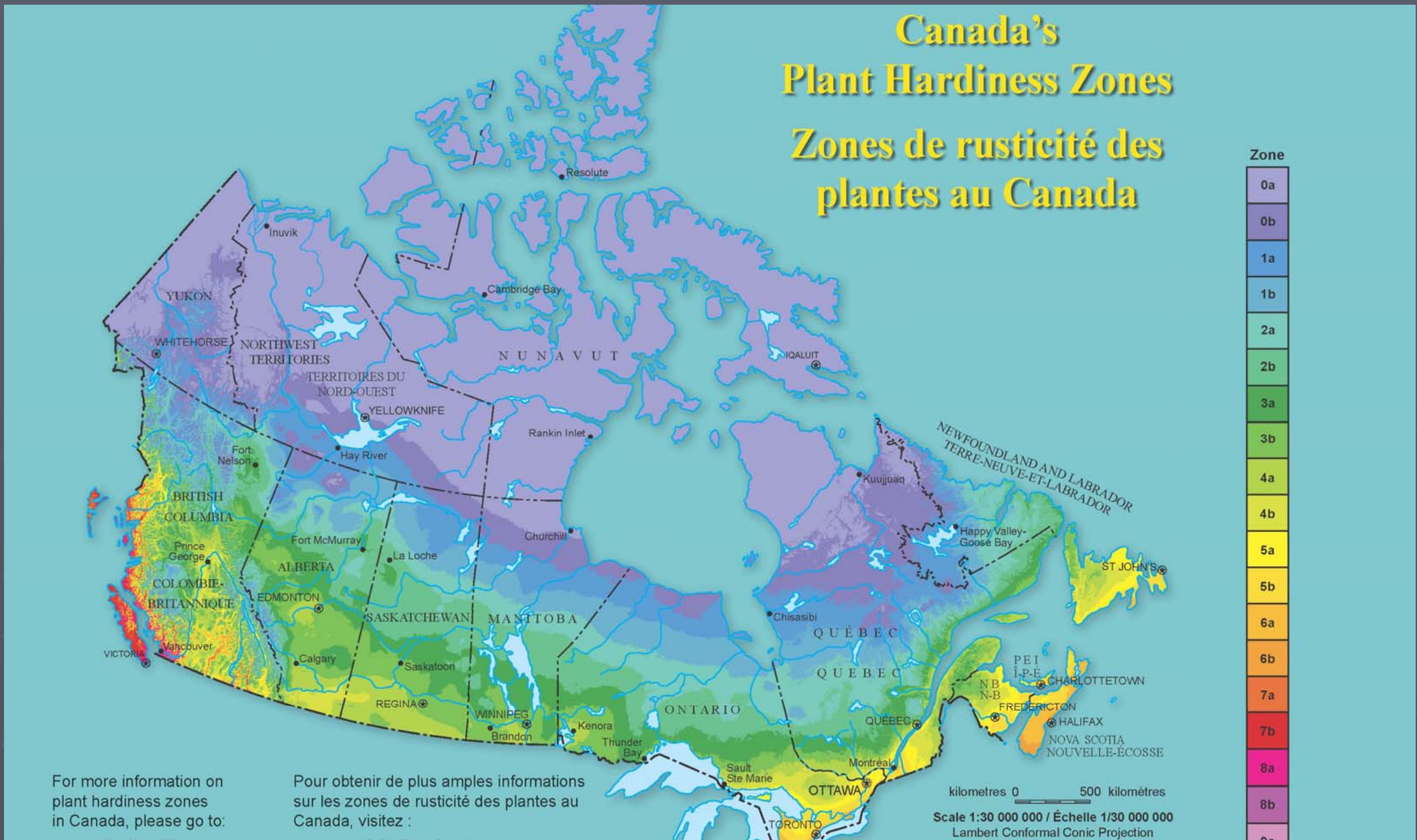
Let's examine the Okanagan Valley (red circles).

Left: 1990 Right: 2005



Dark blue: zone 4 Light blue: zone 5 Dark green: zone 6

The latest "plant hardiness zones" for Canada



For more information on plant hardiness zones in Canada, please go to:

Pour obtenir de plus amples informations sur les zones de rusticité des plantes au Canada, visitez :

The Okanagan was zone 5 and is now zone 6. We should discuss what plants to add to our urban inventory (and select pest resistant ones).

This talk was about events outside of BC that impacted our work in the past 20 years

1- The start of Integrated Pest Management

2- Using composts to stimulate plant health

3- Some pesticides were registered using fraudulent testing

4- The climate is changing

Thank you for your interest !