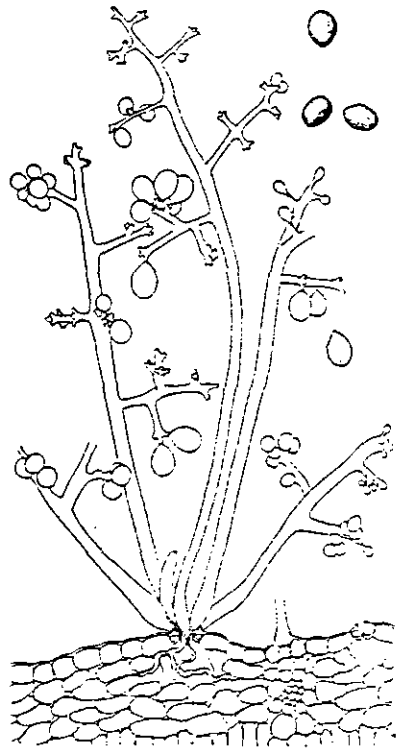
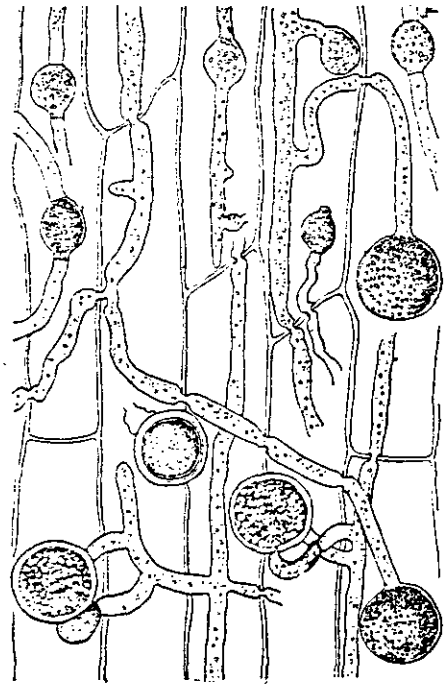
Volume IX Number 4



Plasmopara viticola



Pythium debaryanum growing in the tissues of an alfalfa seedling.

PLANT DIAGNOSTICIAN'S QUARTERLY

December, 1988

Features

The Plant Diagnostician's Quarterly (PDQ) is a nonprofit publication which serves plant pathologists in extension, regulatory and industrial clinical laboratories, private consultants, and other interested persons. PDQ is published four times a year, in March, June, September, and December. Yearly subscription fees:

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Send manuscripts, announcements and letters to the editor to Melodie Putnam, Maryland Department of Agriculture, Plant Protection Section, 50 Harry S Truman Parkway, Annapolis, MD 21401.

PDQ is an equal opportunity publication with a policy of nondiscrimination regarding race, color, religion, age, national origin, sex, or handicap.

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FROM THE EDITOR

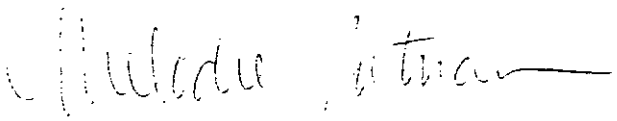
Greetings!

This issue, the last for 1988, focuses on the APS meetings held in San Diego, California during November 14-17th. Highlights, including the pre-meeting APS-sponsored virus detection workshop, the nursery tour, and some special sessions, are covered. Minutes of the Diagnostics Committee meeting, as well as a history of the Committee will appear in the upcoming March issue.

PDQ is still undergoing some changes. I have added a new feature, "Clinics and Clinicians," which will focus on a different laboratory with each appearance of the feature. The purpose is to give readers the opportunity to learn of clinics about which the reader may not already know, and thereby expand the potential of their network of diagnosticians. (For more about networking, see one of the tear-off sheets at the back of this issue.)

I would like to thank all those who contributed to PDQ this past year - the strength of PDQ depends on the quality of its contributors, and I think we have done quite well in 1988. I would also like to thank Ethel Dutky for continuing to create each issue's cover. Ethyl was the editor of this publication for three years and still contributes much time and input, which is greatly appreciated.

Best wishes to you all in the new year.



Melodie Putnam

(Cover illustrations by Miss Elsa O. Horn, 1928.)

DIFFUSION

This issue's DIFFUSION has two special features: the abstracts presented at the APS meetings in San Diego, and an update on the taxonomy of various fungal pathogens. For the former, the number preceeding the entry refers to the number of the abstract; the entire abstract will be published in the December issue of Phytopathology.

67 STRESS-RELATED PITH NECROSIS AND ROOT ROT OF PINUS PINEA CAUSED BY FUSARIUM SP. C. M. Sandlin & D. M. Ferrin, Univ. Calif., Riverside.

A Fusarium sp. resembling F. oxysporum was isolated from the pith of wilted Italian stone pine seedlings from San Diego Co., CA. Inoculations with the isolates obtained resulted in wilt and death of seedlings at 32 C or when placed under low-water stress.

155 SCLEROTIUM ROLFSII CONTROL ON BULBOUS IRIS AND LILIES WITH IN - FURROW FUNGICIDE APPLICATIONS. G. A Chastagner, J. M. Staley & K. L. Riley, Washington State Univ., Puyallup, WA.

Field-grown 'Ideal' iris treated with benodanil, flutolanil, or quintozene showed a significant increase in bulb yields. On 'Enchantment' lilies, benodanil, flutolanil, quintozene, quintozene + benomyl, flutolanil + Nor-Am 5N-596, and Nor-Am FBC 39865 significantly increased numbers of healthy plants, with no detrimental effects.

169 FUSARIUM DISEASES OF CONTAINERIZED CONIFER SEEDLINGS IN NORTHERN ROCKY MOUNTAIN NURSERIES: INFECTION, SYMPTOM PRODUCTION AND PATHOGENICITY OF ASSOCIATED FUSARIA. R. L. James, R. K. Dumroese & D. L. Wenny. USDA Forest Service, Missoula, Mt, and Univ. Idaho Research Nursery, Moscow, ID.

Containerized conifer seedlings infected with Fusarium spp. often did not show symptoms. Fusarium was found to cause pre- and post-emergence damping-off and root diseases. Losses were greatest for those seedlings under stress, and occurred randomly throughout greenhouses. Species isolated with decreasing frequency were F. acuminatum, F. oxysporum, F. avenaceum, F. sambucinum, and F. tricinctum.

334 ASH YELLOWS: GEOGRAPHIC RANGE AND ASSOCIATION WITH DECLINE OF WHITE ASH. W. A. Sinclair, et al.

Mycoplasmalike organisms were found on 29 of 36 sites where dieback of Fraxinus americana was severe. Sites in Indiana, New York, Pennsylvania, Vermont, and Ontario were examined. Incidence and severity of ash yellows were worse in areas where open land and woods were mixed, rather than in forest situations.

411 FIRST REPORT OF HEAD SMUT OF CORN IN COLORADO. W. M. Brown, Jr. & E. A. Milus. Colorado State Univ., Fort Collins, CO.

The presence of Sphacelotheca reiliana on Zea mays was recently confirmed in Adams Co., CO. Disease incidence was less than 0.1% and yield losses were low. The pathogen is thought to have been present in Colorado for several years.

447 DECLINE OF ORIENTAL PERSIMMON. S. W. Scott, Clemson Univ, SC and J. A. Payne, USDA S.E. Fruit and Tree Nut Res. Lab., Byron, GA 31008.

A virus of persimmon has been reported for the first time in the USA. Isometric particles were observed in fixed and embedded tissue and in sap from declining tees showing leaf veinal necrosis, premature defoliation, and bud and branch death. (The virus was not identified in the abstract.)

525 ROOT ROT OF ONION CAUSED BY PYTHIUM IRREGULARE AND P. COLORATUM. P. C. Vincelli, & J. W. Lorbeer, Cornell Univ., Ithaca, NY.

Both species of Pythium caused root rot of mature field grown onions following moderate to heavy rainfall.

554 ETIOLOGY OF PITH NECROSIS IN FIELD GROWN TRELLISED TOMATOES IN WESTERN NORTH CAROLINA. N. B. Carrol, E. Echandi, and P. B. Shoemaker. North Carolina State Univ., Ralegh, NC.

Pseudomonas corrugata was isolated from tomato pith of diseased plants. Inoculations with the bacterium produced stem lesions, vascular browning, necrotic or hollowed pith, and adventitious roots.

573 DETECTION OF VIRAL RNA IN MEALYBUGS ASSOCIATED WITH MEALYBUG-WILT OF PINEAPPLE. U. B. Gunasinghe & T. L. German. Univ. Hawaii, Honolulu, HI.

Mealybugs assayed for a virus infecting pineapple reacted positively to a nucleic acid probe developed against the virus. The possibility that mealybugs may transmit the virus from weed hosts to pineapple is being investigated.

676 ELISA DETECTION OF PRUNE DWARF AND PRUNUS NECROTIC RINGSPOT VIRUSES IN EXTRACTS OF DORMANT BUDS AND YOUNG LEAVES OF PEACH AND PRUNE TREES. C. F. Luhn & J. K. Uyemoto, USDA, Univ. Calif., Davis.

Young leaves are best to use with ELISA when assaying peach and prune for PDV and PNRSV.

759 SERIDIUM CANKER OF JUNIPERUS SPP. AND THUJA ORIENTALIS IN KANSAS. N. Tisserat & A. Nus, Kansas State Univ., Manhattan, KS.

Flattened, resiny cankers were found in association with declining eastern redcedar and oriental arborvitae windbreaks. The causal agent was tentatively identified as Seiridium unicorne, and is thought to contribute to the decline of the trees.

811 DOWNY MILDEW OF PANSY IN CALIFORNIA. R. D. Raabe & T. E. Tidwell, Univ. Calif., Berkekey, and Calif. Dep. Food and Agric., Sacramento, CA.

Pseudoperonospora was found infecting pansy (Viola x wittrockiana), viola (V. cornuta), and Johnny-jump-up (V. tricolor) in San Francisco area greenhouses. Biweekly sprays of metalaxyl controlled the disease.

815 GLOXINIA NECROSIS CAUSED BY A TOMATO SPOTTED WILT-LIKE VIRUS. B. E. L. Lockhart, F. L. Pfleger, & G. G. Ahlstrand. Univ. Minnesota, St. Paul, MN.

A virus that resembled TSWV, but which did not react with a commercially available TSWV ELA kit was found to cuase a widespread systemic necrosis of gloxinias in Minnesota. Systemic infection of standard indicator hosts was also unsuccessful.

Teleomorph of ash anthracnose described. Causal agents of anthracnose diseases of hardwood trees have been lumped by von Arx into the aggregate anamorph genus Discula (previously various species of Gloeosporium), based on morphological similarity of the conidiomata and conidia. Up until recently the teleomorph of ash anthracnose has never been described. S. C. Redlin and R. W. Stack (North Dakota State Univ.) have now isolated from anthracnose infected green ash (Fraxinus pennsylvanica Marsh.) the teleomorph, which they named Gnomoniella fraxini. Based on their observations, the authors have rejected von Arx's vision of an aggregate species for tree anthracnoses and have renamed the anamorph of ash anthracnose Discula fraxinea. Mycotaxon, 1988 32:175-198.

Phoma vs. Ascochyta on tomato. G. Morgan-Jones and K. B. Burch of Auburn University, Alabama have been studying species of Phoma in an attempt to clarify the taxonomy of this large genus. They consider the fungus which causes stem canker and fruit rot of Lycopersicon esculentum to be Phoma lycopersici Cooke rather than Asochyta lycopersici (Plowr.) Brun. Line drawings and photomicrographs, as well as a thorough written description (in English) of the fungus supports their position. Mycotaxon, 1988 32:133-142.

Formae speciales for the fungus causing leaf rust of poplar. L. Shain of the University of Kentucky in Lexington has found evidence that Melampsora medusae, the causal agent of poplar leaf rust, has two forms which differ in host preference. The rust has been thought to produce uredia and telia on eastern cottonwood (Populus deltoides Bartr) and trembling aspen (P. tremuloides Michx.) with equal frequency. Shain has found that urediospores collected from aspen produced uredia only on aspen, and urediospores from cottonwood preferentially colonized cottonwood, regardless of the geographic origin of the isolates. The names given to the different types are Melampsora medusae Thuem. f. sp. deltoidae for the form pathogenic primarily to P. deltoides, and M. m. Theum. f. sp. tremuloidae for that which prefers P. tremuloides. Mycologia 1988, 80:729-731.

New species of Phytophthora? Researchers at the University of Wisconsin-Madison have been investigating the relatedness of four Phytophthora megasperma isolates (P. m. f. sp. glycinea (Pmg) from soybean, P. m. f. sp. medicaginis (Pmm) from alfalfa, and two isolates from apple or alfalfa), P. cactorum, P. cryptogea, and P. parasitica var. nicotianae. The authors compared restriction fragment length polymorphisms of mitochondrial DNAs between the species and found evidence that supports the theory of different evolutionary origins for P. megasperma. Pmg and Pmm may be separate biological species. Mycologia 1988, 80:466-478.

INDUSTRY NEWS

Contact - Patrick J. Burke (301) 231-5524

Free ATCC Fungi and Yeast Reference Catalogue Update.

December 1988 Edition now Available

ROCKVILLE, MARYLAND, USA. 1/13/89 - The American Type Culture Collection is pleased to announce the availability of the 1988 ATCC FUNGI/YEAST UPDATE, a supplement to the 1987 ATCC Fungi & Yeast Reference Catalogue. The 1988 UPDATE includes 1150 strains, representing 600 species that have been added to the ATCC's collection since the printing of the 1987 reference catalogue. As with the 1987 reference catalogue the UPDATE contains scientific information useful to industry and academia such as literature citations which indicate uses of the cultures, recommended growth media and media formulations. Both the 1988 FUNGI/YEAST UPDATE and 1987 REFERENCE CATALOGUE are FREE to U.S. researchers. A modest shipping & handling fee is charged for catalogue shipments to locations outside the USA.

The ATCC is a private, nonprofit organization and the source of perhaps the largest and most diverse collection of biological cultures and genetic materials in the world.

Direct inquiries to: ATCC/MKTING NR24, 12301 Parklawn Dr., Rockville, MD 20852 USA

FIGURE 1

NEMATICIDAL EFFECT OF CLANDOSAN*

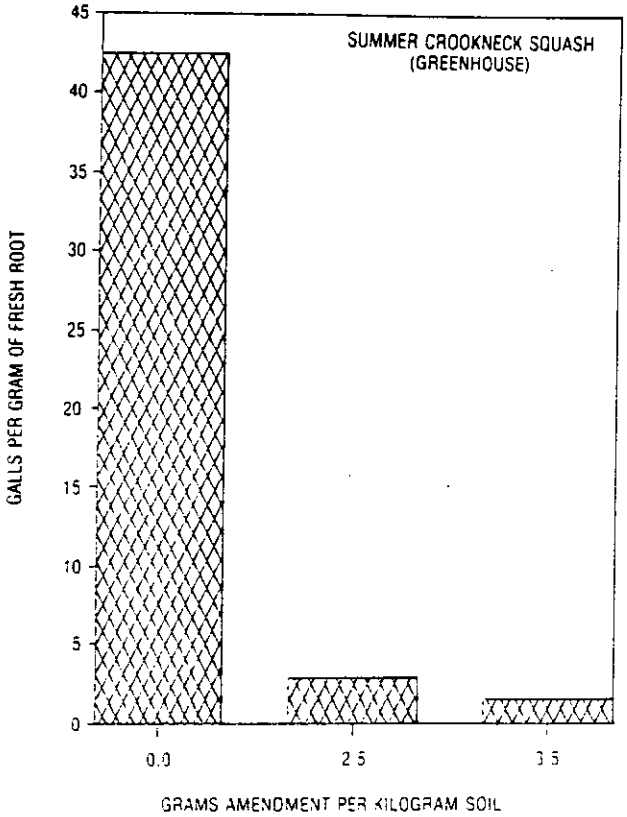


FIGURE 2

FERTILIZER EFFECT OF CLANDOSAN*

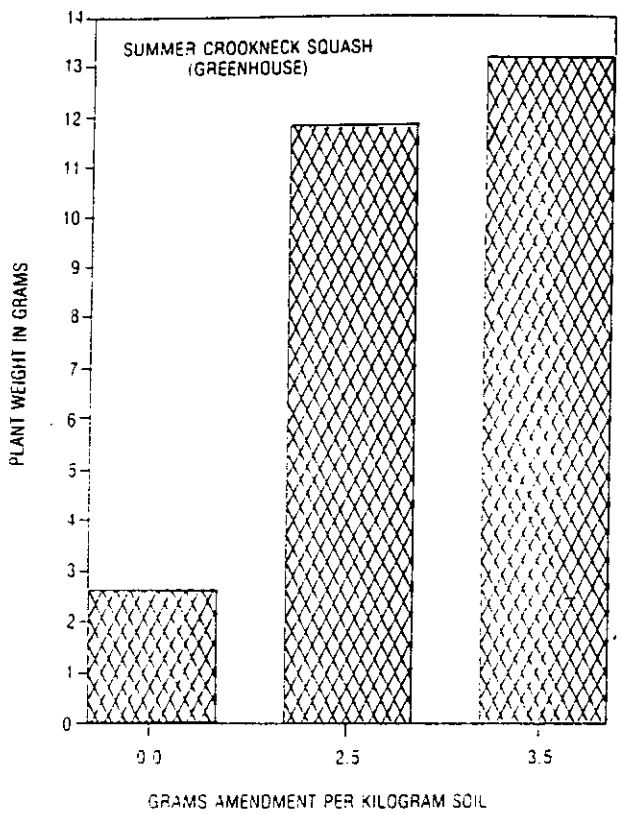


FIGURE 3

NEMATODE AND PLANT GROWTH EFFECTS

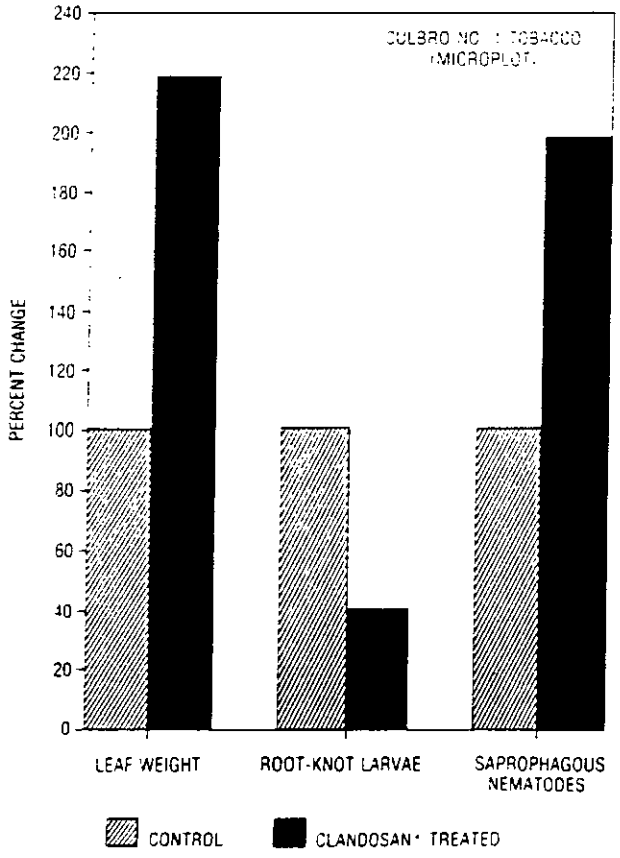
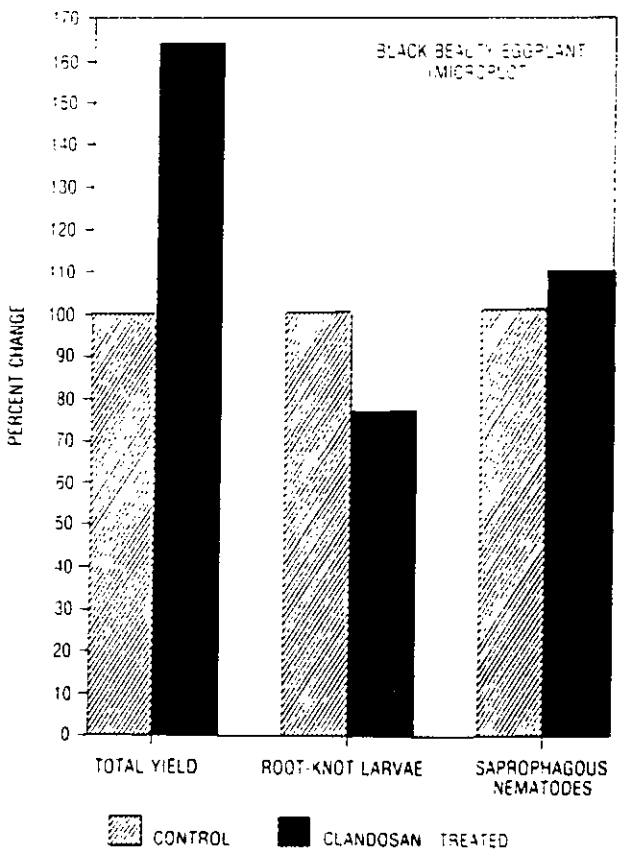


FIGURE 4

NEMATODE AND PLANT GROWTH EFFECTS



IGENE Biotechnology, Inc.

TECHNICAL BULLETIN
March, 1988

CLANDOSAN® 618

PRODUCT:

CHITIN NEMATICIDE

Active Ingredient	
Chitin (Poly-N-acetyl-D-glucosamine)-Protein	25%
Inactive Ingredients	
Organic Buffer, Urea and Minerals	75%

PRODUCT DESCRIPTION:

ClandoSan® is the registered trademark of IGENE Biotechnology, Inc. for a dried, granular chitin-protein material that is isolated from the tough polymer matrix of crustacean exoskeletons, especially crab, crawfish and shrimp shells, and processed into pellets or granules by patented and patent pending processes developed by IGENE Biotechnology, Inc.

The commercial ClandoSan®618 product is composed of a blend of the crustacean chitin-protein complex with agricultural grade urea and an organic buffer and contains no artificial or synthetic substances, additives, fillers or preservatives and no halogenated hydrocarbons or any other materials derived from petrochemical sources.

The product acts in soils as a biological control agent to stimulate the growth of normal soil microorganisms, such as fungus-like actinomyces, bacteria, and fungi, which produce chitinase and other enzymes and destroy plant pathogenic nematodes and their eggs. ClandoSan®618 does not have a direct adverse effect on plant-pathogenic nematodes either *in vitro* or in sterilized or irradiated soils.

REGULATORY STATUS

ClandoSan®618 is registered by the U.S. Environmental Protection Agency (EPA Reg. No. 58200-9) for use in the following:

Lawns and Turf	Including cool season winter grasses, summer grasses, and ornamental bunch grasses.
Ornamental Plants	Including annual garden plants, temperate perennial non-food garden herbs, commercial greenhouse crops, (including nursery/seed crops/medical crops/tobacco) house-plants, home and retail greenhouse and conservatory plants, public display plantings, bulb, corn, and tuber ornamentals, subtropical/tropical garden evergreen plants, ground-covers and aquatic plants; ornamental trees, shrubs, and vines; and forest tree nurseries.
Greenhouse (Commercial)	Includes nursery/seed crop/medical crop/tobacco
Vegetables	Includes leaf/stem, root, seed and pod, fruiting vegetables, and cucurbits, including commercial annual (e.g., tomato, bean) and commercial perennial (e.g., asparagus, rhubarb); annual legumes (e.g., crotalaria, soybean)
Fruits and Nuts	Includes caneberries, bushberries, vine fruits, strawberries, cranberries, pome fruits, stone fruits, nut crops—tree and shrub (e.g., pecan, filbert) and other temperate fruits
Tropical and Subtropical Fruits and Nuts	Citrus, banana, and plantain, palm fruits and nuts (e.g., date, coconut), pineapple, and other fruits and nuts
Beverage Crops	Includes cocoa, coffee, tea, chicory, mint
Fiber Crops	Includes cotton, flax, and other
Grain and Edible Seed Crops	Including corn, rice, wheat, barley, rye, oats, sorghum, alfalfa, other grains, other non-grains (e.g., squash, pumpkin), buckwheat, sesame, peanut, and sunflower
Seed sprout crops	Includes mung bean, red clover, soybean, alfalfa, and non-legume crops such as wheat, radish, and black mustard
Other Agricultural Crops	Crops for smoking and chewing; and oil crops.

NOTE: Do not use on crops which may be adversely affected by high rates of urea nitrogen.

FIGURE 1

NEMATICIDAL EFFECT OF CLANDOSAN*

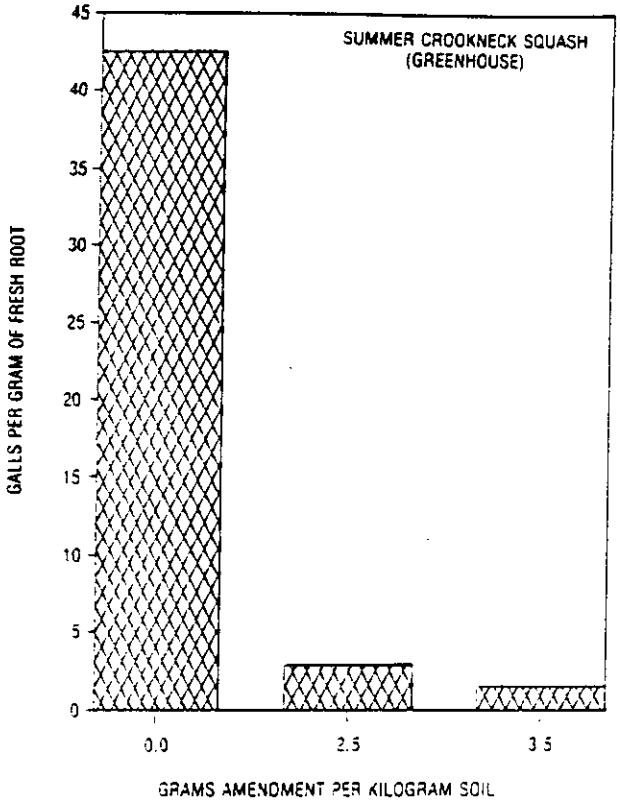


FIGURE 2

FERTILIZER EFFECT OF CLANDOSAN*

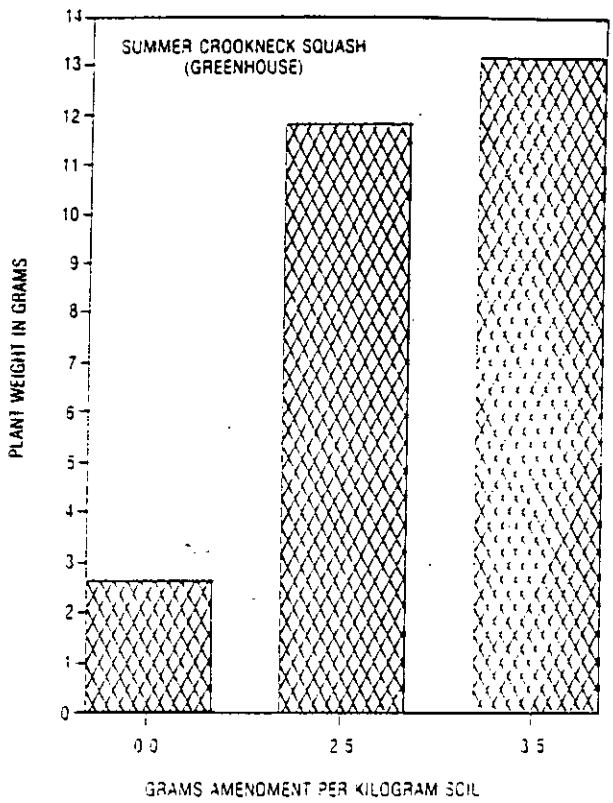


FIGURE 3

NEMATODE AND PLANT GROWTH EFFECTS

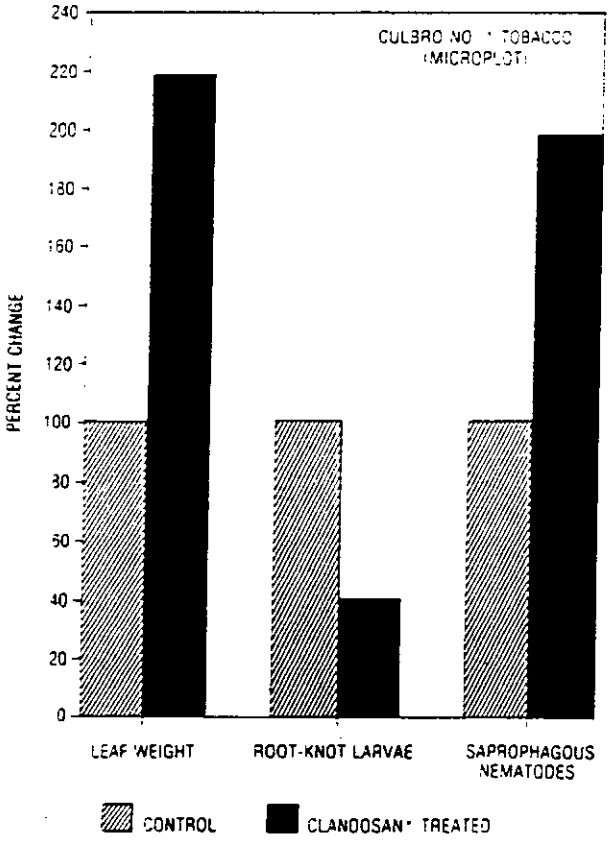
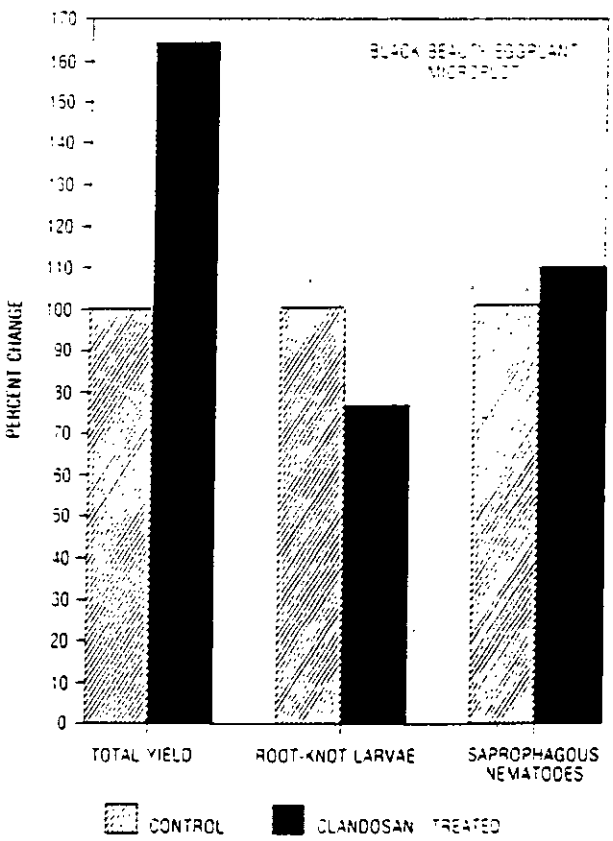


FIGURE 4

NEMATODE AND PLANT GROWTH EFFECTS



TYPICAL ANALYSIS:

The chitin (poly-N-acetyl-D-glucosamine) component of the ClandoSan®618 chitin-protein complex contains an acetyl constituent that is substantially identical to that of chitin prepared from other natural sources as shown by a characteristic infrared absorption band (amide I) at 1660 cm^{-1} and a typical downward shift of the amide II band from 1595 cm^{-1} to 1550 cm^{-1} with an added absorption band at 870 cm^{-1}. The molecular weight of the protein component of the chitin-protein complex is in the range of 10–15 kdal, as determined by gel electrophoresis, and its amino acid composition is substantially identical to that found in untreated crustacean shell materials (McCandliss, Eastwood and Milch, U.S. Pat. No. 4,536,207, issued August 20, 1985).

Typical analysis, on an "as is" basis, of ClandoSan®618 is illustrated below:

Proximate Analysis (%)

Moisture	9.0
Ash	23.3
Organic Matter	67.7

Primary Nutrients (%)

Nitrogen (Kjeldahl)	10.4
Phosphorus (as P_2O_5)	2.3
Potassium (as K_2O)	1.3

Micronutrients (Mg %)

Manganese	8.9
Zinc	5.0
Barium	2.1
Copper	1.4

Elemental Analysis (%)

Calcium	7.5
Chlorine	1.0
Sodium	0.8
Magnesium	0.5
Strontium	0.1

Carbon:Nitrogen Analysis

Total Carbon (%)	31.9
Organic Carbon (%)	29.7
Total C:N Ratio	3.1
Organic C:N Ratio	2.9
Kjeldahl "Protein" (%)	64.8

The low carbon:nitrogen (C:N) ratios and high Kjeldahl "protein" content of ClandoSan®618 are characteristics of organic soil amendments which act to render plant-pathogenic nematodes and their eggs susceptible to destruction by native soil microorganisms (Rodriguez-Kabana and King, *Nematropica* 10:38–44, 1980, and Rodriguez-Kabana and Milch, U.S. Patent Office Serial No. 07/084061, August 11, 1987)

DIRECTIONS FOR USE:

It is a violation of federal law to use ClandoSan®618 in a manner inconsistent with labeling.

For control of all plant-pathogenic nematodes.

APPLICATION METHODS:

PRE-PLANT SOIL INCORPORATION

ClandoSan®618 should be tilled, on a broadcast or band basis, or otherwise thoroughly mixed into soil 2–4 weeks before planting to stimulate the proliferation of actinomyces and other soil microorganisms, which are responsible for the "earthy aroma" of freshly plowed fields.

For broadcast and band application under field, home garden and nursery conditions, the product should be tilled to a depth of 6–8 inches below the surface where plant roots commonly extend and where plant pathogenic nematodes tend to proliferate. The same equipment may be used for both band and broadcast applications.

For bulk soil treatment in greenhouse, home garden and nursery situations, soil should be sieved to remove large particles and crop debris and then blended with ClandoSan®618 in an appropriate mixer to assure homogenization with little or no segregation of particles.

POST-PLANT SURFACE APPLICATION

For post-plant surface application to lawns, turfgrasses, sod farms, golf course greens or fairways, ClandoSan®618 can be distributed at any point in the growing season using conventional applicators, and should be immediately irrigated to assure adequate subsurface penetration.

APPLICATION RATES:

For all uses, a single annual application is usually sufficient for nematode control. For best results, soil analysis for nematode typing and counts of adult forms and larvae should be undertaken both before and after each crop season. These analyses are routinely provided by IGENE Biotechnology, Inc. as a service to customers.

For broadcast application: Recommended application rates are approximately 1 to 3 tons per acre on a broadcast basis (or 4.5 to 14.0 pounds per 100 square feet).

RATE CONVERSION CHART

CLANDOSAN®618 TONS PER ACRE	CLANDOSAN®618 APPROXIMATE LBS. PER 100 SQ. FT.
1.0	4.5
1.5	7.0
2.0	9.0
2.5	11.5
3.0	14.0

For bulk soil application: Apply on a 0.1 to 0.3% weight/weight basis (i.e., 1 to 3 lbs. ClandoSan® for 1000 lbs. of soil, 1 to 3 grams per kilogram of soil, or 2.5 to 7.4 lbs. per cubic yard of soil).

For homeowner use: One 50-pound bag of ClandoSan®618 will cover approximately 1,000 square feet at an application rate of 1 ton per treated acre on a broadcast basis. For bulk soil treatment, apply approximately 1.5 to 4.4 ounces ClandoSan®618 per cubic foot.

For band application to all crops other than lawn and turfgrasses: Row spacings can be used to determine the amount of ClandoSan®618 recommended for band application. Band widths should be equal to one-half the distance between rows and the bands should be centered directly over the centerline of the intended planting row. As a result, only one-half of available acreage is treated when band application is used and recommended application rates per acre for band application are equal to one-half the rates recommended for broadcast application. Recommended application rates on this basis are as follows:

Distance Between Rows (inches)	18	24	30	36	48
Band Width (inches)	9	12	15	18	24
Approximate Pounds of ClandoSan®618 Per 100 Feet of Banded Row, at Equivalent of:					
1 ton per treated acre	3.5	4.5	5.5	7.0	9.0
3 tons per treated acre	11.0	14.0	16.0	20.5	27.5

Application rates will vary according to the characteristics of the soil, types of plant-pathogenic nematodes, and extent of infestation. Acid soils (i.e., lower pH) or soils with a severe degree or type of infestation (e.g., root-knot nematode) will require the higher rates of application within the specified ranges. *NOTE*: Do not adjust rates of application in order to meet fertilizer requirements for your soil.

In determining your soil fertility requirements, you must take into account the amount of urea nitrogen which will be applied through the use of ClandoSan®618. Total Kjeldahl nitrogen equals approximately 10.4 pounds per 100 pounds of product (4.6 pounds from urea, 2.8 pounds from the chitin-protein complex and 3.0 pounds from inert ingredients). Phosphorus as phosphoric acid (P_2O_5) equals 2.3 pounds per 100 pounds of product and potassium as potash (K_2O) equals 1.3 pounds per 100 pounds of product. The optimum soil temperature conditions for application of this product range from 40° to 95°F at a soil depth of 6 to 8 inches.

ClandoSan®618 has been shown to have controlled or slow release effects in soils and may not require reapplication at optimal rates which are recommended for first time use. For best results, soil analysis for nematode typing and counts of adult forms and larvae should be undertaken both before and after each crop season. These analysis are routinely provided by IGENE Biotechnology, Inc. as a service to customers.

ENVIRONMENTAL HAZARD

Do not apply directly to water. Do not contaminate water when disposing of equipment washwater.

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal. Do not reuse bag or container.

STORAGE: Avoid exposure to extreme conditions such as heat, moisture, sunlight or contaminating substances.

DISPOSAL: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility. Completely empty bag into application equipment. Then dispose of empty bag in a sanitary landfill or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

MATERIAL SAFETY DATA SHEET

SECTION I: IDENTIFICATION

Product Name: ClandoSan®618

Description: Dried, granular chitin-protein material that is isolated from crustacean exoskeletons, especially crab, crawfish, and shrimp shells, and blended with agricultural grade urea and an organic buffer.

SECTION II: PHYSICAL & CHEMICAL CHARACTERISTICS

Boiling Point:	N/A
Bulk Density:	35–45 lbs/ft^3
Vapor Pressure (mm Hg):	N/A
Vapor Density (air = 1):	N/A
Evaporation Rate:	N/A
Solubility in Water:	Insoluble
Melting Point:	N/A
Appearance and Odor:	Tan granules with faint fishlike ammonia odor, accentuated after irrigation.

SECTION III: FIRE & EXPLOSION HAZARD DATA

Flash Point (method used):	N/A
Flammability Limits:	N/A
LEL:	N/A
UEL:	N/A
Extinguisher Media:	Water
Special Fire Fighting Procedures:	None known
Unusual Fire and Explosion Hazards:	None known. Keep away from open flames, sparks and sources of ignition.

SECTION IV: REACTIVITY DATA

Incompatibility (Materials to Avoid):	None known
Hazardous Decomposition Products:	N/A
Hazardous Polymerization:	None known

SECTION V: HEALTH HAZARD DATA

Routes of Entry: Inhalation, eye and skin contact, ingestion

Carcinogens: None known

Emergency First Aid Procedures:

Eye Contact:	In case of contact with eyes, immediately flush eyes with plenty of water. Get medical attention if irritation persists.
Skin Contact:	Wash with soap and water
Inhalation:	Seek medical assistance and remove to fresh air
Ingestion:	Induce vomiting and get medical assistance

SECTION VI: PROTECTIVE MEASURES

Respiratory Protection:	Not required.
Protective Gloves:	Not required.
Eye Protection:	**Avoid contact with eyes.** Use eye protection when handling this product

SECTION VII: STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage or disposal. Do not reuse bag or container.

STORAGE: Avoid exposure to extreme conditions such as heat, moisture, sunlight or contaminating substances.

DISPOSAL: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility. Completely empty bag into application equipment. Then dispose of empty bag in a sanitary landfill or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

KEEP OUT OF REACH OF CHILDREN
CAUTION
HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION: Avoid contact with eyes. Use eye protection when handling this product.

STATEMENT OF PRACTICAL TREATMENT:
In case of contact with eyes, immediately flush eyes with plenty of water. Get medical attention if irritation persists.

PACKING INFORMATION:

ClandoSan®618 is supplied, F.O.B. plant, in 50-pound 6 mil low density, linear polyethylene bags.

LIMITATION OF WARRANTY

To the best of manufacturer's knowledge and belief, the information contained herein is correct. The data outlined and statements made are intended only as a source of information. Appropriate tests under user's operating conditions should be run before use. Manufacturer makes no warranties, express or implied, including warranties of merchantability or fitness for a particular use. The parties agree that the buyer's exclusive remedy shall be a refund of the purchase price of the product. In no event shall manufacturer be liable for any incidental, consequential, or special damages suffered or incurred by user or its officers, employees, subsidiaries, affiliates, representatives or customers as a result of the use of the product, whether under theories of warranty, negligence, or strict liability. Manufacturer disclaims all liability for results and for any damages, injury or patent infringement with respect to the use of the product or any material supplied by the manufacturer, whether under theories of warranty, negligence, or strict liability.

AGRI-SCREEN

WHY TEST FOR AFLATOXIN?

Aflatoxin is one of the most potent carcinogens known to man. It has been linked to a wide variety of health problems in both humans and animals. A by-product of mold growth, aflatoxin can develop during pre-harvest, harvest, and storage of a variety of commodities.

The U.S. Food and Drug Administration has set a maximum allowable level of Aflatoxin B_1 at 20 parts per billion. Commodities used for human and animal consumption must be tested to ensure that aflatoxin levels are below this level. The foreign market regularly inspects loads and rejects shipments of commodities with levels higher than 5 to 15 ppb.

When aflatoxin-contaminated feed is eaten by livestock, it can cause many health and performance problems (see table at right). Because aflatoxin does not result in distinct disease symptoms, it often isn't suspected as the cause of poor performance in livestock. In many cases, due to the effects of aflatoxins, diseases develop that are then diagnosed as the primary cause of poor performance. Because aflatoxin is not suspected as the culprit, contaminated feed can continue being fed to livestock long after problems develop — and after substantial physical and economic loss has resulted.

Agri-Screen provides you with a quick and inexpensive method to screen commodities for aflatoxin and helps prevent the use of commodities containing toxic levels of aflatoxin.

WHY USE AGRI-SCREEN?

Agri-Screen is a dependable and efficient test for aflatoxin. It rapidly detects aflatoxin levels in commodities without requiring expensive laboratory equipment. All the supplies you need to run the test are included right in the Agri-Screen kit. When you are through, all the materials are disposable.

There are two formats to choose from:
The single test format contains all the materials needed to test one sample in a convenient package. You only supply the sample.

The multi-test format is ideal for large sample volumes. Up to eleven samples can be tested against one control in less time than even the quickest laboratory test can test determine results of one sample. Batching samples also increases the cost effectiveness of Agri-Screen.

Results can be determined in only 6 to 10 minutes using Agri-Screen. Unlike conventional testing methods, you can run Agri-Screen in almost any location; in the food processing plant, in the feed mill, at the grain elevator, or on the farm. Yet Agri-Screen's accuracy and reliability make it attractive to even the most sophisticated laboratories.

Agri-Screen for aflatoxin is one of a series of mycotoxin kits available from Neogen Corporation. One testing format provides you access to tests for five harmful mycotoxins.

PROBLEMS ASSOCIATED WITH AFLATOXIN B_1

Industry	Problems
Food Processors	FDA requires that commodities contain less than 20 ppb aflatoxin
Grain Elevators	May receive grain with mold contaminant that will continue to produce aflatoxins if conditions are right
Feed Mills	Aflatoxin-contaminated feed may be sold to livestock producers
Livestock Poultry	Reduced growth rate, decreased resistance to infection, fatty liver syndrome, death
	Broilers: Increased susceptibility of carcasses to bruising
	Layers: Diminished egg production, increased susceptibility to coccidiosis
Swine	Decreased feed efficiency, lowered rate of gain, stunted growth, suppressed immune system
Cattle	Reduced feed intake, reduced rate of gain, reduced feed efficiency, reduced susceptibility to stress, reduced reproductive performance
	Dairy Cattle: Decreased milk production, conversion to Aflatoxin M_1, which is secreted in milk
Horses	Acute gastronomictoxicity

DESCRIPTION OF AGRI-SCREEN

Agri-Screen is based on new immunoassay technology. Unique aflatoxin-specific antibodies determine the levels of aflatoxin present in a sample. The user receives accurate and distinct test results based on color differences. If you can distinguish between shades of red and blue, you can easily read Agri-Screen's results. To read results, compare the color differences between the grain or feed sample(s) and the provided 20 parts per billion control. A sample that is bluer than the control contains less aflatoxin than the control, while a sample that is lighter blue (or pinker) contains more aflatoxin than the control. For quantitative results, optional controls are available that allow you to construct a standard curve and read results on a microplate reader.

Unlike chemical testing methods, Agri-Screen does not require the use of solvents like benzene and acetonitriles. Instead the extraction step uses a methanol-water solution for a clean, safe extraction process.

Tests also available for Vomitoxin, Zearalenone, T-2 Toxin and Aflatoxin M_1 ASAO2/88

NEOGEN CORPORATION

AGRI-SCREEN®

Prices effective Oct. 1, 1987

Item No.	Description	Price		
	Agri-Screen For Aflatoxin	1	2-10	11+
10	24-well test (w/20ppb control)	$ 77.00	$ 75.00	$ 73.00
11	48-well test (w/20ppb control)	$144.00	$136.00	$132.00
12	Single test 6-unit carton	$ 48.00	$ 46.00	$ 44.00
13	Single test 12-unit carton	$ 90.00	$ 87.00	$ 84.00
14	Extraction Kit (for 12 tests.	$ 12.00	$ 12.00	$ 12.00
15	Optional Controls (each) ___0ppb ___5ppb ___10ppb ___15ppb ___50ppb	$ 10.00	$ 10.00	$ 10.00
16	Extra Conjugate (for 12 tests)	$ 5.00	$ 5.00	$ 5.00
	Agri-Screen For Zearalenone			
20	24-well test (w/500ppb control)	$120.00	$117.00	$114.00
21	48-well test (w/500ppb control)	$224.00	$216.00	$212.00
22	Single test 6-unit carton	$ 69.00	$ 67.00	$ 65.00
23	Single test 12-unit carton	$135.00	$132.00	$129.00
24	Extraction Kit (for 12 tests)	$ 15.00	$ 15.00	$ 15.00
25	Optional Controls (each) ___0ppb ___250ppb ___1000ppb ___2000ppb	$ 10.00	$ 10.00	$ 10.00
	Agri-Screen For T_2 Toxin			
32	Single test 6-unit carton (w/500ppb control)	$ 69.00	$ 67.00	$ 65.00
33	Single test 12-unit carton (w/500ppb control)	$135.00	$132.00	$129.00
	Agri-Screen For DON (Vomitoxin)			
40	24-well test (w/1000ppb control)	$120.00	$117.00	$114.00
41	48-well test (w/1000ppb control)	$224.00	$216.00	$212.00
42	Single test 6-unit carton	$ 69.00	$ 67.00	$ 65.00
43	Single test 12-unit carton	$135.00	$132.00	$129.00
44	Extraction Kit (for 12 tests)	$ 15.00	$ 15.00	$ 15.00
45	Optional Controls (each) ___0ppb ___500ppb ___2000ppb ___3000ppb ___4000ppb	$ 10.00	$ 10.00	$ 10.00
	Agri-Screen For Aflatoxin M_1			
57	36-well test (w/.5ppb control)	$360.00	$350.00	$340.00
55	Optional Controls (each) ___0ppb ___.25ppb ___1ppb ___2ppb	$ 10.00	$ 10.00	$ 10.00
	Accessories			
A1	Agri-Scan Microwell Reader	$450.00	---	---
A2	Agri-Grind	$ 30.00	---	---
A3	Well Holder	$ 2.00	---	---
A4	Wash Bottle	$ 3.00	---	---

Shipping & Handling will be added to each order (Prices F.O.B. Plant, Lansing, MI)

1-800-234-5333

620 Lesher Place • Lansing Michigan 48912 • 517/372-9200

Furnished

NEOGEN CORPORATION

AGRI-SCREEN®

Prices effective Oct. 1, 1987

Item No.	Description	Price 1	2-10	11+
	Agri-Screen For Aflatoxin			
10	24-well test (w/20ppb control)	$ 77.00	$ 75.00	$ 73.00
11	48-well test (w/20ppb control)	$144.00	$136.00	$132.00
12	Single test 6-unit carton	$ 48.00	$ 46.00	$ 44.00
13	Single test 12-unit carton	$ 90.00	$ 87.00	$ 84.00
14	Extraction Kit (for 12 tests)	$ 12.00	$ 12.00	$ 12.00
15	Optional Controls (each) ___0ppb ___5ppb ___10ppb ___15ppb ___50ppb	$ 10.00	$ 10.00	$ 10.00
16	Extra Conjugate (for 12 tests)	$ 5.00	$ 5.00	$ 5.00
	Agri-Screen For Zearalenone			
20	24-well test (w/500ppb control)	$120.00	$117.00	$114.00
21	48-well test (w/500ppb control)	$224.00	$216.00	$212.00
22	Single test 6-unit carton	$ 69.00	$ 67.00	$ 65.00
23	Single test 12-unit carton	$135.00	$132.00	$129.00
24	Extraction Kit (for 12 tests)	$ 15.00	$ 15.00	$ 15.00
25	Optional Controls (each) ___0ppb ___250ppb ___1000ppb ___2000ppb	$ 10.00	$ 10.00	$ 10.00
	Agri-Screen For T_2 Toxin			
32	Single test 6-unit carton (w/500ppb control)	$ 69.00	$ 67.00	$ 65.00
33	Single test 12-unit carton (w/500ppb control)	$135.00	$132.00	$129.00
	Agri-Screen For DON (Vomitoxin)			
40	24-well test (w/1000ppb control)	$120.00	$117.00	$114.00
41	48-well test (w/1000ppb control)	$224.00	$216.00	$212.00
42	Single test 6-unit carton	$ 69.00	$ 67.00	$ 65.00
43	Single test 12-unit carton	$135.00	$132.00	$129.00
44	Extraction Kit (for 12 tests)	$ 15.00	$ 15.00	$ 15.00
45	Optional Controls (each) ___0ppb ___500ppb ___2000ppb ___3000ppb ___4000ppb	$ 10.00	$ 10.00	$ 10.00
	Agri-Screen For Aflatoxin M_1			
57	36-well test (w/.5ppb control)	$360.00	$350.00	$340.00
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	Accessories			
A1	Agri-Scan Microwell Reader	$450.00	—	—
A2	Agri-Grind	$ 30.00	—	—
A3	Well Holder	$ 2.00	—	—
A4	Wash Bottle	$ 3.00	—	—

Shipping & Handling will be added to each order (Prices F.O.B. Plant, Lansing, MI)

1-800-234-5333

620 Lesher Place • Lansing Michigan 48912 • 517/372-9200

PATHOSCREEN–Xf

Agdia's ELISA for *Xylella fastidiosa*

Xylella fastidiosa (*Xf*), are fastidious, xylem–inhabiting, gram negative bacteria culturable in cell free media, transmitted by leafhoppers, which affect a wide range of host plants. *Xf* cause a group of important diseases, such as: Pierce's disease of grapevines, phony peach disease, alfalfa dwarf, almond leaf scorch, plum leaf scald and leaf scorch of elm, oak, sycamore and mulberry. The economic importance of landscape trees and nursery crops and the recent advances in the isolation and diagnosis of *Xf* have sparked increased interest in diseases caused by *Xylella fastidiosa*.

Agdia Inc., is pleased to offer PATHOSCREEN–Xf, a ready–to–use ELISA kit to detect *Xylella fastidiosa*. The kit is a valuable aid to the detection of *Xf*. It is very sensitive, specific, reliable and rapid. It can be used, on site, by growers in a nursery or a field office. At the same time, it is an excellent performer in a research or diagnostic laboratory.

Agdia also offers reagent components to test for *Xylella fastidiosa* and performs the test in its testing service providing results in 24 hours from the receipt of samples. Please contact Agdia, Inc. at (219) 255–2817, 1901 N. Cedar Street, Mishawaka, Indiana 46545 for more information or to place an order. Agdia will be happy to answer your questions or help you develop a testing program that fits your requirements .

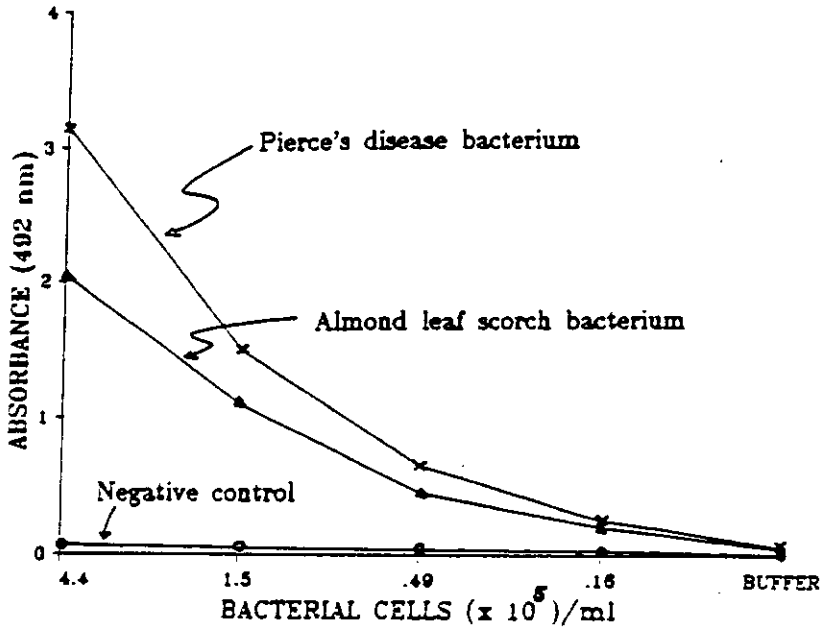
Test Characteristics

The antibody used in PATHOSCREEN–Xf was prepared, in rabbit, against isolates of *Xylella fastidiosa*. The test is specific for *Xf* and does not distinguish between strains. It detects all isolates tested in common hosts. The test does not react with other major groups of bacteria.

Typical response curves using culture isolates of Pierce's disease and almond leaf scorch are shown on the back page.

Reference

Agdia's PATHOSCREEN–Xf has been investigated by J. L. Sherald: Leaf Scorch of Trees Associated with *Xylella fastidiosa*. Plant Diagnostician's Quarterly 9(3):11–22 (1988).



Test Format

PATHOSCREEN–Xf uses a method of double antibody sandwich ELISA. The entire procedure requires about 4.5 hours and is performed at room temperature. Terminal stems, petioles, roots or leaves are convenient and effective samples for the test.

Summarized Test Procedure

1. Extract sample. Dilute 1:10 and put 100ul into each well.
2. Incubate for 2 hours.
3. Wash plate.
4. Put 100 ul enzyme–conjugated IgG into each well.
5. Incubate for 2 hours.
6. Wash plate.
7. Put two drops of color forming substrate into each well.
8. Observe color after 15–30 minutes.

Prices ($USA)

Ready–to–use Kits	288 tests	$184
	480 tests	291
1000 Reagents	IgG and Conjugate	$290
	Conjugate only	172
	IgG only	127
Testing Service	Minimum charge	$25
	Per sample	3

New!!

IFA and ELISA Reagents

Agdia, Inc. working together with Agri–Sciences, Inc. is pleased to offer the following reagents, developed specifically for immunofluorescence (IFA) and ELISA protocols. These reagents are characterized monoclonal antibodies, matched to tested procedures and offered in convenient sizes for popular test formats.

* *Xanthomonas (genus specific)*
* *Xanthomonas c. pv. campestris*
* *Xanthomonas c. pv. pelargonii*
* *Xanthomonas c. pv. begoniae*
* *Xanthomonas c. pv. dieffenbachiae*
* *Xanthomonas c. pv. citri*
* *Xanthomonas c. pv. oryzae*
* *Xanthomonas c. pv. maltophilia*
* *Erwinia c. pv. carotovora*
* *Erwinia chrysanthemi*
* *Clavibacter m. pv. michiganensis*

Contact:

Agdia, Inc.
1901 N. Cedar Street
Mishawaka, IN 46545
phone: (219) 255–2817

Agdia, Inc. introduces the POTYVIRUS GROUP TEST

The POTYVIRUS GROUP TEST detects all members of the potyvirus group, the largest and economically most important group of plant viruses. This group contains at least 85 definitive viruses including, for example, potato virus Y (type member), bean common mosaic virus, dasheen mosaic virus, lettuce mosaic virus, pea seedborne mosaic virus, soybean mosaic virus, and tulip breaking virus. Viruses in this group are typically transmitted by aphids in a non–persistent manner, exist as filamentous particles (11 x 680–900nm) and form characteristic cytoplasmic inclusions. Some are transmitted through seed.

The POTYVIRUS GROUP TEST is the first test offered to detect all viruses and strains within a group of plant viruses. The group specificity of the test makes it a valuable tool in diagnostic and screening applications. The test is very sensitive, specific for the potyvirus group and reliable. It can be used, on site, by growers in a nursery or a field office. At the same time, it is an excellent performer in a research or diagnostic laboratory.

Agdia offers the POTYVIRUS GROUP TEST as a reagent kit or by components and also performs the test in its testing service providing results in 48 hours from the receipt of samples. Please contact Agdia, Inc. at (219) 255–2817, 1901 N. Cedar Street, Mishawaka, Indiana 46545 for more information or to place an order. Agdia will be happy to answer your questions or help you develop a testing program that fits your requirements.

Test Characteristics

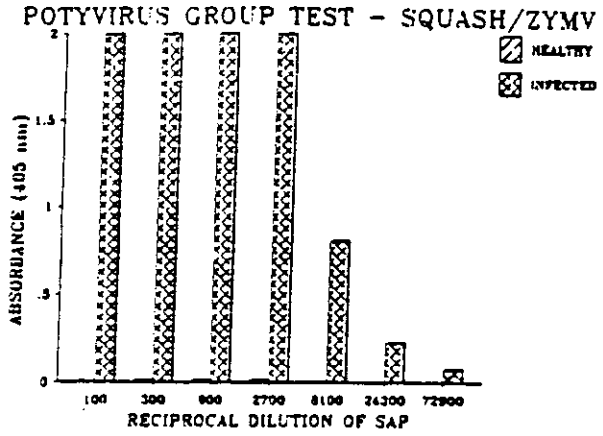
The POTYVIRUS GROUP TEST is based on a monoclonal antibody developed by R. Jordan and J. Hammond, USDA Florist and Nursery Crops Laboratory in Beltsville, Maryland. Research has shown that this antibody recognizes all potyviruses tested thus far. The test does not react with viruses outside of the potyvirus group. It is very sensitive and does not show strain dependency.

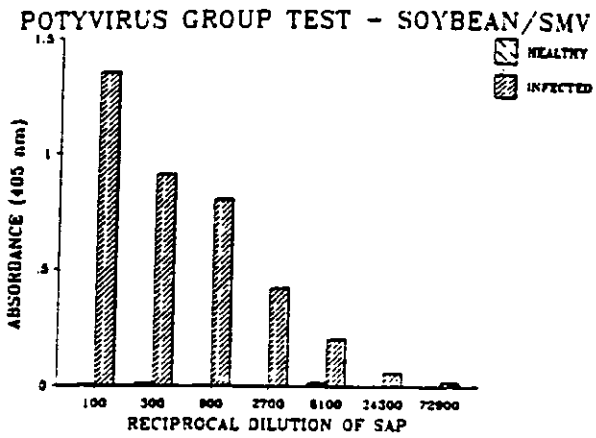
Typical response of the POTYVIRUS GROUP TEST to squash tissue infected with zucchini yellow mosaic virus (ZYMV), and to soybean tissue infected with soybean mosaic virus (SMV), after 30 minutes incubation in substrate, is shown on back page.

References

Jordan, Ramon and Hammond, John. 1988. Epitope specificity of strain–, virus–, subgroup–specific and potyvirus group cross reactive monoclonal antibodies. American Phytopathological Society Annual Meeting, San Diego, November 1988, Poster 699–21. Phytopathology 79: (in press).

Jordan, Ramon and Hammond, John. 1986. Analysis of antigenic specificity of monoclonal antibodies to several potyviruses. Phytopathology 76: 1091.





Test Format

Agdia's POTYVIRUS GROUP TEST uses a protocol of antigen–coated indirect ELISA. The procedure involves coating plastic test wells with plant sap and detecting the virus with a potyvirus group specific IgG, followed by an anti–IgG enzyme conjugate. The test can be completed in 6 hr, but for optimum sensitivity we suggest a protocol which requires two days.

Summarized Test Procedure

1. Extract sample. Dilute 1:100 and put 100 ul into each well.
2. Incubate for 2 hr.
3. Wash plate.
4. Dilute IgG solution 1:100 and place 100 ul into each well.
5. Incubate overnight in refrigerator.
6. Wash plate.
7. Dilute Enzyme Conjugate 1:100 and place 100 ul in each well.
8. Incubate for 2 hr.
9. Wash plate.
10. Prepare substrate and put 100 ul into each well.
11. Observe color after 15–60 min or longer if desired.

Price Schedule ($USA):	NUMBER OF TESTS		
	1000	500	96
Potyvirus Group IgG	$320	--	--
IgG and Alk. Phos. Conjugate	360	$240	--
Complete Kit	457	313	$95

Testing Service:	Minimum charge	$25
	Per sample	4

APS ORNAMENTALS NURSERY TOUR

Cynthia Ash, University of Minnesota

A two day tour of southern California nurseries was held the Friday and Saturday prior to the 1988 APS Annual Meeting in San Diego. The tour was organized by Jim MacDonald, Don Ferrin, and John Kabashima of the University of California.

First stop was Monrovia Nursery. Monrovia is involved in the propagation and production of woody ornamentals. Conrad Skimina, Director of Research, gave the group a tour of Monrovia's propagation facilities, soil pasteurization and mixing areas; and water recycling and treatment facilities - the first and perhaps the only nursery to completely recycle their irrigation water. Monrovia relies heavily on sanitation procedures during the propagation of their stock, including dipping shears in disinfectant, using and frequently changing rubber gloves while making cuttings, and dipping the cut ends of propagation material in a surface disinfestant prior to planting.

Next on the tour was Hines Nursery, which specializes in container grown woody ornamentals and perennials. Soil mixing, irrigation systems (an impressive amount of material was under drip irrigation), and pest control were discussed during the tour. The potting of small junipers was observed with awe as workers used just seconds per unit to move the plants up to larger pots in a highly efficient and mechanized process. Adjacent to Hines was El Modeno Gardens, whose main products are greenhouse and field grown perennials and potted flowers. The main emphasis here was a computer controlled irrigation system designed to reduce water usage, runoff, and fertilization: reductions were 30%, 67%, and 49%, respectively over 1986 figures.

The group spent the night in Irvine at a unique hotel constructed from old storage silos ("600,000,000 lima beans slept here").

The first stop of the second day was The Pinery, which bills itself as the largest producer of container Christmas trees in the West. Our host gave us a tour of propagation and production areas and discussed disease and cultural control practices; he was of the opinion that all their disease problems stemmed from poor cultural conditions. It was

interesting to note that late planted pine seedlings in red plastic pots were having disease problems, but those planted at the same time under the same conditions in black plastic pots were healthy. The Pinery was able to produce a market ready tree from seed in just 28 months.

Next stop, Mellano and Company, a producer of field grown cut flowers over approximately 200 acres. Cultural practices and disease management were discussed as the group toured the field and shipping operations.

After lunch at Paul Ecke's ocean view Poinsettia Ranch, the group toured the impatiens production houses. Emphasis here was on tomato spotted wilt/thrips control. Fine mesh screen on all doors and vents, and protective clothing for people entering the houses are the primary methods used for thrips exclusion. The preventive measures appeared to work quite well: continual thrips population monitoring via yellow sticky cards showed one to four thrips per range, in contrast to several hundred thrips per card prior to installation of the screening. Plants are periodicaly tested for TSWV via ELISA. The group also toured the poinsettia production operation.

The last stop was the Dram and Echter Company for a look at flower production in the greenhouse and associated problems. Downy mildew was causing some problems on a variety of roses in one house.

All the nursery operations were clean and well organized. The methods of disease control varied somewhat between Bperations, but the importance of preventive measures was stressed at each nursery. One of the major concerns was water quality and availablity, a natural consideration in southern California.

RAPID DIAGNOSTIC ASSAYS FOR PLANT PATHOGENS WORKSHOP

A Really Good Workshop at the San Diego APS Meeting

Jackie Mullen
Auburn University

This well-organized workshop was designed to acquaint those preregistered pathologists, students or other APS meeting attendees with some of the commercial ELISA or Immunoassay detection kits now available.

Workshop participants were exposed to 30 minutes of experience with each product. The companies which prepared the session were as follows: Agri-Diagnostics Associates; Agdia, Inc., Neogen Corp.; and Kinetic Laboratory Equipment Co. The products demonstrated and set-up for workshop experience were: Rapid Immunoassays for Detection of Plant Pathogenic Fungi (Agri-Diagnostics); Rapid Detection of Xanthomonas in Geraniums (Agri-Diagnostics); ELISA for Fastidious Xylem-Inhabiting Bacteria (Agdia); ELISA for Viruses (Agdia); Mycotoxin Detection Assays (Neogen Corp.); and the Kleco Model 2000 tissue pulverizer (Kinetic Laboratory Equipment). Each product was introduced and described by a company representative who then took the participants through the assay or test procedure with each participant or participant pairs performing actual tests. With some assay kits, only a portion of the test could be performed due to the time requirement for some reactions. The 60-70 preregistered participants were divided into 6 groups which moved together from one product table to another as 30 minute time increments passed. Below is a brief summary of the assay or product activities performed at each table.

1. Mycotoxin Detection Assay. C. Dilley. Neogen Corp., 620 Lesher Place, Lansing, MI 48912 (517/372-9200).

Neogen now has ELISA kits available for the detection of aflatoxin, zearalenone, T_2 Toxin, and Vomitoxin. Our hands-on experience was with the aflatoxin kit.

The aflatoxin extract was pre-prepared in a methanol:water solution. The multiwells provided came pre-coated with the aflatoxin antibody. As a first step in our experience, we were given known standards of aflatoxin and an unknown aflatoxin extract. The standards and the unknown were each mixed with equal volumes of the enzyme-labelled conjugate antigen; an aliquot of each mixture was added to an assay well. After a short inocubation, wells were washed 10 times with water. To the washed and drained wells, substrate was added. After a short incubation, a stopping reagent was added. The concentration of aflatoxin B_1 in the unknown sample was determined by a color comparison with the known standards.

I believe this assay technique could be very useful in a laboratory situation where mycotoxin assays are performed. At the present time, the assay reagents have a shelf life of approximately 4 months so purchase of these kits should be made close to the time of expected use.

2. Rapid Immunoassays for Detection of Plant Pathogenic Fungi. V. Estes, Agri-Diagnostics Associates. 2611 Branch Pike, Cinnaminson. New Jersey 08077 (609/829-6935) Toll-free in US: 800-822-KITS.

The Rapid Immunoassays of Agri-Diagnostics are also referred to as "Alert On-site Crop Disease Detection Kits". These kits can be used in the field or elsewhere in the absence of other laboratory equipment. The test may be completed in 10-15 minutes. Kits are available for identification of Phytophthora, Pythium, Rhizoctonia, Sclerotinia.

In our workshop experience, diseased soybean seedlings were provided to each participant. Extracts of the stem lesion areas were prepared using the kit materials. The extracts were then tested for the presence of Rhizoctonia using the Rhizoctonia test ampules. Each ampule contains 3 circular membrance areas. One membrane circle has been pre-coated with the Rhizoctonia antibody. One membrane circle has been pre-coated with the Rhizoctonia antibody and a Rhizoctonia antigen (positive control circle). And, one membrane circle has not been precoated with any antibody (negative control circle). With this design, each ampule contains a built-in positive and negative control. The soybean tissue extract was added (drop-wise) onto the 3 membranes. After absorption, the specific antibody-enzyme-conjugate was added. After absorption, the membranes were rinsed (drop-wise) and then drops of substrate were added and absorbed. Finally, rinse solution was added in drop-wise fashion and color development was observed. The built-in controls alert the user to any internal problems with the ampule function.

This rapid test kit could be used by a wide range of clientele--both professional and non- professional. Many golf course superintendents in the East have already put these products to good use.

3. ELISA for Fastidious Xylem-Inhabiting Bacteria. B. Sakaguchi, Agdia, Inc., 1901 North Cedar Street, Mishawaka, Indiana 46545 (219/255-2817).

The assay for Xylella fastidiosa--causal agent of Pierce's disease of grapevines, phony peach disease, alfalfa dwarf, almond leaf scorch, plum leaf scald, elm leaf scorch, and other scorch diseases on sycamore, oak, mulberry and others--was demonstrated using a multi-well assay kit called PATHOSCREEN-Xf. Due to time restrictions, part of the test was performed ahead of time. Xylem sap was expressed and diluted in extract buffer. Aliquots of the sample extract were added to the microwell strip coated with X.f. antibody. After incubation, wells were washed with a

buffer wash. To the drained wells were added the enzyme-conjugate-antibody. This addition was then incubated. The wells were then rinsed with the buffer solution. At this point in the assay, multi-well strips were given to the workshop participants for completion of the test. Substrate was added to each well, and after a short incubation, a stopping solution was added to stop the reaction. Color development was observed and discussed. Even though it was not possible to perform the complete test in the 20-30 minute time period allotted, discussion of the early steps provided orientation for the later steps performed. The enzyme test used involved a peroxidase enzyme system. (Agdia also has reagents available for a alkaline phosphatase ELISA test for X.f.).

I used this kit last summer to detect sycamore scorch, oak scorch and phony peach disease. The procedure can be readily performed in a diagnostic lab/clinic facility or other lab setting.

4. Rapid Detection of Xanthomonas in Geraniums. S. Nameth, Ohio State University, Columbus and M. Klopmeyer, Agri-Diagnostic Associates, Cinnaminson, N.J.

This kit gives positive results for X. campestris pv. pelargonii and several other pathovars (i.e. poinsetticola, vesicatoria, malvacearum, campestris, begoniae, and hederae) of X. campestris.

A geranium infected with X. campestris pv. pelargonii was available for display. Infected tissue extracts had been prepared prior to the workshop group time. The workshop participants worked in pairs and each pair was able to conduct an assay using the prepared geranium tissue extract. The extract (antigen) was added to the multi-well strip which was previously coated with X.c.p. antibody. This mixture was incubated for a short time using a Vortex shaker. The samples were rinsed and then enzyme-antibody conjugate was added and incubation with mixing was again performed as before. The samples were rinsed as before, and then substrate was added. Color development was observed.

This assay procedure was relatively quick (Complete assay time was about 30 minutes.), and it could be easily performed in a laboratory or any other location. I understand that some large-scale greenhouse operations are using the kit also.

5. ELISA for Viruses. C. Sutula, Agdia, Inc., Mishawska, IN.

This particular session was devoted to detection of Potato Virus X but the test procedure would be the same for several other viruses kits. Test samples were prepared ahead of time in extraction solution. Each participant was provided with a multiwell strip which was coated with PVX antibody, the test

tissue extract, and necessary reagents for the complete assay. The sample extract was added and incubated for a short time. After washing the wells with the wash buffer, the enzyme-conjugate-antibody was added. Incubation for another short period followed. The wells were washed and then substrate solution was added. After 3-5 minutes, the acid stop solution was added. Color development was noted.

This was another quick assay which was completed during the 30 minute workshop time period. Similar virus kits I used last summer were very helpful in identification of virus where large crop areas were involved and mosiac symptoms could not be used for exact virus identification.

In addition to the 5 ELISA assays described above, one other table was set up and time was alloted for explanation and demonstration of a tissue pulverizer. Use of the New Kleco Model 2000 by Kinetic Laboratory Equipment Co. (14097 Ave. 272, Visalia, CA 93277 (209/732-3785)) was demonstrated by J. Garcia. Tissues were completely pulverized (dry or wet) in 10-20 seconds.

If you planned to do many, many ELISA-type assays, and if your laboratory facility was well-funded, you would want to have this handy little machine!

This workshop was very well-organized. The session was beneficial for those who had never used ELISA (Immunoassay) techniques and for those who had experience with this relatively new identification technology. Presentations were directed at the novice user, but discussion time allowed for informative interchange between instructors, users and future users. Understandably, this has been a popular session for the past two years, and I know some of us have been trying--unsuccessfully--for 2 years to register fast enough to be able to attend. Due to the nature of the session, a limit must be placed on the number of folks admitted. I understand that the session will again be offerred at our next APS meeting in Richmond. If you have not used these techniques or even if you have used some of them, I would recommend this workshop as a "real good" educational experience for all working in a diagnostic situation.

SYMPOSIUM ON BIOTIC AND ABIOTIC DISEASES OF ORNAMENTAL PALMS HELD AT THE APS ANNUAL MEETING IN SAN DIEGO

JAMES H. BLAKE
UNIVERSITY OF FLORIDA

The symposium was comprised of presentations on biotic and abiotic diseases of ornamental palms in California, Florida, and Hawaii. Dr. Howard D. Ohr from the University of California at Riverside presented information on the major diseases of landscape palms in California which included pink rot caused by Gliocladium vermoeseni, diamond scale caused by Sphaerodothus neowashingtonia, a leaf spot caused by Serenomyces californica, and Fusarium wilt caused by Fusarium oxysporum. The major diseases of landscape palms in Florida, presented by Dr. Gary W. Simone from the University of Florida, included Ganoderma butt rot caused Polyporus lucidus var. zonatus (Ganoderma sulcatum), lethal yellowing caused by a mycoplasma, bud rots caused by Phytophthora palmivora and Thielaviopsis sp., false smut caused by Graphiola phoenicis, and Stigmina leaf spot caused by Stigmina palmivora. Dr. Janice Y. Uchida, from the University of Hawaii, presented information on leaf spots caused by Calonectria thea cohunii, Bipolaris incurvata, and Cercospora rhapis as well as fruit and bud rots caused by Phytophthora katsurae and P. parasitica. Dr. Ann R. Chase from the University of Florida reported on diseases of nursery palms which included leaf spots caused by Bipolaris sp., Exserohilum sp., Phaeotrichoconis sp., Cylindrocladium sp., and Cercospora sp. Information on root and stem rots caused by various fungi were also presented. Dr. Chase indicated that there are essentially no biotic diseases of palms in interiorscapes. The major limiting factor in growing palms in interiorscapes appears to be the very low light levels. Mites, mealy bugs, and scale insects appear to be causing the most significant damage. Dr. Timothy K. Broschat from the University of Florida presented information on abiotic problems caused by nutritional deficiencies. The most severe symptoms are caused by deficiencies of potassium, magnesium, and manganese. Dr. Broschat also discussed problems due to improper transport and improper planting of palms.

The information presented at this symposium has been proposed for publication as a book of color photographs with disease descriptions, micrographs of the pathogens, diagnostic techniques, and recommendations for appropriate tissue content of the major and minor elements. Two slide sets have also been proposed and will be produced from the book with one set on biotic diseases and one set on abiotic diseases. If you would be interested in the book or slide sets, please fill out the attached questionnaire and return to Dr. Chase. This information will be compiled to encourage the publishers to proceed with publication.

PLANT VIRUS DETECTION WORKSHOP

This workshop, held in Riverside at the University of California prior to the APS meetings, was divided into three units: detection of viral nucleic acid, led by Allan Dodds and Rodrigo Valverde (unit 1); serological techniques (ELISA, western blots) taught by Ramon Jordan and David Gumpf (unit 2); and virus inclusion body analysis using light and electron microscopy, with Paul Desjardins and Steve Nameth instructing (unit 3). The 17 participants were divided into groups of five or six people, and each group spent one day on each unit, then rotated to the next.

The workshop evoked mixed responses when participants were questioned about it, with remarks ranging from "very useful" to "poorly organized" and "not worth the money." Some complaints were trivial (no coffee - horrors!), but most were more substantial.

Of the six participants interviewed (35% of those attending), all noted that the organization of the workshop could have been better, with the exception of unit 1. Dr. Dodds' section on ds-RNA analysis unanimously received praise for being both well planned and clearly presented. The other sections were not so charitably received, at least by the people I spoke with. Complaints centered around the apparent lack of preparation: for example, insufficient numbers of tools, and hand-outs that needed many corrections. Some complained that clear-cut positive results were not obtained after completing the procedures, especially in unit 3, so that participants were unsure if they would be able to recognize a positive when using the technique on their own.

I received conflicting information from the people I spoke with regarding certain particulars. Some said there had been no positive slides demonstrating inclusion bodies for light microscopy, while another person denied this and said the slides had been available. Again, for another section, one person remarked that there had been a lot of down time while materials were incubating, yet the instructor told me he had lectured during those periods. I think part of the problem was that not all instructors were present during all three days, which might have contributed to discrepancies in reports.

When asked how the workshop could be improved (apart from organization), some people expressed a desire for more theory and background information, while others thought the units should have been offered separately so that participants could take only those units that interested them.

I think the main problem with this workshop, and I am reading between the lines here because I was not present, was the price. All but one person I spoke to thought the price of the workshop ($400) far exceeded the value obtained, and one person said $100 would have been a more reasonable fee (although why people would be willing to pay even that much for a workshop of perceived inferior quality is beyond my comprehension). There appears to be a direct positive correlation between workshop fees and expectations of excellence.

The workshop was sponsored by three APS committees: Diagnostics, Plant Virology, and Disease Detection; some portion of the fee was to be returned to APS to support future activities of these committees, another portion was to be paid the instructors, and the rest was to cover the cost of materials, overhead, and other miscellaneous expenses. I was unable to determine the actual breakdown as I was unsuccessful in contacting the organizer of the workshop, Dr. Dodds.

Workshops are an important way of learning techniques, and have the advantage of offering an excellent opportunity to interact with people who are (hopefully) experts in their field of presentation. APS sponsorship of workshops that charge fees, some of which will go back to the society, should not be looked upon as a misguided effort to raise capital. However, as Dr. Weinhold mentions in his letter (see following item), the fee structure needs consideration.

M. P.

PLANT VIRUS DETECTION WORKSHOP -- PART II

The saga continues. With our last installment (PDQ 9(3)), I urged all concerned citizens who have strong reservations over the policy of for-profit APS sponsored workshops to voice their objections. Some faithful souls heeded my exhortations to write Albert Weinhold, immediate Past President of the APS, which prompted the letter which follows, addressed to Steve Nameth, then Chair of the Diagnostics Committee. The letter is self explanatory and again I ask all those who did not attend the workshop because of its cost to please write Dr. Weinhold and inform him of this. In addition if you did attend the workshop, but at the cost of attending the national APS meetings, please also write. The APS is anxious to increase participation at meetings and would be very interested to know of such conflicts of interest.

The American Phytopathological Society

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October 11, 1988

Dr. Stephen T. Nameth
Department of Plant Pathology
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Columbus, Ohio 43210-1087

Dear Steve:

I am sure you are aware of the concern among members of the Diagnosticians Committee regarding the fee for the Virus Detection Workshop at San Diego. I have received several letters about this and am enclosing a copy of my response for your information.

I realize that the cost of presenting the Workshop is high and regret the fee has been interpreted as primarily an effort to generate income. I would appreciate any information you receive regarding indivduals who could not participate because of the fee. I believe that workshops and short courses are an excellent means to provide educational opportunities to our members, and in certain cases could result in modest income for the sponsoring Committees. We must, however, give careful consideration to the fee structure.

Sincerely,

A. R. Weinhold
President

ARW/eb

1988 APS Diagnosticians Committee Meeting

San Diego, California

4:30-6:30 p.m. Sunday, November 13, 1988

S. T. Nameth, Chair

Revised Agenda

1. Discussion of Diagnostic Worksheets - G. Simone
2. PDQ Report - M. Putnam, Editor
3. Election of New Chair for 1989-90*
4. Discussion of 1989 Workshop, if any?
5. Discussion on Changing Committee Name to Diagnostics from Diagnosticians
6. Discussion of Possible Merger with Disease Detection Committee
7. Other Business

*Please be prepared to have specific names of nominees with you at the meeting. Be sure you have checked with that person first as to their willingness to be nominated.

PLANT DIAGNOSTICIAN'S QUARTERLY (P.D.Q.)
1988 Financial Report

Submitted by Gail E. Ruhl
Assistant Editor
November 13, 1988

1988

Total Subscribers: 138

United States - 113
Canada - 18
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Costa Rica - 1
West Germany - 1
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1987 Balance.....$1,674.22
1988 Income Received.....$1,369.28
1988 Expenses.....$975.83
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1988 Balance.....$2,067.67
(as of 10/31/88)

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EFFECTS OF SODIUM HYPOCHLORITE CONCENTRATION, EXPOSURE TIME, AND EVACUATION ON RECOVERY OF FUNGI FROM LEAF AND ROOT TISSUE

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Recovery of fungi from diseased plant tissue has been studied extensively during the last 50 years. With very few exceptions, these studies have concentrated on development of methods for isolating specific organisms (4,6,11) or small groups of organisms from a single source (8,9,10). While these methods have been informative and useful to many plant pathologists, their utilization in plant disease diagnosis has been limited because of the complexity, expense and time required for their use and the lack of applicability under the conditions existing in plant disease diagnostic clinics.

At present, methods for isolating pathogenic fungi from diseased plant tissue rely chiefly on selective inhibition of saprophytes, selective enhancement of pathogens, or both via chemical additives in culture media (12,13). Few studies have been conducted that investigate specifically effective surface-disinfestation procedures for isolating a wide spectrum of pathogenic fungi from diseased plant tissue. The study reported here was designed to develop guidelines on isolation of many types of pathogenic fungi from two types of plant tissue. The following factors were tested using pathogenic fungi from ornamental plants: 1) sterilant concentration (NaOCl sodium hypochlorite), 2) time of exposure to the sterilant, and 3) vacuum infiltration during surface-disinfestation.

GENERAL PROCEDURE

A 4 x 3 x 2 factorial experimental design was used for most tests. Aqueous sterilant concentrations of 0, 0.5, 0.52, and 2.6% NaOCl prepared in sterilized deionized water (SDW), exposure times of 1, 3 and 10 min, and air pressures of ambient (101.3 kPa) and partially evacuated (81.3 kPa, vacuum infiltration) levels were tested.

Diseased tissues were collected from naturally infected plants unless otherwise noted and used immediately. Foliar lesions approximately 1-3 mm in diameter with a 2 mm border of green tissue, or 1 cm root pieces with both necrotic and healthy appearing tissue were cut prior to sterilization procedures, bulked and mixed to ensure randomness. Ten leaf lesions or 20 root pieces were used in each of the 12 treatments. Leaf lesions were cut in half, following the surface-disinfestation procedures, rinsed in SDW, and the resulting 20 pieces were placed on potato-dextrose agar medium (PDA, Difco Laboratories, Detroit, MI 48232) amended with 100 µg of streptomycin sulfate per ml of medium. Root pieces were treated similarly except that they were not recut prior to plating on the culture medium (PDA or a medium selective for pythiaceous fungi: (PVP)) (12). The surface-disinfestant employed was sodium hypochlorite. Four pieces were placed on each of five plates (replicates) per treatment. Plates were incubated for 4-7 days, depending upon the pathogen-suscept combination, at 24-26°C, and approximately 25 $\mu Em^{-2}sec^{-1}$ fluorescent light (12 hr/day), or in the dark (PVP medium). Numbers of pathogen colonies (maximum of four possible per plate) and saprophyte colonies (different genera were not distinguished) were recorded. The following pathogen-suscept combinations were tested; the number in parenthesis indicates the number of tests performed for each combination:

1. Alternaria panax Whetzel Brassaia actinophylla Endl. (schefflera leaves) (3)
2. Bipolaris setariae (Saw.) Shoemaker Maranta leuconeura E. Morr. cv. Kerchoviana (green prayer plant leaves) (2)
3. Corynespora cassiicola (Berk. & Curt>) Wei Aechynanthus pulcher (Blume) G. Don (lipstick vine leaves) (3)
4. C. cassiicola Aphelandra squarrosa Nees (zebra plant leaves) (5)
5. Cylindrocladium spathiphylli (Schoulties, El-Gholl and Alfieri) Spathiphyllum sp. (Spathiphyllum roots) (3)
6. Exserohilum rostratum (Drechs) Leonard & Suggs Chrysalidocarpus lutescens Wendl. (Areca palm leaves) (2)
7. Phaeotrichoconis crotalariae (Salam. Rao) Subram. Areca palm leaves (10) (artificially infected)
8. Pythium sp. - Dizygotheca elegantissima (false aralia roots) (3)
9. Pythium splendens Braun - schefflera roots (3) (artificially infected).

Tests involving P. crotalariae from Areca palm employed artificially infected plants. Inoculum was grown on V-8 juice agar medium (18% V-8 juice cleared with 4.5 g $CaCO_3$, and 15 g agar per liter), for 14 days at 24-26°C under the light conditions given previously. Conidia were removed from cultures with a sterilized rubber spatula, and concentrations were adjusted to 1 x 10^4 conidia/ml. Areca palms approximately 6 mos old and free of visible lesions were sprayed to runoff with the conidial suspension and placed in polyethylene bags for 72 hrs. The resulting lesions were harvested after 3 wks and used in the test described above.

Tests involving P. splendens from schefflera roots employed artificially infected plants. Inoculum was grown on Difco cornmeal agar for 3 days in the dark at 26-26°C prior to use. Pathogen-free schefflera plants in a steam-treated potting

medium consisting of Canadian peat, pine bark and cypress shavings (2-1-1, v-v-v) were inoculated 3 wk prior to use. Inoculum was made by blending one 3-day old culture of P. splendens with 200 ml of SDW for 15 sec in a Waring blender. Each of ten plants were inoculated with 10 ml of the resulting mycelial slurry added to the surface of the potting medium and watered in lightly.

Data were analyzed for significant main effects and interactions between factors for recovery frequencies of saprophytes and pathogens using the F test and regression analysis.

EFFECT OF EVACUATION

Increasing air pressure, resulting in vacuum infiltration, during sterilization did not generally affect recovery frequencies of either saprophytic or pathogenic fungi from either leaf or root tissue (Figure 1). This may have been due to the period of time tested since even the longest exposure was only 10 min; the type of tissue used may also have been a factor: possibly, woody stem tissue would be affected by infiltration. In addition, the level of air pressure applied may have been insufficient.

EFFECT OF EXPOSURE TIME

Exposure times between 1 and 10 min did not generally affect recovery frequencies of fungi from leaf or root tissue (Table 1). Although slight reductions in recovery of both saprophytes (Figure 1) and pathogens (Table 1) did occur in some cases, the effect was not statistically significant nor was it consistent. Increasing exposure times to greater than 10 min may have resulted in a clear reduction in recovery of these organisms.

EFFECTS OF STERILANT CONCENTRATION

Recovery of saprophytic fungi exhibited a consistent response to the sterilant concentration for all pathogen-suscept combinations. In the majority of these tests, increased sterilant concentration resulted in decreased recovery frequencies for saprophytic fungi from either leaf or root tissue. The greatest incremental decrease Bas found at lower concentrations (e.g. a change from 0 to 1% NaOCl).

Generally, the responses of pathogenic fungi to the factors tested were less consistent than those of the saprophytes. Concentration of sterilant was an important factor in maximizing recovery frequencies of many of the pathogens (Table 2). The recovery frequencies of pathogenic fungi were variably influenced by sterilant concentration. Bipolaris setariae from Areca palm leaves and C. spathiphylli from Spathiphyllum roots were the only pathogens which were not affected significantly by the sterilant concentrations tested. Previous research reported isolation of Cylindrocladium spp. from Rumohra adiantiformis (G. Forst) Ching (leatherleaf fern) was unaffected by concentrations of NaOCl in the range tested here (1). Possibly Cylindrocladium spp. are tolerant of NaOCl up to 2.6% ai. The other pathogen-suscept combinations exhibited one of two otherresponses. Alternaria panax, C. cassiicola on aphelandra and P. crotalariae each had higher recovery frequencies as sterilant concentration increase (Table 2). In contrast, C. cassiicola from lipstick vine, E. rostratum and Pythium spp. from the two hosts tested had markedly decreased recovery frequencies as sterilant concentration increased. Results of tests for each suscept-pathogen combination were similar to those presented in the tables.

DISCUSSION

Host tissue may be an important factor in determining the effect of sterilant concentration on the recovery of pathogens. The density and permeability of the host tissue, the presence and condition of water repellant cutins and waxes, and perhaps the amount of tissue water loss prior to culturing may be factors influencing pathogen recovery after exposure to different sterilant concentrations. In addition, the genus or species and location and condition of each pathogen in the host tissue could affect its sensitivity to the sterilant. Although many of the organisms tested were dematiaceous hyphomycetes, they did not respond similarly to the treatments tested. The three organisms isolated from root tissue also showed a variable response to sterilant concentration. Recovery frequencies of both species of Pythium tested were dramatically reduced as sterilant concentrations were increased. This may indicate a common sensitivity of Pythium spp. to NaOCl. It may also indicate similarities in roots of false aralia and schefflera (both members of Araliaceae). Certainly transport of the sterilant within root tissue is more common than its transport within leaf tissues.

The use of 0.52% NaOCl in surface-disinfestation of diseased plant tissue, a standard practice among plant pathologists, is well established in the literature (3,4) and is the preferred method in some cases (3,6). Over the past 20 years, other concentrations of NaOCl have been tested in specific isolation trials as well as other sterilants, and combinations of sterilants (3,7,11). The results have been variable and may be dependent upon the pathogen-suscept combination being employed in each report. In isolations of pathogens from spruce seeds, increased NaOCl concentrations from 0.2% to 5% did not affect recovery of either pathogenic or saprophytic fungi (11). In addition, increased exposure time from 5 to 60 min reduced recovery of saprophytes but did not affect pathogen recovery.

Until the role of suscept tissue is elucidated, surface-disinfestation in a 0.05% (roots and some leaves) to 0.52% NaOCl solution for 1 min at ambient air pressure should provide adequate recovery frequences of many fungi from ornamental plant tissue.

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Table 1. Effect of increasing exposure times on recovery frequencies of pathogenic fungi from leaves and roots.

Pathogen - suscept combination tissue type	Exposure time (min)		
	1 a	3	10
Alternaria panax[b] *Brassaia actinophylla*-leaves	2.7[a]	2.6	2.4[ns c]
Bipolaris setariae *Maranta leuconeura*-leaves	3.0	2.6	2.6[ns]
Corynespora cassiicola *Aeschynanthus pulcher*-leaves	0.8	0.4	0.4[ns]
Corynespora cassiicola *Aphelandra squarrosa*-leaves	3.7	3.6	3.5[ns]
Cylindrocladium spathiphylli *Spathiphyllum* sp.-roots	2.6	3.0	2.7[ns]
Exserohilum rostratum *Chrysalidocarpus lutescens*-leaves	0.6	0.6	0.2[ns]
Phaeotrichoconis crotalariae *Chrysalidocarpus lutescens*-leaves	3.0	2.7	3.3[ns]
Pythium sp. *Dizygotheca elegantissima*-roots	0.6	0.9	0.7[*]
Pythium splendens *Brassaia actinophylla*-roots	1.7	1.6	1.5[ns]

[a] Mean of four colonies per each of five plates.

[b] Data presented are for one test in each series. Data from other tests were similar. No further statistical analyses were performed since most F tests were not significant.

[c] NS = not significant and * = significant at the 5% level.

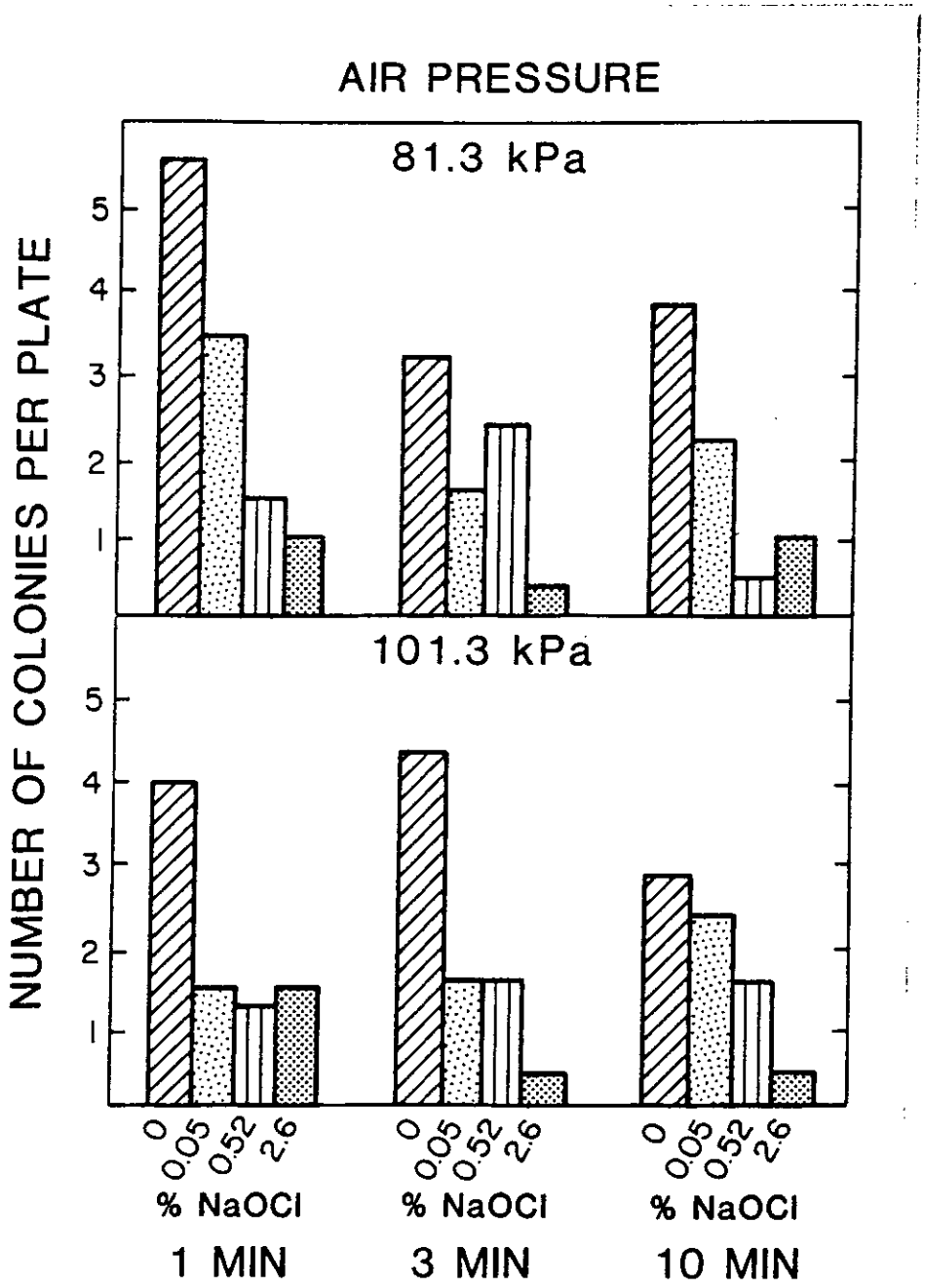
Table 2. Effect of sterilant concentration on recovery frequencies of pathogenic fungi from leaves and roots.

Pathogen - suscept combination tissue type	Sterilant concentration (%NaOCl) 0	0.05	0.52	2.6
Alternaria panax[a] *Brassaia actinophylla*-leaves	1.4	2.4	2.4	2.3**[b]
Bipolaris setariae *Maranta leuconeura*-leaves	2.9	2.7	2.8	2.7[ns]
Corynespora cassiicola *Aeschynanthus pulcher*-leaves	1.4	0.2	0.2	0.3**
Corynespora cassiicola *Aphelandra squarrosa*-leaves	3.3	3.7	3.8	3.6**
Cylindrocladium spathiphylli *Spathiphyllum* sp.-roots	2.4	1.9	2.5	2.2[ns]
Exserohilum rostratum *Chrysalidocarpus lutescens*-leaves	1.0	0.4	0.4	0.4**
Phaeotrichoconis crotalariae *Chrysalidocarpus lutescens*-leaves	2.5	3.3	3.2	3.0*
Pythium sp. *Dizygotheca elegantissma*-roots	1.5	1.0	0.3	0.1**
Pythium splendens *Brassaia actinophylla*-roots	3.0	2.2	1.2	0.1**

[a] Mean of four colonies per each of five plates were possible.

[b] Data presented are for one test in each series. Data from other tests were similar. An F test was performed and the significance level denoted as follows: ** = 0.01, * = 0.05 and ns = not significant. Regression analyses indicated that the response was not linear, quadratic, cubic nor exponential.

Figure 1. Recovery frequencies of saprophytic fungi from Chrysalidocarpus lutescens leaves infected with Phaeotrichoconis crotalariae as affected by air pressure, sterilant concentration and exposure time to the sterilant.



DISEASE RESISTANCE

The chart below gives the resistance (+) of various cultivars of chrysanthemum to Verticillium wilt (Verticillium dahliae) and rust (Puccinia chrysanthemi). Those cultivars with no resistance are marked "0".

CULTIVAR	WILT	RUST
383 White	+	+
Achievement	+	+
Aglow	+	0
Alabama	+	0
Albatross	0	0
Alice Searle	+	0
Altis	+	0
Always Pink	+	0
Americana	+	0
Andrew H. Hayes	+	+
Ann Fulton	+	0
Annette	0	+
Arab Chief	+	+
Arctic	+	0
Artemis	+	0
Arthur Caldwell	+	+
Baby Tears	0	+
Ballerina	+	+
Barcarole	+	+
Beauregard	+	0
Benku Yami	+	+
Bess Witt	+	+
Bicentennial	+	+
Big Bronze	+	0
Bill Bye	+	0
Blaze	0	0
Blue Chip #2	0	0
Blue Marble	+	0
Bluechip	0	0
Bolero	+	0
Bonnie Jean	+	0
Bridesmaid	0	0
Bridesveil	0	0
Bright Yellow May Shoesmith	+	0
Bright Golden Ann	0	0
Bright Yellow Tuneful	+	0
Brilliant Anne	+	0
Broadacre	+	+
Bronze Bridesmaid	0	0
Bronze Charm	+	+

CULTIVAR	WILT	RUST
Bronze Chip	+	0
Bronze Eye Stingray	0	0
Bronze Isola	+	0
Bronze Marble	+	+
Bronze Rosamund	+	+
Bronze Spider	+	+
Brown Eyes	0	0
Brown Spider	0	+
Bullfinch	+	+
Butter Ball	0	0
Calypso	0	+
Cameo	+	+
Camino Gold	0	0
Capri	+	0
Carefree	0	+
Carillon	+	0
Carl H. Allen	+	+
Carlira	+	+
Carlos Yellow	+	0
Cavalier	+	0
Celebrity	+	+
Celestial Angel	+	+
Celestial Beauty	+	+
Centennial	+	+
CF2275	+	0
China Gold	+	0
Chiquita	+	0
Christmas Star	+	+
Cimarron	0	+
Citrus Queen	+	+
Classic Cloud	+	0
Colonel Comfort	+	+
Conquest B.G.A.	+	+
Copper Ann	+	+
Copper Bowl	+	+
Copper Brown	+	+
Copperay	+	0
Coral Frost	+	0
Coral Marble	+	+
Cream Yellow Princess Anne	+	0
Crescendo	+	+
Crimson Clover	+	+
Dainty White	0	+
Dark Blue Chip	0	0
Dark Delight	0	0
Dark Pinnacle	+	0
Dark Red Star	+	+
Daybreak	0	0
Daybreak Orange	+	+
Dazzler	0	0
Deanna Lee	+	0
Deep Conquest	+	0

CULTIVAR	WILT	RUST
Deep Hot Pink	+	0
Deep Louie	0	0
Deep Popsie	0	0
Deep Ridge	0	0
Deep Snow Pink	+	0
Deep Tuneful	+	+
Detroit News	+	+
Diamond	0	0
Dignity	0	0
Dillion Beauregard	0	0
Distinctive	+	0
Dixie	+	0
Dolly	+	+
Dolly-ette	0	0
Donlope's White Spider	0	0
Dot Turner	+	+
Dramatic	0	0
Early Golden Hill	0	0
Edwin Pianter	+	0
Eirie	+	0
Elegant Cushion	0	0
Elsie C. Walsh	+	+
Emerald Isle	+	+
Enchantress	+	+
Escapade	+	+
Estrellita	+	0
Fair Dinkum	+	0
Fairyland	0	0
Fancy	0	+
Fantasy	+	0
Festival	0	0
Festive Cushion	+	0
Fiesta	+	0
Fire	+	0
Fireside Cushion	+	0
Flame Belair	+	0
Flaming Sun	+	0
Florida Marble	+	+
Floridian	+	0
Flying Saucer	0	+
Frances Marion	+	0
Frank J. Bird	+	0
Fred Shoesmith	0	0
Freedom	+	0
Fuji Mefo	0	0
Gambit	0	0
Garden State	0	+
Garland	0	0
Gay Ann	+	0

CULTIVAR	WILT	RUST
Gem	0	+
George H. Holt	+	0
Glazed Bronze	0	+
Glowing Mandalay*	+	+
Gold Coast	+	0
Gold Pavilion	0	0
Gold Pot	+	+
Gold Ridge	0	0
Gold Strike	+	0
Goldburst Mefo	0	+
Golden Anniversary	+	0
Golden Clarion	0	+
Golden Crusader	0	+
Golden Crystal	0	0
Golden Galleon	+	0
Golden Marnie	+	+
Golden Starburst	0	0
Goldstar	+	+
Goldstrike	+	0
Gondolier	+	0
Good News	0	0
Grandchild	+	0
Grenadier	0	0
Gypsy	+	0
H. E. Manchester	+	0
Harry Chaney	+	+
Hector	+	0
Height of Beauty	+	0
Helen Castle	+	+
Helen R. McMunn	+	0
His Majesty	+	0
Hollywood Star	0	+
Honey Glow	+	0
Humdinger	+	0
Hurricane	0	0
Iceberg	0	0
Icecapade	+	0
Illini Goldray	+	0
Illini Hot Pink	+	0
Illini Trophy	+	0
Imperial Yellow Marguerita	+	0
Improved Bluechip	0	0
Improved Indianapolis Yellow	0	0
Improved Mefo	+	0
Improved Rivalry	0	0
Improved Yellow Hurricane	0	0
Indian Summer	+	0
Indianapolis	+	+
Indianapolis White	0	0
Indianapolis Yellow	0	0

CULTIVAR	WILT	RUST
Ira B. Cross	0	0
Ironsides	+	0
Ivanhoe	+	0
J. Torrey Connor	0	+
Jackstraw	+	+
Jacob Fibush	+	+
Jasmine	+	0
Jessamine Williams	0	0
Jubilee	+	0
June Shiraki	+	0
Kenshii	+	+
Kimi	+	0
King's Ransom	+	0
Kings Radiance	0	0
Lady Blanche	+	0
Lakeside	0	0
Lavender Beauty	+	+
Lavender Button	+	0
Lavina	+	+
Lem	+	0
Lemon	+	+
Letitia	+	+
Liberty	+	+
Lillian Henningsen	0	0
Limelight	+	+
Linda	0	0
Lipstick	+	0
Lt. Melvin Nawman	+	0
Luv	+	0
Luyona	+	0
Lyric	0	+
Maestro	+	+
Magic Charm	+	+
Magic Light	+	+
Magic Mound	+	+
Magic Snow	+	+
Maiko	+	+
Malabar	0	+
Mandalay	+	+
Mandalay Bronze	+	+
Marguerita	+	0
Martha	+	+
Martian	0	0
Matador	+	+
May Shoesmith	+	0
Mayan Gold	0	0
Melody	+	0
Mermaid	+	0

CULTIVAR	WILT	RUST
Milestone	0	0
Millie 1	+	+
Millie 2	+	+
Minautumn	+	0
Miss Atlanta	+	+
Miss Oakland	+	0
Miss Olympia	+	+
Mojave	+	+
Monticello	0	0
Morocco	+	0
Mountaineer	+	0
Mountain Peak	+	0
Mountain Snow	0	0
Mountain Sun	+	0
Mrs. Bert Bertillion	+	+
Mrs. Roy	+	+
Musa	0	+
Neptune	0	0
New Snow	+	0
Nightingale	0	+
Nob Hill	0	0
Nomajo	+	0
Nuggets	+	+
Oberlin	0	+
Ohkwan	+	0
Ohomo	+	+
Onward	+	0
Orange	+	+
Orange Aglow	+	0
Orange Beauregard	0	0
Orange Bowl	+	+
Orange Seedling	+	+
Oriental Knight	+	0
Otome	+	+
Otome Pink	+	+
Otome White	+	+
Otome Yellow	+	+
Pancho	+	0
Paragon	0	0
Patriot	+	+
Paula	+	0
Peacock	+	+
Pearls	0	0
Peggy Stevens	+	0
Perfecto	+	0
Pink Dot	+	+
Pink Marble	+	+
Pink Masterpiece	+	0

CULTIVAR	WILT	RUST
Pink Pom	0	0
Playmate	+	+
Plaza	+	0
Polaris	+	0
Portrait	0	0
Pot O' Gold	0	0
Potomac	+	+
Powder Puff	+	+
Powder River	+	0
Pride	+	0
Promenade	+	0
Puritan	0	0
Purple Spider	0	0
Purple Waters	+	+
Radiant	0	0
Ranger	+	+
Raspberry	+	0
Red Beauregard	+	0
Red Coat	+	0
Red Dazzler	+	0
Red Hector	+	0
Red Quill	0	0
Red Rover	+	0
Red Stingray	0	0
Red Torch	+	0
Revelation	0	+
Revere	0	0
Roll Call	0	0
Rosaline	+	+
Rose Chip	0	+
Rose Masterpiece	+	0
Rose Royal	0	0
Roulette	0	0
Royal Purple	+	0
Ruby Mound	0	0
Rudolph Bitterman	+	0
Sarah	+	+
Sea Foam	+	0
Sea Urchin	+	0
Senorita	0	+
Showoff	0	+
Sierra Gold	+	0
Silver Lining	+	0
Silver Song	+	+
Silver Strand	0	+
Snow Crystal	+	0
Southern Gold	+	0
Spark	+	0
Sparkling Mandalay	0	0
Spice	0	0

CULTIVAR	WILT	RUST
Spindles	0	0
Spirit	+	0
Spitfire	+	0
Starburst*	0	0
Stardom	+	0
Starlet	+	0
Stingray	+	+
Streamer	0	+
Sue Ann	+	+
Sun Spider	+	0
Sunburst Cushion	+	0
Sunnyslope Charm	+	+
Sunnyslope Splendor	0	0
Sunset Skies	+	0
Super Chief	+	0
Super White	+	0
Surf	+	0
Surfside	+	0
Tantillizer	+	0
Thistledown	+	0
Tinker Bell	+	+
Tiny Tim	+	0
Tioga	+	+
Tip	0	0
Tokyo	0	0
Torch	+	0
Toreador	0	0
Touchdown	+	0
Tuneful	+	0
UC Mothers Club	0	0
Universe	+	0
Vermillion	+	+
Walnut Queen	0	0
Wedgewood	0	0
White Button	+	0
White Cactus	+	0
White Daisy	+	+
White Dot	+	+
White Grandchild	+	+
White Marble	+	0
White Popsie	0	0
White Spider	+	0
White Stardom	+	0
White Valencia	+	0
Wild Honey	0	0
Wildfire	0	+
Winnie O. Brown	+	+
Winter Carnival	0	0

CULTIVAR	WILT	RUST
Wm. Turner	0	0
World's Fair	0	+
Yakima	0	0
Yellow Albatross	0	0
Yellow Bonnie Jean	+	0
Yellow Cloud	+	0
Yellow Daisy	0	0
Yellow Delaware	+	0
Yellow Dignity	0	0
Yellow Dot	+	+
Yellow Estrellita	+	+
Yellow Gull	+	0
Yellow Hammer	+	+
Yellow Hector	+	0
Yellow Ivanhoe	0	0
Yellow Jesamine Williams	0	0
Yellow Knight	0	+
Yellow Lamong	0	0
Yellow Marguerita	+	0
Yellow May Shoesmith	0	0
Yellow Nob Hill	0	0
Yellow Sierra	0	0
Yellow Spider	0	0
Yellow Spinwheel	0	0
Yellow Spoon	+	0
Yellow Starlet	+	0
Yellow Symbol	+	0
Yellow Torch	0	0
Zonta	+	0

* Denotes cultivars for which there are conflicting data.

Compiled by A. H. McCain, T. G. Byrne, and T. M. Kretchun, University of California, Davis.

RESOURCES

The winter months are a good time to review your resources: evaluate what you have, and look about for new sources of information. With that in mind, we have gathered together a small sample of periodicals available which may be of interest. All prices are in American dollars and are for domestic postage. Thanks are due to Cynthia Ash, Stacey Fischer, and Laura Pickett for their contributions to this list. Following this are some of the publications currently available from the U. S. Government Printing Office, which may be ordered using a photocopy of the form following the list.

Arborescence

Published by the Minnesota Society of Arboriculture for its members.

Quarterly. $10.00 for membership. Contact Mike Zins, Minnestoa Landscape Arboretum, 3675 Arboretum Drive, P.O. Box 39, Chanhassen, MN 55317.

California Plant Pathology

Features research results and new information on ornamental and field crop diseases present in California.

Quarterly. $4.00. Mail check payable to: Regents of the University of California. ANR Publications, Univ. of California, 6701 San Pablo Ave., Oakland, CA 94608-1239.

Forest Insect and Disease Newsletter

Provides information on current insect and disease problems in the forests of Minnesota.

Quarterly. No charge. Minnesota Dept. of Natural Resources, 500 Lafayette Road, St. Paul, MN 55146.

Insect-Disease

Covers disease and insect problems and their control for tree and small fruits, vegetables, field and forage crops, ornamentals, and turf. Local to New Jersey.

Issued 24 times/year, weekly during the growing season. No charge. Contact Louis M. Vasvary, Dept. of Entomology, Rutgers University, New Brunswick, NJ 08903.

Insect, Plant Disease and Weed Science News

Features articles of current insect, disease, and weed problems of ornamentals and field crops.

Weekly during the growing season. No charge. Dept. of Plant Pathology, University of Nebraska-Lincoln, East Campus, Lincoln, NE 68583.

Minnesota State Florist Bulletin

Contains general and disease information on florist crops; includes research reports.

Monthly. No charge. Minnesota Extension Service, Dept. of Horticulture, Alderman Hall, Univ. of Minnesota, St. Paul, MN 55108.

MFVGA Newsletter

The Minnesota Fruit and Vegetable Growers Association newsletter.

Contact MFVGA for subscription information. Office of Executive Coordinator, A. M. Sannerud and Associates, 1207 Constance Blvd. N. E., Ham Lake, MN 55304.

Ornamentals Northwest

Features articles on pests and diseases of interest to the ornamentals industry in Oregon, Washington, Idaho, and British Columbia. Also occasionally publishes in-depth research reports.

Bimonthly. $10.00 for 1 year in the US, $15.00 for 1 year elsewhere. Ornamentals Northwest Newsletter, Horticulture Department, Oregon State University, Corvallis, OR 97331.

Overstory

A shade tree newsletter for individuals interested in trees. Geared to the general public.

Quarterly. No charge. Minnesota Dept. of Agriculture, Plant Industry Division, 90 W. Plato Blvd., St. Paul, MN 55107.

Pest Alert

Articles on current and seasonal insect, weed, and plant diesase problems of the state of Colorado.

Weekly during summer, biweekly during spring and fall, and monthly during winter. No charge. Dept. of Plant Pathology, Plant Science Bldg., Colorado State Univ., Ft. Collins, CO 80523 (303) 491-5594.

Plant Disease Alert

Features articles on current diesase problems of ornamentals and field crops.

Weekly during the growing season. No charge. Write or call: Extension Plant Pathology, Throckmorton Hall, Manhattan, KS 66506 (913) 532-5810.

Plant Pest Newsletter

Published by the Univ. of Minnesota. Features articles on weed, insect, and disease problems of field crops and ornamentals; occasionally deals with trees.

Weekly. No charge to people associated with universities and cooperative extension. Dept. of Plant Pathology, Univ. of Minnesota, 495 Borlaug Hall, St. Paul, MN 55108.

Regulatory Horticulture

Articles focus on a variety of diseases, insects and other pests of interest to the agricultural industries of the state of Pennsylvania. Deals primarily with ornamentals.

Biannual. No charge. Pennsylvania Department of Agriculture, Bureau of Plant Industry, 2301 North Cameron Street, Harrisburg, Pennsylvania 17110-9408.

Tri-ology

A report of the Bureaus of Nematology, Entomology, and Plant Pathology and the Office of Systematic Botany listing detections of special interest from the Floida Department of Agriculture. Each issue includes a color fact sheet on an insect, nematode and disease problem.

Monthly. No charge. Contact the Florida Department of Agriculture and Consumer Services, Division of Plant Industry, P.O. Box 1269, Gainesville, FL 32602.

The Voice of M.A.N.

The official publication of the Michigan Association of Nurserymen, featuring general articles on ornamentals.

Bimonthly. No charge to nursery industry extension agents and educators throughout North America. Michigan Association of Nurserymen, Inc., 819 N. Washington Ave., Suite 2, Lansing, MI 48906.

Weekly Report on Pests and Crop Development

Reports on fruits, field crops, homes and grounds, and other topics. Gives results of pheromone trapping, current insect and disease outbreaks, and pesticide recommendations.

Weekly during April - September. No charge. Cooperative Extension, U.S. Department of Agriculture, Roberts Hall, Cornell Univ., Ithaca, NY 14853-5901.

U. S. GPO Publications. Prices are in U.S. dollars and shipment outside the U.S. will add additional costs.

DISEASE CONTROL

Guidelines for the Control of Plant Diseases and Nematodes.
A tabular format listing, for each crop and disease, the following: chemical name, minimum days from last application to harvest, dose, where and when to apply, and safety restrictions. Covers field crops, flowers and ornamentals, fruits, vegetables, shade trees, turf, grass seed and oilseed crops, and nuts. 1986, 278 p. S/N 001-000-04470-2 $13.00

GARDENING, LANDSCAPING

Control of Insects on Deciduous Fruits and Tree Nuts in the Home Orchard, Without Insecticides.
1981. 36 p., ill. revised ed. S/N 001-000-04231-9 $2.00

Insects and Diseases of Vegetables in the Home Garden.
Discusses various insecticides and fungicides and how to mix and apply them to the home garden. 1980. 56 p., ill. revised ed. S/N 001-000-04019-7 $4.25

Salt Injury to Ornamental Shrubs and Ground Covers.
1980. 10 p., ill. S/N 001-000-04144-4 $2.50

Virus Diseases of Small Fruits.
Identifies and illustrates virus and viruslike diseases in strawberries, blueberries, cranberries, gooseberries, currents, and raspberries. Gives geographic distribution, economic importance, symptoms, transmission, cause, detection, and control of these diseases. (See also review in the March, 1988 issue of PDQ.) 1986. 288 p., ill. S/N 001-000-04483-4 $20.00

Weed Control in Lawns and Other Turf.
Illustrates common weeds graphically and provides guidance in applying herbicides and pesticides. 1984. 41 p., ill. S/N 001-000-04420-6 $2.00

INSECTS

Manual of the Agromyzidae (Diptera) of the United States.
Consists of two parts. Part 1 contains information on 531 species of agromyzidae, including their diagnostic characteristics, biology, host plants, economic importance, and distribution; and part 2 contains descriptions of new species of agromyzidae and economic notes. 1986. 484 p., ill. S/N 001-000-04462-1 $22.00

Western Forest Insects.
Describes insects and related organisms in forests and woodlands of North America, east of the 100th Meridian and north of Mexico. 1977. 654 p., ill 1980 repr. Clothbound S/N 001-000-03618-1 $22.00

TREES AND FORESTS

Checklist of United States Trees (Native and Naturalized).

Compiles the accepted scientific names and current synonyms, approved common names and others in use, and the geographic ranges of the native and naturalized trees of the United States of America (continental, including Alaska but not Hawaii). Native trees accepted in the Checklist total approximately 679 species in 216 genera and 73 plant families. Lists genera, species, and important varieties alphabetically by accepted scientific name, with an index of common names. 1979. 375 p. S/N 001-000-03846-0 $13.00

Christmas Tree Pest Manual.

Provides an integrated pest management approach to the identification and control of various Christmas tree pests and diseases. 1983. 107 p. ill. S/N 001-001-00589-4 $14.00

Forest Insect and Disease Field Guide. Amendment Number 1.

Publication is intended to help land management specialists identify existing or potential insect and disease problems. 1986. 57 p. S/N 001-001-00624-6 $3.50

Guide to Common Insects and Diseases of Forest Trees in the Northeastern United States.

This guide will assist forest owners and managers in identifying common forest pests. It emphasizes insects and diseases, but includes some weather factors, vertebrate animals, nematodes and mites. 1979. 127 p., ill. S/N 001-001-00501-1 $6.00

Tree Defects: A Photo Guide.

This guide provides an historical and pictorial overview of CODIT, a model of Compartmentalization of Decay in Trees. Discoloration and decay of trees are illustrated in 110 photographs. 1983. 168 p., ill. S/N 001-001-00586-0 $6.50

Users Guide for Seeds of Western Trees and Shrubs.

Presents recommended practices for identifying, sampling, and testing tree seeds or shrub seeds. Also includes seed testing rules, addresses of seed testing laboratories, and other related information. 1986. 45 p., ill. S/N 001-000-04465-6 $4.25

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7. This form may be reproduced.

BOOK REVIEWS

Herbicide Injury to Trees and Shrubs: A Pictorial Guide to Symptom Diagnosis. 1988. Jeffrey F. Derr and Bonnie L. Appleton. Blue Crab Press. 72 pp. $24.95.

This hot-off-the-press paperback helps fill the void of literature on symptoms caused by abiotic problems. The book includes a series of 40 excellent color plates showing symptoms of various commonly used or abused herbicides on azaleas, hollies, maples, junipers, turfgrass, rhododendrons, and apples. The majority of photographs are of azaleas and hollies.

The text categorizes and describes herbicides according to the following crop uses: nursery crop and landscape herbicides; agronomic, vegetable and fruit crop herbicides; turf preemergence crabgrass herbicides; turf and noncrop broadleaf herbicides; total vegetation control herbicides; and aquatic and forestry herbicides. Mode of action of each herbicide type is discussed, as well as methods of herbicide application that may result in plant injury. Tables that list which herbicides cause a certain symptom type are also included in the text.

The final chapter, which most diagnosticians should find useful, is entitled "Questions to Ask When Investigating Herbicide Injury". I would highly recommend this book to anyone involved in plant disease diagnosis.

I have included the press release from the authors and the order form for anyone interested. Please note that a slide set of the photographs in the book is available at a cost of $39.95.

Reviewed by Mary Ann Hansen, VPI & SU

Blue Crab Press
Book and Slide Order Form

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Herbicide Injury to Trees and Shrubs : A Pictorial Guide to Symptom Diagnosis by J. F. Derr and B. L. Appleton	$24.95	_____	_____
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Herbicide Injury to Trees and Shrubs (41 color slides used to illustrate text)	$39.95	_____	_____

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SPECIAL EVENTS

Workshop on the Identification of Phytophthora Species. August 16-18, 1989. West Virginia University, Morgantown, WV 26506-6057.

The workshop will consist of lectures on morphology, procedures for inducing structures necessary for identification, taxonomy, use of several identification keys, problems in identifying species, and procedures/ problems in the detection and isolation of Phytophthora species from plant tissue and soil. The laboratory will consist of microscopic examination of the morphologic stages necessary for identification, and keying to species of about 25 species. Emphasis will be placed on the 15-16 most commonly encountered species. Live cultures will be used.

Instructors for the workshop will be P. H. Tsao, University of California, Riverside, CA; A. F. Schmitthenner, Ohio State University, Wooster, OH; and M. E. Gallegly, West Virginia University. The Diagnostic Committee and the Mycology Committee have approved the workshop.

This second workshop will be similar to the first one by the same instructors at Ohio State University in Columbus, OH the week prior to the 1987 Cincinnati, OH annual meetings. The first workshop was restricted to diagnosticians, but the second one is open. The number of participants must be restricted to 24; chronological preference by date of application will be given. A registration fee of about $135.00 per person must be assessed to cover expenses. Write to the contact person for an application form and other details.

Contact: **Dr. Mannon E. Gallegly, 401 Brooks Hall, West Virginia University, Morgantown, WV 26506-6057.**

LAB NOTES

The following modification of oatmeal agar is good to use to produce sporualtion of many isolates of Botryosphaeria dothidea and other Botryosphaeria species.

quick-cooking oats, ground (dry) in a blender	50 g
agar	15 g
deionized water	1,000 ml
silicone defoamer spray*	1 ml

* principle ingredient is dimethylpolysiloxane; available from Kalo Agricultural Chemicals, Overlook Park, Kansas.

Dissolve agar in boiling water and thoroughly mix in oatmeal. Add defoamer immediately before autoclaving; if bottling in aliquots, allow more headroom in the bottles than for other types of media. This medium must be poured hot to keep the oatmeal well suspended.

Most isolates sporulated in about 14 days when kept under continuous fluorescent illumination (8-10 inches below a fixture containing two 34 Watt tubes). Scoring or scraping also speeds sporulation of some intractable isolates.

Contributed by Tom Creswell, North Carolina State University.

AN EXPLOSION INOCULATION TECHNIQUE

James D. Panzer[1], E. C. Tullis[2], and R. D. Beier[1]

Abstract

An inoculation technique is described in which inoculum is dispersed by means of an explosive charge coupled to an electrical ignition device. A clock adapted so that an electrical contact would be made every hour for a period of 24 hours enables the investigator to make field and greenhouse inoculations during his absence. This method has proven successful for greenhouse inoculation and should be adaptable for field inoculations during periods of darkness and during adverse weather conditions.

Unpublished results indicated that certain spores are liberated in the field at definite periods during the day or night. In order to ascertain the infection potentials of spores at various times of day a device that would allow the field inoculation of various plants during periods of darkness or adverse weather conditions such as rain storms was warranted. Such an instrument has been developed, using a timing device which initiates an explosive charge placed in a sealed container of inoculum. Preliminary field trials indicated that satisfactory inoculations could be made by igniting a 2-inch salute-type firecracker sealed inside a water-proof bag containing spores of Piricularia oryzae in a perlite or talc diluent. A modification of this technique is herein reported which utilizes this explosive type inoculation.

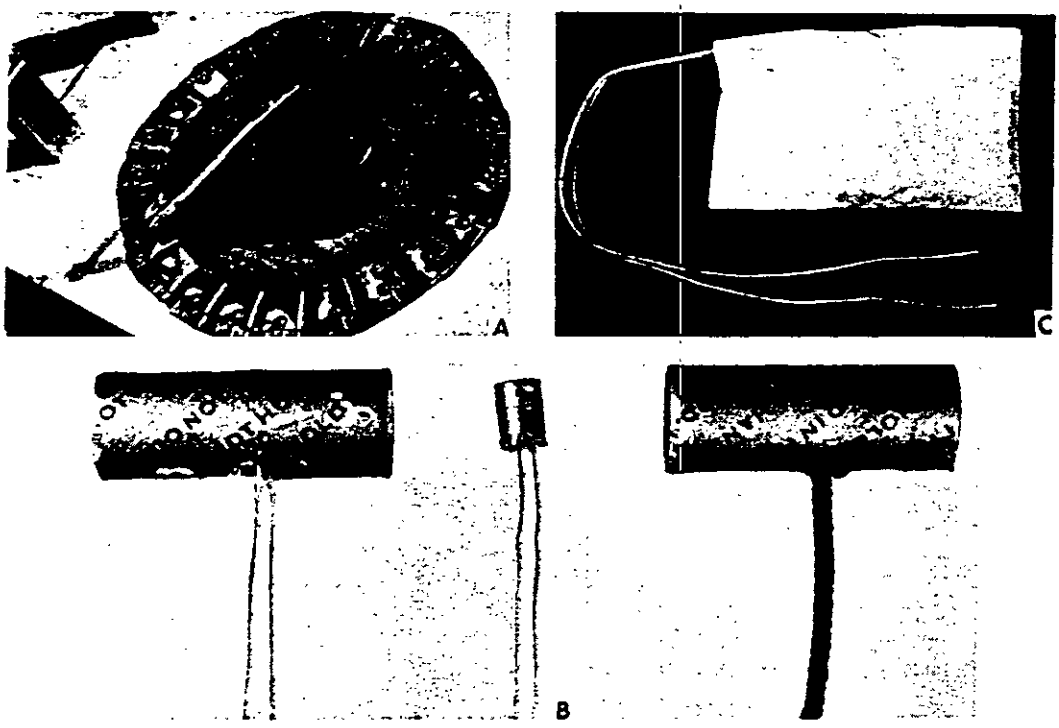

FIGURE 1. A--Timing device. B--(From right to left), 2-inch firecracker salute, M-1-A-1 squib, and modified firecracker. C--Container with inoculum and detonating device.

[1] Biological Laboratories, Fort Detrick, Frederick, Maryland.

[2] Formerly with Biological Laboratories, Fort Detrick; present address: Army Medical Center, Edgewood, Maryland.

A clock was adapted so that an electrical contact would be made every hour for a period of 24 hours (Figure 1A). Two-inch salutes were modified by removal of the fuse and the substitution of an M-1-A-1 squib (an electrically operated flash ignition device) (Figure 1B). The modified firecracker was placed inside a waterproof bag containing dry inoculum. The top of the bag was then folded and stapled shut, with the contact wires of the squib protruding from the bag (Figure 1C). One contact wire was connected to the desired hourly contact on the board of the timing device, and the other to the positive pole of a 6-volt dry-cell battery which was in turn connected to the sweep arm mounted on the clock of the timing device. Single or multiple inoculations may be made at predetermined intervals by modification in the circuits used to attach the wires to the timing device. If successive inoculations are desired, all positive contacts may be connected to a common wire from the battery, and the other contacts to the respective hourly contacts of the timing device. This device has proved successful in greenhouse inoculations and should be adaptable to many types of field experiments.

CHEMICAL CORP, FORT DETRICK, FREDERICK, MARYLAND

(Some techniques just never catch on)

CLINICS AND CLINICIANS

PRINCE EDWARD ISLAND DIAGNOSTIC LABORATORY

The Prince Edward Island Plant Diagnostic Laboratory has been in operation for approximately five years. Since the service is a Provincial Agricultural service, the main thrust of the laboratory service is to enhance productivity at the farm level through eradication and/or control of plant diseases.

The actual laboratory area consists of about 660 ft^2 and contains general laboratory equipment. The average number of plant samples received per year range from 70 to 100. In the past, the majority of samples came from P.E.I. potato producers. However now the Agricultural Extension Specialists, who work on other commodities such as cole crops, fruit crops, forages, and cereal crops, also submit samples for analysis. Samples may also some from a producer, chemical company representative or from a local Federal Inspector. Therefore, the Diagnostic Report Forms are printed in triplicate: one for the laboratory, one for field staff, and one for the producer.

The laboratory is run exclusively by Marleen Campbell and a 4-month casual. In addition to carrying out laboratory work, other responsibilities include attending various commodity meetings with industry and/or government representatives, travel in-province and out-of-province for regional meetings, preparation of Provincial Agri-Fact Sheets on plant diseases, work on various applied research projects, and conduct and organize seminars or conferences on potato diseases.

A list of some of the publications used for diagnostic work includes:

1. Compendium of Potato Diseases. W. J. Hooker, American Phytopathological Society, St. Paul, MN.

2. Potato Diseases. A. E. Rich, Dept. of Botany and Plant Pathology, University of New Hampshire, Durum, NH.

3. Market Diseases of Potatoes. United States Government Printing Office, Superintendent of Documents, Washington, D. C. 20402.

4. The Diagnosis of Plant Diseases. R. B. Streets, Sr., University of Arizona Press, Phoenix, AZ.

5. A Laboratory Guide to Fungi in Polluted Waters, Sewage, and Sewage Treatment Systems. U. S. Dept. of Health, Education and Welfare, Cincinnati, OH.

6. Integrated Pest Management for Tomatoes. University of California Statewide Integrated Pest Management Project, Division of Agriculture and Natural Resources, Publication 3274.

7. Integrated Pest Management for Cole Crops and Lettuce. As above, publication 3307.

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BIOTIC AND ABIOTIC DISEASES OF ORNAMENTAL PALMS
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1. Would you be interested in a book on ornamental palm diseases with color photographs, disease descriptions, micrographs of the pathogens, and diagnostic techniques? The expected cost will be $25.00.

_____Yes _____No

2. Do you think this book will be of interest to commercial producers and landscapers?

_____Yes _____No

3. Would a slide set of the color plates be useful? Each set would contain about 50 slides and could cost $50.00 per set.

Biotic diseases _____Yes _____No

Abiotic diseases _____Yes _____No

4. Is the cost of the slide set(s) prohibitive?

_____Yes _____No

If you would like further information on these publications, please fill in your name and address below.

Name _____

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Please return to:

Dr. A. R. Chase
CFREC-Apopka
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Dear PDQ Reader,

Recent discussion among some of the diagnosticians who attended the Woody Ornamental Workshop at Crossnore, N.C., in October, brought up the subject of "networking" and "Are diagnosticians interested in a networking system for diagnostic reference purposes?" Just what does that question mean? Well, it means--are we interested in establishing a listing of those of us who would be willing to offer advice on diagnostics for particular diseases we often see in our labs or clinics? Naturally, we all would have some reservations about offering ourselves up for a multitude of phone calls and requests for doing a particular technique or diagnostic procedure for all our many friends and acquaintances in other states. Perhaps this type of networking listing is not what we want to pursue? If we did consider the topic further, I envision we would want (perhaps a poor choice of words?) to consider a short questionnaire where we would indicate the diseases frequently diagnosed and possibly the type of technique(s) used. Results of the questionnaire responses would then be summarized in PDQ. Please take a minute to fill out the short form (& questionnaire) below.

Return to: Jackie Mullen
Plant Diagnostic Lab
Plant Pathology Dept.
Extension Hall
Auburn University, AL 36849

Name _____

Address _____

_____

_____ I would be interested in participating in a diagnostician's reference networking system. Please fill out short questions below.

_____ I would not be interested in participating in a diagnostician's reference networking system. Thank you for your response.

Frequent Diseases Diagnosed Techniques Used

Comments: (Please use additional paper if necessary.)