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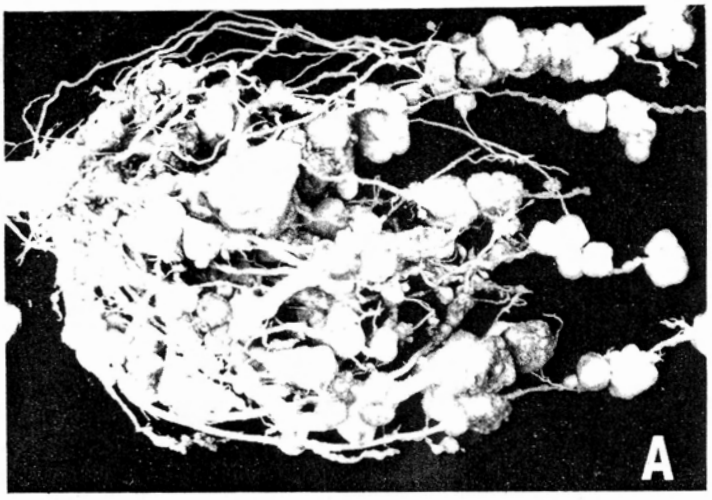

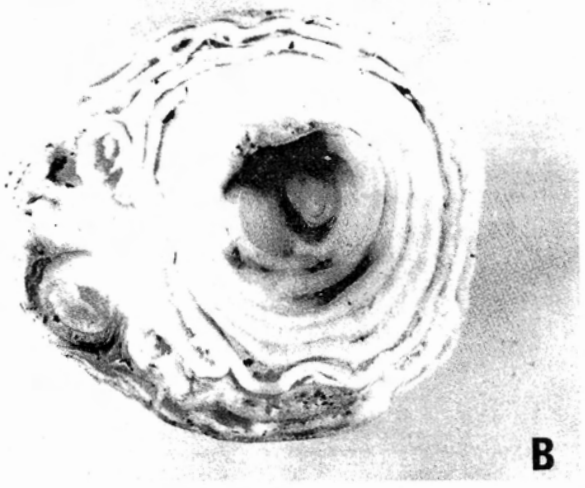

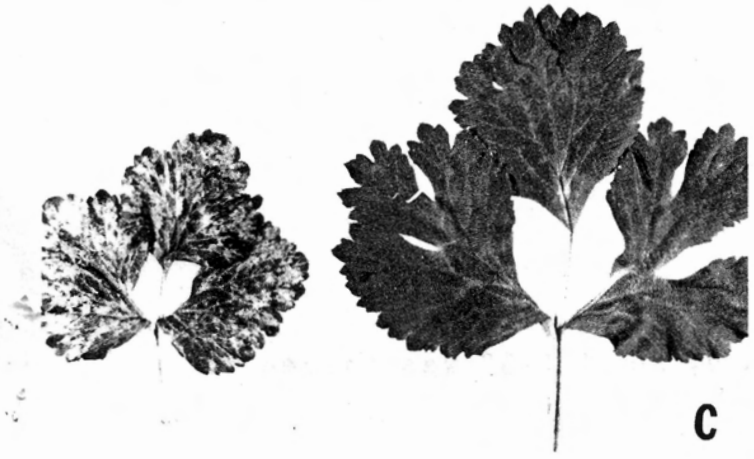

Examples of symptomatic nematode damages to plants. A: Root-knot of tomato by Meloidogyne sp. B: Brown-ring disease of narcissus by Ditylenchus dipsaci. C: Leaf distortion and discoloration of strawberry by Aphelenchoides fragariae. D: Severe tuber galling of potato by Meloidogyne chitwoodi.

Most nematodes do not cause symptomatic damages to plants, but their insidious attacks reduce yields. See the article on pages 2 to 7.

Correspondence should be addressed to the appropriate member of the editorial staff of the California Plant Pest and Disease Report (C.P.P.D.R.):

Entomology Editor	Ray Gill
Assistant	Susan Kaiser
Plant Pathology Editor	James Smith
Nematology Editor	Renaud Fortuner
Layout Editor	Jeanenne White
Typesetter	Janet LeMasters

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NEMATODE DAMAGE ASSESSMENT PROBLEMS AND SOLUTION FOR A RICE NEMATODE: *HIRSCHMANNIELLA ORYZAE*

Renaud Fortuner

Evaluation of pathogenicity of plant nematodes poses difficult methodology problems. Most plant nematodes are obligate parasites and cannot be cultivated on artificial media. Nematodes are invisible to the naked eye and in their majority they make no macroscopic damage. Most nematode attacks on plants result in heavy yield losses unaccompanied by any visible symptom. There are no leaf spots, no discoloration or change of color, no malformations, but only a general reduction of the plant vigor that may be too slight to be readily noticed. As a result, plant nematodes are often considered as parasites of little economic importance according to the common wisdom that what you cannot see cannot hurt you. Not so with nematodes that can reduce by a third, a half, or more the yield of an apparently healthy field. It is one of the tasks of plant nematologists to prove to sceptical farmers and agronomists the reality of heavy nematode related yield losses.

Traditionally, yield losses have been demonstrated by i) histopathological studies; ii) chemical field tests; and iii) pot inoculations.

1. Histopathological Studies

The first step in demonstrating the pathogenicity of a nematode is to make sure that it is able to inflict damage to plant tissues. Inoculations, extractions, and staining experiments show where and how the parasite attack the roots or the aerial parts of the plant. The potential noxiousness of a nematode depends, up to a point, on its mode of attack. A parasite that feeds in the central cylinder is more likely to do heavy damage than one like *H. oryzae* that remains in the cortex. However, a cortical attack, if sustained by a sufficient number of nematodes, can result in total destruction of the cortex and death of the root. Histopathology may indicate a pctential threat to a plant, it does not evaluate the extent of this threat.

2. Chemical Field Tests

Many studies pretend to obtain a direct estimate of yield losses by comparing, in a statistically significant field experiment, control plots to plots treated with a suitable nematicide. Such experiments often show a high yield increase correlated to the control of the nematodes. For example, chemical control of *H. oryzae* in Japan resulted in a 38% yield increase (Kawashima & Hori, cited in Siddiqi, 1973). However, it is not possible to conclude that nematodes were the sole responsible of the observed yield loss. In addition to the target pest, nematicides may also control other pests. Some chemicals have a direct fertilizer-

like action on the plant. This results in a yield increase in the absence of any pathogen. On the other hand, some pesticides may be phytotoxic at higher concentrations. They also may destroy natural enemies of the nematode. Finally, pesticides may have a positive and/or a negative effect on the plant when they interfere with harmful or with beneficial soil bacteria.

3. Pot Experiments

To avoid the side effects of chemicals, plant growth in pots inoculated with a nematode can be compared to the growth in non-inoculated control pots. Such experiments often show a high correlation between number of inoculated nematodes and plant growth reduction. For example, Babatola & Bridge (1979) demonstrated a yield reduction of 30 to 38% in pots inoculated with 1,000 or 5,000 H. oryzae specimens. These results are inconclusive because pots provide a very artificial medium for the culture of the plant and its parasite. Pots are small and roots cannot develop properly. The hypothesis that a healthy root growth can "outrun" a nematode attack is largely unproven, but it remains that roots developping in a crowded space may be more susceptible to nematode attacks. Other environmental factors, and particularly temperature and the watering of the pot may also affect the plant and lower its natural resistance to parasites. The parasites themselves suffer from the same environmental factors and from the extraction/inoculation trauma. More than half the inoculum disappears after a few days, and populations remain low until the next generation is produced (Fortuner, 1977b). Pot experiments may also be biased by "overkill" when an enormous inoculum (up to 10,000 nematodes per pot) is used. However, a higher inoculum does not always result in a higher established population in the pot. An inoculum of 300 H. oryzae produced a final pot population of 9,000 after three months. Final populations were not higher when a two and a half time bigger inoculum was used (Fortuner, 1977b). Because we ignore what happens in a pot after it has been inoculated, results of pot experiments also are suspect.

Histopathological studies are inconclusive, field pesticide tests are tainted by side effects, pot experiments are too artificial. Are we doomed to never know for sure how much damage a nematode attack actually do?

4. Microplots Experiments

When I started working in Africa on the rice root nematode, H. oryzae, I quickly discovered that numerous observations hinted at the possibility of a high damage to the rice by this nematode, but also that, for the reasons explained above, no single study was perfectly satisfactory. What was needed was an experiment medium small enough to be under complete control, and at the same time large enough to imitate natural field conditions. Helped by my colleagues at ORSTOM (particularly Michel Luc and Georges Merny), I decided to use the microplot design elaborated for population dynamics studies by Seinhorst and by Oostenbrink, in

Holland. I conducted some experiments with H. oryzae that were published in two articles (Fortuner, 1974;1977a). Probably because these publications are in French, they did not receive much attention from the scientific community. The method used and the results obtained in these tests are briefly summarized below.

4.1. Methods

Fig. 1 shows the microplots at Dakar (Senegal) ORSTOM nematology laboratory. The plots are cement cubes one cubic meter in capacity, where rice can be cultivated under flooded conditions. The plots were initially filled with soil disinfected with metham-sodium. Because soil of all plots were similarly treated, any possible side-effect from the chemical would occur in all plots. Specimens of H. oryzae, obtained from a local rice field, were cultivated in pots in the greenhouse. Nematodes were extracted from the culture pots several times at a few months interval, and reinoculated to more pots to increase the available populations. Each successive extraction was made by elutriation where nematodes are washed from soil, soil debris, and soil microorganisms by water. Finally, large numbers of H. oryzae were inoculated to five microplots. Five other plots were used as non-inoculated plots. No fertilizer was added to the soil.

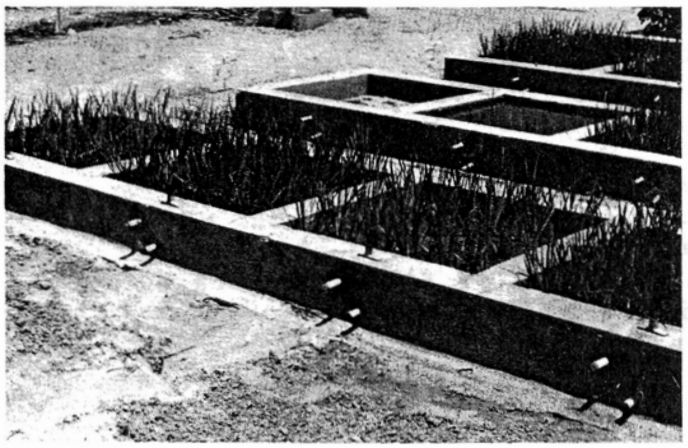

Fig. 1 - General view of the microplots at Dakar (Senegal).

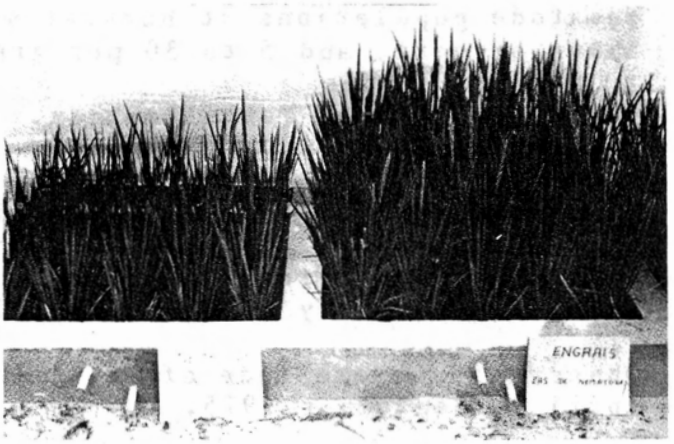

Fig 2 - Difference in growth in plots inoculated and non-inoculated with H. oryzae.

Two successive rice cultures (from July to November 1972 and from November 1972 to May 1973) were necessary to establish nematode populations in inoculated plots at a level similar to local field population levels (2,750 nematodes per liter of soil, and 100 per gram of roots in Senegal Delta, Fortuner, 1976). Observations were made during a third cultivation, from May to September 1973, which is the normal rice growing season in many parts of Senegal. Rice was sown directly into the plots at a density of 25 plants per square meter, identical to local field density. Observations were made only on the nine plants in the middle of each plot.

4.2. Results

4.2.1. First Experiment Without Fertilization

Plants in all plots were seemingly healthy, without any disease symptoms from nematode or other pests. Rice plants in inoculated plots were markedly smaller and less vigorous than plants in control plots (Fig. 2). Highly significant differences between inoculated and control plants occurred in number of tillers per plant (10.2 vs. 13.6), number of panicles (10.1 vs. 12.3), plant height (78.5 cm vs.87.0), plant weight (43.9 g vs. 74.1), and panicle weight (2.71 g vs. 3.11).

Grains from each plant (nine central plants per plot) were harvested separately, dried, and weighed. Dry weight per plant was highly significantly different between inoculated plots (22.3 g) and non-inoculated ones (31.6 g). This represents a yield loss of 41.7%. The germinative power of the grains was not reduced by the nematodes.

Nematode populations at harvest were 3,200 to 6,000 nematodes per liter of soil, and 5 to 30 per gram of root.

4.2.2. Effect of Fertilization.

A second test was made with twenty microplots where rice was cultivated under similar conditions. Half the plots were inoculated with H. oryzae. In each series, five plots received a fertilization formula (135, 40, and 50 kg/ha of the elements N, P, and K) commonly used in Senegal rice fields.

Observations were made after two preliminary rice cultures, from April to September 1975.

As during the first test, presence of nematodes reduced rice growth, whether fertilization was applied or not. Yields in dry weight of grain per plant were as follows:

Treatment	Grain Dry Weight (g)	Significativity
1. No fertilization, nematodes	24.9	a
2. -d°- , no nematodes	36.1	bc
3. Fertilization , nematodes	33.7	b
4. -d°- , no nematodes	41.5	cd

Nematode populations at harvest were 1,500 to 2,500 nematodes per liter of soil, and 90 to 410 per gram of root.

Yield losses in non-fertilized plots (treatments 1 and 2) is 45%. this compares well with the 42% observed in the first test.

In fertilized plots, nematodes reduce yield by 23% (treatment 3 and 4). It can be noted that, when nematodes are present, fertilization significantly increases yield (treatment 1 and 3, +35%) but, without nematodes, the effect of fertilization is not significant (treatment 2 and 4). It can also be noted that treatment 2 and 3 are not significantly different. From plots with the lowest yield (treatment 1, no fertilizer, nematodes present), the increase in yield obtained by fertilization only (treatment 1 and 3, +35%) is not significantly different from the increase in yield that result from the absence of the nematodes (treatment 1 and 2, +45%). Naturally, the best yield is obtained when both nematodes are absent and fertilization is used (treatment 4).

In conclusion, H. oryzae significantly reduces yield, even when the rice is grown in the best conditions with adequate fertilization. Nematode damage caused by H. oryzae on rice is so high that removal of the nematode produces an increase in yield comparable to the increase produced by fertilization, a common agricultural practice.

5. Discussion

Microplot experiments are proposed as a reliable method to assess nematode damage to plants because i) plants are grown almost under field conditions. Soil temperature, watering, and volume of soil available to the roots are similar to natural conditions; ii) nematode populations are able to get over the trauma of initial inoculation and get established in the plots at normal field population levels.

It is unlikely that other pathogens (bacteria or virus for example)were introduced in the plots with the nematode inoculum because i) nematodes from the field are cultivated in the greenhouse during several cultures prior to inoculation. Between each successive culture, nematodes are extracted by an elutriation method that washes off most surface contaminants; and ii) bacterial, fungal, or virus diseases are usually visible macroscopically by the characteristics spots, changes in color, or malformations they cause. No such symptom was ever observed in the experiment microplots. Nevertheless, it would be better to raise the last doubts by a proper control of the absence of contamination of the inoculum.

It has been argued that the successive rice over rice over rice cultures are damaging to the plants. In fact, because the control plots bear a similar continuous rice culture, any problem *related to rice monoculture would exist in inoculated and control*

plots alike. Also, adverse effects of monoculture is probably for the most part linked to the establishment of high populations of pathogenic nematodes. This is precisely the point we want to investigate.

Microplot experiments have demonstrated conclusively the damage caused by H. oryzae to rice culture in Senegal. It is hoped that similar tests will be conducted to assess rice damage associated with the related nematode H. belli in California.

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R. Fortuner worked for ten years with ORSTOM in Africa. He is currently an Associate Plant Nematologist with the Analysis and Identification Unit, CDFA in Sacramento.

SUMMARY OF DIAGNOSES FOR SHADE TREES AND CONIFERS FOR THE CALENDAR YEAR 1984

Barbara Pauly and T.E. Tidwell

The following is an abbreviated list of diagnoses for samples of shade trees and conifers which were received by the CDFA laboratory during 1984. The sources for these samples include parks, both urban and forest; urban street trees; dooryards; various landscaped facilities such as office and residential complexes, schools, etc.; both wholesale and retail nurseries; governmental and private conifer seedling nurseries; Christmas tree farms; forests, on both private and government land; and highway plantings. Clients submitting such samples range from various state, city, and county officials, to private homeowners, commercial growers and nurserymen. No attempt was made to confirm pathogenicity of organisms reported on the samples. The list merely tabulates the various organisms isolated from the samples or reflects the type of damage observed on the sample. Nor was this list intended to be exhaustive, but rather, merely a summary of samples received. The numbers following a host and diagnosis represents the specific California county from which the sample originated. The numbers and their respective counties are as follows:

1. Alameda
2. Alpine
3. Amador
4. Butte
5. Calaveras
6. Colusa
7. Contra Costa
8. Del Norte
9. El Dorado
10. Fresno
11. Glenn
12. Humboldt
13. Imperial
14. Inyo
15. Kern
16. Kings
17. Lake
18. Lassen
19. Los Angeles
20. Madera
21. Marin
22. Mariposa
23. Mendocino
24. Merced
30. Orange
31. Placer
32. Plumas
33. Riverside
34. Sacramento
35. San Benito
36. San Bernardino
37. San Diego
38. San Francisco
39. San Joaquin
40. San Luis Obispo
41. San Mateo
42. Santa Barbara
43. Santa Clara
44. Santa Cruz
45. Shasta
46. Sierra
47. Siskiyou
48. Solano
49. Sonoma
50. Stanislaus
51. Sutter
52. Tehama
53. Trinity

25. Modoc
26. Mono
27. Monterey
28. Napa
29. Nevada
54. Tulare
55. Tuolumne
56. Ventura
57. Yolo
58. Yuba

Host	Diagnosis	County of Origin
Abies concolor	*Virgella robusta*	12
	Lirula abietis-concolorous	9
	Lophodermium sp.	12
	aphid injury	9
	physiological injury	9
	Phytophthora sp.	28
	Pythium sp.	28
	Fusarium oxysporum (seedlings)	57
	Verticillium sp. (seedlings)	57
Abies grandis	Adelgid injury	12
Abies magnifica	*Fusarium oxysporum* (seedlings)	4
Acer macrophyllum	*Melanconium* sp.	4
Acer saccharinum	*Phialophora* sp.	34
	physiological injury	34
Acer sp.	*Verticillium* sp. (wilt)	1
	herbicide injury	48
	physiological injury	57
Aesculus sp.	physiological injury	57
Alnus rhombifolia	physiological injury	10
Arbutus menziesii	*Mycosphaerella arbuticola*	8
	Dothiorella sp.	53
	Fusicoccum sp.	44,12,42
Arctostaphylos densiflora	*Phomopsis* sp. (canker)	49
	Fusicoccum sp. (canker)	49
Arctostaphylos sp.	*Heterobasidion annosum* (*Oedocephalum* stage)	53
	Fusicoccum sp.	4
Betula sp.	physiological injury	31
	Fusarium solani	31
	herbicide injury	48

Calocedrus decurrens	insect injury & mite injury	18
	Pythium sp. (seedlings)	57
Cedrus deodora	*Phytophthora* sp.	51
	physiological	45,48,34
	Phytophthora cactorum	43
	Pythium sp.	43
	Fusarium solani	43
	insect injury	34
Cedrus sp.	*Pythium* sp.	6
	physiological	47
Celtis sp.	herbicide injury	48
Ceonothus griseus	*Botrytis cinerea*	44
	thrips injury	49
Cercis occidentalis	*Verticillium* sp.	49
	Fusarium solani	49
	Alternaria sp.	49
Cupressus sp.	*Seiridium cardinale*	40,23,27 42,49,48
	Fusarium oxysporum	49
	Alternaria sp. + insect injury	49
	physiological	34
	herbicide injury	49
	Verticillium sp.	49
Cupressus arizonica	*Cytospora* sp.	45
	Seiridium cardinale	45,48
Fraxinus sp.	*Gloeosporium aridum*	56
Heteromeles arbutifolia	*Venturia inaequalis*	4
	Alternaria sp. and *Cladosporium* sp.	4
	Alternaria sp. (seedlings)	57
Juglans regia	sunburn injury	48
Juglans sp.	herbicide injury	34,24
	physiological injury	35,28,34
	heat scortch	35,43
	Diplodia sp.	42
	Blackline (virus)	28
	Xanthomonas juglandis	51,42
	Xanthomonas sp.	50

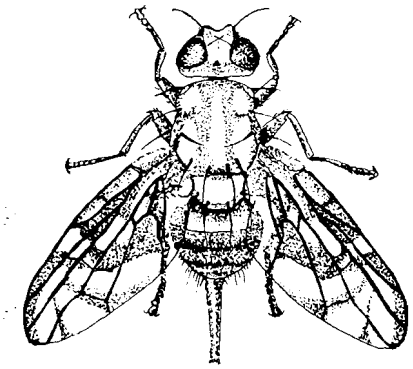
Juniperus sp.	*Armillaria mellea*	31
	physiological injury	56,41,43 47,27,41
	Botryosphaeria ribis	48
	Lophidermium juniperinum	23
	chemical injury	23
	insect injury	56,23
Lithocarpus densiflora	*Fusarium solani*	23
Magnolia sp.	*Cephaleuros* sp. (alga)	57
	Botrytis cinerea	8
	physiological injury	6
Phoenix sp.	*Fusarium oxysporum* (palm wilt)	48
Picea mariana	*Rosellinia herportrichioides*	48
Picea pungens	*Rosellinia* sp.	48
	physiological injury	47
Picea sitchensis	Adelgid injury	12
Pinus attenuata	drought stress	49
	beetle injury	57
Pinus contorta	*Endocronartium harknessii*	11
Pinus coulteri	*Fusarium oxysporum* (seedlings)	44
	beetle injury	57
Pinus eldarica	physiological injury	54
Pinus halepensis	*Endocronartium harknessii*	56
Pinus lambertiana	*Fusarium oxysporum* (seedlings)	4,8
	Fusarium solani	8
Pinus monticola	*Phytophthora* sp.	48
Pinus ponderosa	*Scirrhia pini* (=*Dothistroma pini*)	8
	physiological injury	57,28
	Phytophthora cactorum (seedlings)	57
	Fusarium oxysporum (seedlings)	4,57
	Leptographium sp. (seedlings)	57
	Ectomycorrhizal fungus infection	4
	Pythium sp. (seedlings)	57

Pinus radiata	physiological injury	54,34,24
	Phytophthora sp.	51
	Pythium sp.	43
	"J"-root injury (improper planting)	43
	Heterobasidion annosum	53
	Endocronartium harknessii	34,12
Pinus sabiniana	insect injury	17
	dwarf mistletoe (Arceuthobium sp.)	17
	Endocronartium harknessii	17
Pinus sp.	physiological injury	54,57
	insect injury	11
	chemical injury	12
	mite injury	55
	Endocronartium harknessii	9,43,24
	Thelephora sp.	23
	Phytophthora sp.	56
	Pythium sp.	56
Platanus occidentalis	scale damage	5
	Gnomonia platani	5
	Stigmina platani	42
	Fusarium solani	30
Platanus racemosa	Stigmina platani	42
Platanus sp.	Cylindrocarpon sp.	34
	Fusaruim solani (secondary)	34
Populus nigra	physiological injury	48
	Cytospora sp.	31
Populus sp.	Venturia populina	9
	Fusicladium sp.	34
	Cytospora sp.	18
	insect injury	5,62,9
	Marssonina sp.	9
	Erwinia nimipressuralis	18
Pseudotsuga menziesii	Verticicladiella wagnerii	23
	aphid injury	5
	Pythium sp.	12
	Phytophthora sp.	12,29
	physiologiçal injury	49,12,24
	Fusarium oxysporum	49
	Botrytis cinerea (seedlings)	4
	genetic disorder	45
	Fusarium oxysporum (seedlings)	27,4,44
	Stemphylium botryosum	27
	Fusicoccum sp.	4

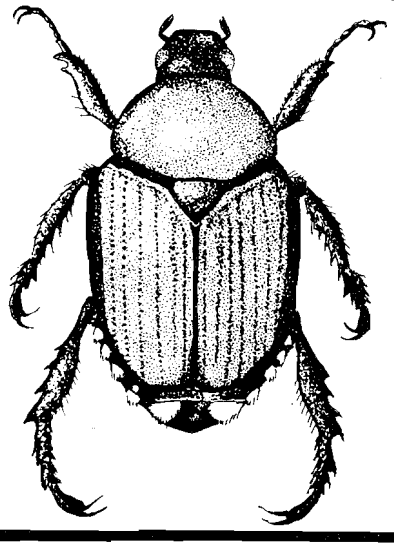
Quercus kelloggii	heat scortch	4
Quercus lobata	chemical injury	7
Quercus palustris	chemical injury	34
Quercus rubra	physiological injury	34
	nutritional deficiency	34
Quercus sp.	gall wasp injury	43,62
	Polyporus sp.	41,62
	insect injury	27
	powdery mildew (Oidium stage)	43,17
	Taphrina caerulescens	9
	Tubercularia vulgaris	31
Quercus virginiana	Taphrinia caerulescens	1
	Monochaeta sp.	35
	Dothiorella sp.	35,27
	Andricus spp. (gall wasp injury)	35
	Disholcaspis sp. (gall wasp injury)	35
Salix matsudana	Cytospora chrysosperma	9
	Sesia tibialis	9
Salix sp.	Cytospora chrysosperma	34
Sequois sempervirens	insect injury	12
	Pythium macrosporum (seedlings)	44
	heat scortch	34
	physiological injury	49,34
Sequoiadendron giganteum	Botryosphaeria ribis	39,28,31 34,23
	Fusicoccum sp.	31,42
	Phytophthora sp.	4
	Botrytis sp.	4
	Macrophomina phaseoli	4
	insect injury	45
	Phytophthora cactorum (seedlings)	57
	Phoma sp. (seedlings)	4
	Brachysporiella sp.	4
	Fusarium oxysporum	4
	Curvularia sp. (seedlings)	4
Thuja occidentalis	Seiridium cardinale	47
Thuja plicata	mite injury	34

Ulmus americana	herbicide injury	34
Ulmus parvifolia	*Erwinia nimipressuralis*	31
	Diplodia sp.	41
Umbellularia californica	*Cumminsiella mirabilissima*	Ag.Insp.Sta.
	Cytospora sp.	4
	Coryneum sp.	4

Barbara Pauly is a Reference Librarian and T.E. Tidwell is an Associate Plant Pathologist for the Analysis and Identification Unit of CDFA.



Entomology Highlights



MEDITERRANEAN FRUIT FLY, Ceratitus capitata -(A)- A specimen of this very serious fruit fly pest has again been found in California this year. The first 1984 collection was in Santa Barbara (CPPDR 3(5):111). The following report by John Pozzi outlines the most recent find:

> "A second Mediterranean fruit fly (Medfly) has been trapped this year in California. The discovery was made on 11/20/84, in Beverly Hills, Los Angeles County. Art Evans, Los Angeles County Trapper, found the male Medfly while inspecting a Jackson trap placed in a grapefruit tree along Hillcrest Road.
>
> Jackson/Medfly trap density in the area was five traps per square mile. Los Angeles County Department of Agriculture personnel are increasing that to protocol levels in the 81 square miles around the find."

ORIENTAL FRUIT FLY, Dacus dorsalis -(A)- Adults of this fruit pest are still being found in the greater Los Angeles area. Unfortunately, San Diego County has also seen a flurry of activity in recent weeks. As of November 16, the total number of oriental fruit flies found in California this year totals 97. The following chart outlines the pertinent data associated with all finds since the November 1st find in National City:

Location	County	Date	Collectors	Stage & Number
Gardena	LA	11/7	Sokulsky/Kehr	2 A ♂♂
Encanto	SD	11/9	Gardner	1 A ♀
Gardena	LA	11/14	Armanius/Medina	1 A ♂, 1 A ♀

GYPSY MOTH, Lymantria dispar -(A)- Probably the last gypsy moth adult to be found in the 1984 season was detected in a trap in Palo Alto. The following report by John Pozzi outlines the unusual circumstances surrounding the find and also gives a

cumulative total for gypsy moth finds for the year:

> "A single adult male gypsy moth, Lymantria dispar was detected November 5, 1984 in Palo Alto, Santa Clara County. CDFA Agricultural Inspector Robert Jensen made the detection. The find was made during the standard procedure of making final inspections of field removed traps prior to their being discarded. The last date the trap was serviced in the field was October 31, 1984.
>
> The find is approximately one mile from a spring 1983 gypsy moth infested site that was treated by CDFA crews. An area one quarter mile in radius around the site was treated with a minimum of two applications of carbaryl (Sevin R). The trap density of the find was 49 traps/sq. mile. It was part of a protocol mandated high density trap network that must be deployed a minimum of two years following treatment. The chance this adult is a reintroduction becomes probably in light of the time and distance separating it from the 1983 treatment."
>
> The final determination was made by CDFA Systematic Entomologist R. Somerby. The approximate age of the moth could not be determined due to the desiccated condition of the specimen."

Summary - 1984 Gypsy Moth Finds

County	----Adults---- Trapped	Visual	Properties Egg Masses/ Pupal Cases
Alameda	7	0	1
Contra Costa	3	0	0
El Dorado	1	0	0
Los Angeles	2	0	0
Santa Clara	1	0	0
Santa Cruz	8	0	1
San Diego	1	0	0
Santa Barbara	1	0	0
Ventura	1	0	0
	25	0	2

COTTON BOLL WEEVIL, Anthonomus grandis -(A)- The yearly trap catch and treatment program totals are now complete for this serious cotton pest. The following chart, compiled by Tom Palmer, summarizes the boll weevil trap catches for 1983 and 1984:

Month	BLYTHE Weevils Trapped	BARD Weevils Trapped	IMPERIAL Weevils Trapped	COACHELLA Weevils Trapped	NEEDLES Weevils Trapped
Jan.83	2,927	218	4		
Feb.83	182	145	2		
Mar.83	198	112	8		
Apr.83	77	26	0		
May 83	97	42	4		
Jun.83	9	1	0		
Jul.83	0	0	0		
Aug.83	0	2	0		
Sep.83	23	97	0		
Oct.83	1,054	1,628	73		
Nov.83	655	2,389	297	23	22
Dec.83	1,605	4,355	454		
TOTAL	6,827	9,015	824	23	22
Jan.84	602	2,610	264		
Feb.84	102	909	24		
Mar.84	77	382	70		
Apr.84	12	93	1		
May 84	0	29	0		
Jun.84	1	5	0		
Jul.84	0	15	0		
Aug.84	0	23	0		
Sep.84	49	384	58		2

Oct.84	567	3,638	341		6
Nov.84	1,159	9,707	369	2	19
Dec.84	600	5,481	312	7	
TOTAL	3,169	23,276	1,439	9	27

The total acres treated are 11,402 in the Bard, Winterhaven area, 66,136 acres in the Imperial Valley and 10,418 acres in Blythe.

ACARINE MITE, Acarapis woodi -(A)- The detection program for this serious pest of honeybees is continuing. As of January 11, over 100,000 bee dissections have been made while searching for the pest. The following summary by Tokuwo Kono indicates our present status:

Total Number of	Type of Sample	
	Survey	Quarantine
Field collections	2,227	39
Lab completions	1,852	39
Lab backlog	375	0
Dissections	95,953	5,850
Days worked	74	
Days behind	13	

Fortunately, no acarine mites have been found in the state so far.

Samples of honeybees are detained under the following priorities:

Priority I: All California beekeepers receiving shipments of live honeybees from those states subsequently quarantined due to the detection of acarine mite will be sampled. One hundred percent (100%) of their apiaries are also to be sampled.

Priority II: All California honeybee breeders involved in the production of package honeybees and/or queen bees will be sampled. If multiple locations are involved, at least twenty-five percent (25%) of apiary locations are to be sampled.

Priority III: Beekeepers receiving honeybees from outside of California via border stations, the U.S. Postal Service, and/or package services will be sampled. Random samples of honeybees from ten percent (10%) of these beekeepers/apiaries are to be collected. Bees coming into California from states not under quarantine fall into this priority.

Priority IV: Beekeepers registered in each county, not previously inspected in Priorities I, II, and III will be sampled. Random samples of honeybees from ten percent (10%) of these beekeepers are to be collected.

NEW COUNTY RECORDS

ASPARAGUS APHID, Brachycolus asparagi -(A)- The original find of this asparagus pest in California was recorded in the last issue of CPPDR 3(5):142-143. At that time, the aphid was known from Riverside and Kern Counties. It is now known to occur in Fresno County. The find was made by Fresno County Entomologist Norm Smith at the Fresno State University Campus on November 9. The host was garden asparagus, Asparagus officinalis. In early December, the aphid was also found in Sanger and in south east Fresno.

FUCHSIA MITE, Aculops fuchsiae -(B)- Collected for the first time in Humboldt County. Dick Spadoni made the collection at Fortuna on July 25.

SCIENTIFIC NAME CHANGES

As scientists continue to study the classification and taxonomy of insects, they find that sometimes living things are inadvertently described and classified more than once. According to the International Rules of Zoological Nomenclature, each living organism can have only one specific name, so that every subsequent name accidentally given to that species is declared invalid. In the following report by Tokuwo Kono, just such a case has occurred. The two mites, Aculus fockeui and Aculus cornutus, were found to be one and the same. Therefore, A. fockeui is now the legal name for what was once two species.

> "Evidence for conspecificity of Aculus cornutus and A. fockeui (Acari: Eriophyidae), Rust Mites of Prunus Fruit Trees", an article in the "Annals of the Entomological Society of America" (September, 1984, Vol. 77, No. 5, pages 564-567) by G.N. Oldfield, reports that the name Aculus cornutus is a synonym of A. fockeui.
>
> According to Oldfield, "The evidence indicates that Aculus from peach and plum trees, formerly designated as Aculus cornutus (Banks) and Aculus fockeui (Nalepa and Trouessart), are conspecific, and the name A. cornutus is hereby reduced to the status of synonym of A.

fockeui. The common names, peach silver mite, plum rust mite, plum nursery mite, or cherry rust mite, may be retained since the names describe damage caused by A. fockeui on each host."

Another case where scientific names change is exemplified by the following. In this case, the scientist may decide that a species is placed in the wrong genus, which simply means that it is more closely related to another group of organisms than the group it has been placed into in the past. Or it may not be related to any group, and thus it should be placed in a genus by itself. In this case, only the generic (or first) part of the name changes; the specific name does not (except for possibly the ending of the specific name so that gender modification is correct). The only other change that must now be made is to put parentheses around the name of the author, which simply is an indication that the species is no longer in the genus that it was originally described in.

NAME CHANGE FOR CAROB MOTH

Most recently used name Ectomyelois ceratoniae Zeller
New name Spectrobates ceratoniae (Zeller)

QUARANTINE AND EXCLUSION

GYPSY MOTH, Lymantria dispar -(A)- We are behind in tallying the finds of many insect pests intercepted in quarantine. Gypsy moth is a good example. The following chart outlines the finds made by county personnel while inspecting outdoor furniture and other items being shipped into California from infested states. Collections dates are for the months of July and August.

County	Origin	Date	Stage	Collector
SLO	New Jersey	7/18	all	Stultz
SLO	New Jersey	7/23	EM	Stultz
MAR	New Jersey	7/24	E,L,P	Montgomery
SUT	Connecticut	7/24	-	Anderson
SD	New York	7/24	EM	Kainu
MAR	New York	7/30	EM	Montgomery
STCL	Connecticut	8/1	E,P	Guerra
LA	New York	8/1	EM	Kellam
SD	New Jersey	8/1	EM	Bowers
STCL	Missouri	8/3	EM	Gilmour
YO	Connecticut	8/6	L,P	Souga-Cole
SJ	New York	8/7	E,P	Watkins
MY	New York	8/8	EM	Bunch
LA	New Jersey	8/9	EM	Watanabe
CC	Pennsylvania	8/9	E,P	Alavi
SAC	Virginia	8/16	L,P	Rasmussen

CC	New Jersey	8/15	E,L,P	Alavi
STCZ	New Jersey	8/15	EM	Morton
YO	New York	8/15	L	Souga-Cole
MY	Massachusetts	8/21	EM	Bunch
O	Maryland	8/23	L,P,A	Wyatt
CC	Quebec, Canada	8/27	E,L,P	Alavi
TEH	Maryland	8/27	A	Walker
SAC	New York	8/28	L,P	Rasmussen

EASTERN TENT CATERPILLAR, Malacosoma americanum -(Q)- Specimens of this injurious moth were picked up several times during July and August during the above gypsy moth inspections. Collections were made in Los Angeles, Merced, Sacramento, San Bernardino and Sutter Counties by Eisenhart, Aguilar, Rasmussen, Brachen and Anderson respectively.

Japanese beetle aircraft survey - Every summer during the flight period of the Japanese beetle on the east coast, California conducts a detection program of commercial aircraft landing at airports throughout the state. While nine Japanese beetles were found on incoming aircraft during August, the following "A" or "Q" rated pests were also recovered:

A scarab beetle	Phyllophaga sp.	6
Oriental beetle	Anomala orientalis	9
Asiatic garden beetle	Maladera castanea	3
Mango flower beetle	Protaetia fusca	1
Chinese rose beetle	Adoretes sinica	1
A cutworm moth	Euxoa sp.	1
Pepper maggot	Zonosemata electa	1
A grasshopper	Melanoplus sp.	2
A katydid	Orchelium sp.	1

The following A, B and Q pests have been intercepted in Quarantine during July and August

Rating	Species	Common Name	Date	Origin	County	Host	Collector
Q	Graptostethus manillensus	woodrose bug	7/19	HI	SD	flowers	Ginsky
Q	Lupparia notulata	a cockroach	7/19	HI	SD	flowers	Ginsky
Q	Sitobion luteum	an aphid	7/18	HI	SD	orchids	Kenyon/Corsey
B	Siphanta acuta	torpedo bug	7/20	HI	V	flowers	Hillis
B	Siphanta acuta	torpedo bug	8/13	HI	V	Protea	Van Epp
B	Siphanta acuta	torpedo bug	8/20	HI	LA	flowers	Lee
Q	Aleurodicus dispersus	spiraling whitefly	8/24	HI	CAL	ti	Frieders
Q	Aleurodicus dispersus	spiraling whitefly	8/25	HI	LA	philodendron	McGrath
Q	Dialeurodes sp.	a whitefly	8/15	Braz	SF	lime	Brown
A	Pulvinaria psidii	green shield scale	7/23	HI	SJ	flowers	Willson
A	Pulvinaria psidii	green shield scale	8/2	HI	SON	Fieus	Kobayashi
A	Pulvinaria psidii	green shield scale	8/14	HI	SF	flowers	Rios
A	Pulvinaria psidii	green shield scale	8/15	HI	SON	Ficus	Kobayashi
A	Kilifia acuminata	acuminate scale	8/9	FLA	SM	philodendron	Buerer
Q	Coccus viridis	green scale	7/24	HI	STB	Pulmonaria	Burns
Q	Coccus viridis	green scale	8/15	?	SF	limes	Brown
Q	Pinnaspis buxi	boxwood scale	8/9	HI	V	Ti	Van Epp
Q	Pinnaspis buxi	boxwood scale	8/20	HI	LA	Hala	Lee
A	Pseudaulacasis cockerelli	magnolia whitescale	8/16	?	STCL	coconut	Maggi
A	Pseudaulacasis cockerelli	magnolia whitescale	8/27	HI	SM	flowers	Buerer
A	Gymnaspis aechmeae	aechmea scale	8/16	FLA	SD	Bromeliads	Stotz/Hill
Q	Aonidiella inornata	inornate scale	8/15	Braz	SF	cocoonut	Brown
Q	Pseudaonidia trilobitiformis	trilobed scale	8/15	Brazil	SF	limes	Brown
B	Parlatoria pergandii	chaff scale	8/15	Brazil	SF	limes	Brown
D	Lepidosaphes beckii	purple scale	8/6	Ecuador	V	orange	Lott
A	Lopholeucaspis cockerelli	cockerell scale	7/24	HI	LA	palm	Sulentich
A	Pinnaspis strachani	lesser snow scale	8/7	Costa Rica	SM	Sansevieria	Buerer
Q	Dysmicoccus mckenziei	McKenzie mealybug	7/7	?	LA	Tillandsia	Kellan/Wegener
B	Pseudococcus elisae	elisa mealybug	8/15	HI	V	Aglaonema	Van Epp
A	Leptinotarsa decimlineata	Colorado potato beetle	7/18	Oregon	STN	Barley	Sweeney/Fahey
Q	Phloeosinus sp.	a shothole borer	7/23	Japan	ALA	-	Brown
Q	Polygraphus polygraphus	a shothole borer	7/27	Europe	ALA	conifer	Brown
A	Popillia japonica	Japanese beetle	8/15	NJ	LA	blueberries	Wegener
Q	Bucculatrix sp.	a lyonetid moth	8/18	MI	YO	lawnchair	Souza-Cole
A	Anastrepha nr. obliqua	a fruit fly	7/23	Puerto Rico	V	mango	Van Epp
A	Dacus dorsalis	oriental fruit fly	7/24	HI	LA	auto	Smith/White
Q	Ochetomyrmex auropunctata	little fire ant	8/23	FLA	LA	palm	Caliochia
Q	Pheidole megacephala	big headed ant	7/18	HI	SD	flowers	Ginsky
Q	Pheidole megacephala	big headed ant	7/27	HI	SD	palm	Blocker
Q	Pheidole megacephala	big headed ant	8/15	HI	SJ	Strelitzia	Watkins
Q	Pheidole megacephala	big headed ant	8/15	HI	V	Aglaonema	Van Epp
Q	Paratrechina sp.	an ant	7/17	FLA	LA	palm	Caliochia
Q	Paratrechina sp.	an ant	7/20	FLA	MY	Ficus	Bunch
Q	Paratrechina sp.	an ant	7/26	HI	STB	Dracaena	Cheeseman
Q	Paratrechina sp.	an ant	8/2	FLA	LA	Dracaena	Caliochia
Q	Paratrechina sp.	an ant	8/2	FLA	LA	Ficus	Sulentich
Q	Paratrechina sp.	an ant	8/23	FLA	LA	palm	Calicchia
B	Bradybaena similaris	a snail	7/31	FLA	V	Ficus	Van Epp
B	Bradybaena similaris	a snail	8/16	FLA	STB	Sansevieria	Pritchard
B	Bradybaena similaris	a snail	8/28	FLA	SJ	Fious	Hudson/Gritz

The following insects and molluscs are "A" or "Q" rated pests intercepted in quarantine which were not immediately identifiable to species because of life stage, condition or lack of comprehensive taxonomic studies of the groups.

Rating	Species	Common Name	Date	Origin	County	Host	Collector
Q	*Aleurotuberculatus* sp.?	a whitefly	8/13	Philipp.	SF	lime	Brown
Q	Flatidae?	a planthopper	8/20	HI	LA	Ti	Lee
Q	Curculionidae	weevil larvae	7/25	Japan	ALA	wood	Brown
Q	Cerambycidae	a woodborer	7/24	Europe	ALA	wood	Brown
Q	Xyloborinae	a shot hole borer	7/25	Ecuador	V	wood	Van Epp
Q	Cerambycidae	a wood borer	8/4	Japan	V	wood	Brown
Q	Scolytidae	a shot hole borer	8/4	Japan	V	wood	Brown
Q	Arctiidae	a tiger moth	7/19	Penn.	SD	chair	Kenyon
Q	Arctiidae	a tiger moth	8/24	Honduras	SBO	?	Miller
Q	Tortricidae	a moth	8/13	Taiwan	SF	Litchi	Brown
Q	*Gracilaria* sp.?	a moth	7/26	Taiwan	SF	Litchi	Brown
Q	*Gracilaria* sp.?	a moth	8/13	Taiwan	SF	Litchi	Brown
Q	Pyralidae	a moth	7/28	Malaysia	ALA	cocoa	Brown
Q	Crambinae	a moth	7/20	KS	COL	Zoysia	Storm

BORDER STATIONS

Kudos are in order this issue for the following border station personnel:

Don't Mess With Mona - One November evening, a load of uncertified Texas bell peppers (672 cartons) was rejected by Dave Quimayousie. At 0650 hours the next morning, Mona received a phone call from a person representing himself as being with "Texas-Federal Inspection Services, USDA," who stated that he was willing to verify the load. Realizing the very slim chance of reaching on inspector that early on Saturday morning, Mona pressed for more information. The end result was an admission from the caller that he was not an inspector, but a representative of Griffin and Brand, the shipper. The caller and the driver were promptly "read the 'ole riot act'" and the truck was turned around and sent out-of-State.

Needles Crew Scores First - Station Supervisor Aaron Miller (2) and his crew have each personally intercepted at least one gypsy moth this year. How about that!

Members of the successful Needles crew also include Shift Supervisors Mike Ebers, Kevin Gleason (5), Gary Leslie and Matt Pastell (3). The permanent Plant Quarantine Inspector staff includes Dianne Duffin (6), Dave Gaona (22), Don Pendleton (9), Sharon Bledsoe (3), Dick Brodbeck, Scott Campbell (11), Donley Miller, Carol Prince (5), Dan Tesche (7), and Kimberly Hansen (4). Successful GYPSY MOTHers from Needles who have since transferred to other stations include Craig Blakely (6) and Christine Donaldson (7). Debra Tanouye (4) transferred to the PBW Project. Last, but certainly not least, was Cordie Foster (12) a seasonal inspector who might have intercepted more, except that maternity leave became a necessity.

Congratulations to a winning team. We're all proud of ya!!

In this section of previous issues of CPPDR, we have discussed the gypsy moth infestation in Lane County, Oregon and the problems it was causing at California border stations. The following item indicates a possible successful way to solve some of those problems. It certainly seems to be working so far:

"New Wrinkle - Oregon officials are encouraging Lane County RV owners to bring their vehicles to their central facility for gypsy moth egg mass (creeper check) inspection. Certificates are issued for the vehicle, which will be valid until next summer (egg laying season). The Mt. Shasta crew accepted 39 of these certs. (signed by Oregon inspectors) this past week."

Ever wonder why so many pests are entering California these days? Just look at the number of potential pests carrying commodities that were intercepted at just one border station during one week:

"Interceptions of interest the week of November 29 at Yermo included Missouri cotton, Illinois sweet potatoes, Arizona plants with soil, New York green peppers, Nevada elm firewood, Oklahoma pecans, Arkansas walnuts, Georgia plants with soil, Illinois bulbs in soil, Pennsylvania asparagus fern and Nevada kiwi fruit. This listing will provide our readers with a sample of the variety of plant materials that are prohibited entry into California under various plant pest quarantines."

BORDER STATION INTERCEPTIONS
(Since September 21, 1984)

HICKORY SHUCKWORM	(*Cydia caryana*)	-A-	113
A WOOLLY BEAR	(Arctiidae)	-Q-	30
PURPLE SCALE	(*Lepidosaphes beckii*)	-B-	26
PECAN WEEVIL	(*Curculio caryae*)	-A-	78
A RIBBED CASEMAKER	(*Bucculatrix* sp.)	-Q-	4
PINK BOLLWORM	(*Pectinophora gossypiella*)	-A-	75
A TENT CATERPILLAR	(*Malacosoma* sp.)	-Q-	32
GYPSY MOTH	(*Lymantria dispar*)	-A-	58
A PYRALID MOTH	(Pyralidae)	-Q-	2
A GALL MIDGE	(Cecidomyiidae)	-Q-	1
A PICKLEWORM	(*Diaphania nitidalis*)	-B-	2
CHINCH BUG	(*Blissus leucopterus*)	-Q-	1
A LYGAEID BUG	(Lygaeidae)	-Q-	2
CHAFF SCALE	(*Parlatoria pergandii*)	-B-	43
ARROWHEAD SCALE	(*Unaspis yanonensis*)	-Q-	52
WOOLLY WHITEFLY	(*Aleurothrixus floccosus*)	-A-	1
GLOVER SCALE	(*Lepidosaphes gloverii*)	-B-	10
CALIFORNIA RED SCALE	(*Aonidiella aurantii*)	-B-	13
AN ANT	(*Paratrechina* sp.)	-Q-	7
A FIRE ANT	(*Solenopsis gemmata*)	-Q-	1
ORIENTAL SCALE	(*Aonidiella orientalis*)	-Q-	5
EUROPEAN CORN BORER	(*Ostrinia nubilalis*)	-A-	11
BOLL WEEVIL	(*Anthonomus grandis*)	-A-	19
A WEEVIL	(*Curculio* sp.)	-A-	11
A MEALYBUG (FIRST INSTAR)	(Pseudococcidae)	-Q-	7
IMPORTED FIRE ANT	(*Solenopsis invicta*)	-A-	2
JAPANESE MEALYBUG	(*Planococcus kraunhiae*)	-Q-	3
JAPANESE BEETLE	(*Popillia japonica*)	-A-	1
A MEALYBUG (NYMPH)	(*Planococcus* sp.)	-Q-	5
APPLE MAGGOT	(*Rhagoletis pomonella*)	-A-	53
WALNUT HUSK MAGGOT	(*Rhagoletis suavis*)	-A-	3
AN ARCTIID MOTH	(Arctiidae)	-Q-	3
A PYRALID MOTH	(*Diaphania* sp.?)	-Q-	1
A BAGWORM	(Psychidae)	-Q-	5
A GELECHIID MOTH	(*Gelechia* sp.?)	-Q-	1
AN OWLET MOTH	(Noctuidae)	-Q-	5
PEPPER MAGGOT	(*Zonosemata electa*)	-Q-	1
AN OLETHREUTID MOTH	(Tortricidae)	-Q-	1
AN ARMORED SCALE (NYMPH)	(Diaspididae)	-B-	1
A PLANTHOPPER (NYMPH)	(Fulgoroidea)	-Q-	1
HOLLY LEAFMINER	(*Phytomyza ilicis*)	-B-	5
MEXICAN FRUITFLY	(*Anastrepha* sp. prob. *ludens*)	-A-	2
WHITE-MARKED TUSSOCK MOTH	(*Orgyia leucostigma*)	-Q-	1
EASTERN TENT CATERPILLAR	(*Malacosoma americanum*)	-Q-	1
A TINEID MOTH	(*Opogona* sp.)	-Q-	1
HOLLY SCALE	(*Dynaspidiotus brittanicus*)	-B-	1
COCONUT SCALE	(*Aspidiotus destructor*)	-A-	1
A COCKROACH (NYMPH)	(Blattidae)	-Q-	1

A GRASS BUG	(Rhopalidae)	-Q-	1
A MEALYBUG	(*Dysmicoccus* nr. *texensis*)	-Q-	1
A SNAIL	(poss. *Bradybeana similaris*)	-B-	1
COLORADO POTATO BEETLE	(*Leptinotarsa decemlineata*)	-A-	1
PUSTULE SCALE	(*Asterolecanium pustulans*)	-Q-	1
A LEAFROLLER	(Tortricidae)	-Q-	1
GREEN SHIELD SCALE	(*Pulvinaria psidii*)	-A-	1
A LEAFROLLER	(*Argyrotaenia* sp.)	-Q-	1
A GALL MIDGE	(Cecidomyiidae)	-Q-	1
UNKNOWN ACALYPTRATE FLY	(Diptera)	-Q-	1
A TUSSOCK MOTH	(*Orgyia* sp.)	-Q-	2
SLENDER SOFT SCALE	(*Coccus acutissimus*)	-Q-	1
A LEAFHOPPER (NYMPH)	(Cicadellidae)	-Q-	1
A CASE-BEARING MOTH	(*Coleophara* sp.)	-Q-	1
SWEET POTATO LEAF BEETLE	(*Typophorus viridicyaneus*)	-A-	1
AN ARCTIID MOTH	(Arctiidae)	-Q-	1
A SCARAB BEETLE	(*Eutheola rugiceps*)	-Q-	1
SOUTHERN STINKBUG	(*Nezara viridula*)	-Q-	1
BEAN LEAF BEETLE	(*Cerotoma trifurcata*)	-A-	1

ERRATA

Please note the following errors in the November 1984 issue of C.P.P.D.R.:

The first error is on the front page; the November 1984 issue should be Volume 3, Number 6; not Volume 3, Number 5.

The second error is on page 139, the male-female symbols for the oriental fruit fly collections were not completed.

Location	County	Date	Collector	Stage & Number
Westchester	LA	8/30	R. Inocencio	3 A ♀♀
Inglewood	LA	8/30	R. Inocencio	1 A ♀
Torrance	LA	8/30	M. Quaglia	1 A ♂
Wilmington	LA	9/05	D. Lynch	1 A ♂
Inglewood	LA	9/07	R. Inocencio	1 A ♂
Westchester	LA	9/07	R. Inocencio	1 A ♂
Gardena	LA	9/13	M. Kehr	4 A ♂♂
Torrance	LA	9/13	M. Kehr	1 A ♂
Westchester	LA	9/14	R. Inocencio	1 A ♂
Pomona	LA	9/14	P. White	1 A ♂
Torrance	LA	10/11	M. Kehr	1 A ♂
Torrance	LA	10/12	L. Sundkuist	2 A ♀♀
Anaheim	O	10/12	L. Fernandey	1 A ♂
Gardena	LA	10/15	Armanious/Medina	2 A ♀♀
Gardena	LA	10/16	N. Armanious	1 A ♂, 3 A ♀♀
Torrance	LA	10/17	Armanious/Medina	2 A ♂♂
Gardena	LA	10/24	N. Armanious	1 A ♂, 7 A ♀♀
Gardena	LA	10/25	N. Armanious	1 A ♀
Gardena	LA	10/31	Armanious/Medina	1 A ♀
National City	SD	11/01	B. Gardner	1 A ♂

Third, the asparagus aphid captions for Figures 1 and 3 on page 143 were reversed.

DENNIS H. HALL MEMORIAL FUND

Dr. Dennis Heeley Hall passed away unexpectedly on November 22, 1984. Dr. Hall served the University of California and State of California for nearly 29 years with dedication and distinction. His death has resulted in the loss of one of California Agriculture's most productive Plant Pathologists and effective Extension specialists and leaves a great void in the University's applied research and extension program on the diseases of field and vegetable crops.

Born in 1922 in Brigham City, Utah, Dr. Hall obtained a B.S. degree in 1947 in Botany and an M.S. degree in Plant Pathology in 1949, both at Utah State Agricultural College in Logan, Utah. He earned a Ph.D. in Plant Pathology from the University of Wisconsin, in 1955. He was commissioned First Lieutenant in the U.S. Marine Corps in 1943 and served in the South Pacific during World War II. He remained active in the reserves until retirement as a Major in 1959. He taught at the University of Nevada in Reno for two years before attending Wisconsin and came to Davis as an Extension Plant Pathologist in 1955.

Dr. Hall's record in applied research and extension activities during his years at Davis was truly outstanding. He made significant contributions toward the understanding and control of a large number of field and vegetable crop diseases. He made notable contributions to the sweet potato, garlic, and potato industries through use of meristem culture to provide virus free planting stock. He cultured clones and followed them thru field testing and cycles of selection. His countless studies on modifications of cultural practices and chemical control of diseases on numerous crops including onions, carrots, tomatoes, corn, alfalfa, clover, hops, cotton, cereals, Brussels sprouts, sugarbeets and rice are equally distinguishing. Dr. Hall was a good team researcher and spent much effort in pointing out problems to young pathologists and students. As a result much of his research was conducted cooperatively with either experiment station or extension personnel. He authored or coauthored more than 130 research or extension papers on diseases of field and vegetable crops. His excellence in mission oriented research attracted worldwide attention and resulted in his being sought for advice and counsel from all aspects of agricultural endeavor.

Although the foregoing has emphasized Dr. Hall's research accomplishments, he was equally preeminent in his capacity as an extension plant pathologist. He had the ability to present highly technical information in a manner readily understood by farm advisors, pest management operators, growers and other industry colleagues. He was particularly dedicated to helping young farm advisors. His lab was a constant clinic of unknown plant samples and attempts to identify disease problems. Dr.

Hall was equally effective in guiding the research of graduate students seeking M.S. or Ph.D. degrees.

Dr. Hall was a complete plant pathologist, a true leader and an inspiration to students and staff. He was intrigued with and dedicated to the understanding of plant diseases and their control. Workers in plant pathology often sought his advice and when he gave it, they listened and acted. Few plant pathologists have gained the personal and professional respect accorded D.H. Hall by his colleagues.

In recognition of Dr. Hall's outstanding contributions in plant pathology and extension, the Department of Plant Pathology, University of California, Davis, with encouragement from Dr. Hall's wife, Marjorie, has established the "Dennis H. Hall Memorial Fund". An annual award will be made to a graduate student in the department who is doing excellent mission-oriented research on a disease of a field or vegetable crop. The award is envisioned as an inspiration to graduate students and will aid in perpetuating the excellence that characterized Denny's career. Contributions (payable to The Regents, University of California) should be sent to the Dennis H. Hall Memorial Fund, Department of Plant Pathology, University of California, Davis, California 95616.

NEW PEST RATING LIST FOR PLANT PATHOGENIC BACTERIA

Alex M. French

The last revision of the CDFA pest rating lists for plant pathogenic bacteria was distributed in 1977. We are including herewith a new list which can be removed and placed in your pest rating binder (if you have one).

You will note that the bacterial names have been updated in many cases to reflect new developments in nomenclature since the publication of the Approved Lists of Bacterial Names by the I.S.P.P. Committee on Taxonomy of Phytopathogenic Bacteria in 1980. The changes are listed in the following publications:

International Journal of Systematic Bacteriology 30:225-419. 1980.

Commonwealth Mycological Institute, Review of Plant Pathology 59:158-165. 1980.

On the green pages are listings of bacterial pathogens presently rated "A", "B", and "Q". Listing the "C" and "D" organisms appears to serve no purpose. In regard to those rated "Q", it should be understood that this is by no means a complete listing, and is subject to constant change as new pathogens are detected or intercepted.

Alex M. French is Principal Plant Pathologist/Nematologist with the Analysis and Identification Unit, CDFA, in Sacramento.

STATE OF CALIFORNIA
DEPARTMENT OF FOOD AND AGRICULTURE
DIVISION OF PLANT INDUSTRY

January 1, 1985

PEST RATING LIST - PLANT PATHOGENS: BACTERIA

RATING	PATHOGEN	COMMON NAME
	Agrobacterium	
C	A. rhizogenes	Hairy root
C	A. rubi	Cane gall of brambles
C	A. tumefaciens	Crown gall
	Corynebacterium	
C	C. fascians	Fasciation
-	C. insidiosum	See: C. michiganense pv insidiosum
-	C. michiganense	See: C. michiganense pv michiganense
C	C. michiganense pv insidiosum	Bacterial wilt of alfalfa
B	C. michiganense pv michiganense	Bacterial canker of tomato
B	C. michiganense pv sepidonicum	Ring rot of potato
-	C. sepidonicum	See: C. michiganense pv sepidonicum
	Erwinia	
C	E. amylovora	Fireblight
-	E. aroideae	See: E. carotovora pv carotovora
-	E. atroseptica	See: E. carotovora pv atroseptica
-	E. carotovora	See: E. carotovora pv carotovora
C	E. carotovora pv atroseptica	Potato black leg, soft rot
C	E. carotovora pv carotovora	Soft rot
-	E. chrysanthemi	See: E chrysanthemi pv chrysanthemi
C	E. chrysanthemi pv chrysanthemi	Bacterial blight of chrysanthemums
C	E. chrysanthemi pv dieffenbachiae	Leaf rot of dieffenbachia
C	E. chrysanthemi pv philodendri	Leaf spot and leaf rot of philodendron
C	E. chrysanthemi pv zeae	Stalk rot of corn
C	E. cypripedii	Brown rot of Cypripedium orchids
-	E. dieffenbachiae	See: E. chrysanthemi pv dieffenbachiae
C	E. nigrifluens	Bark canker of walnut
C	E. nimipressuralis	Wetwood disease of elm
C	E. quercina	Drippy nut disease of live oak
C	E. rubrifaciens	Phloem canker of walnut
	Pseudomonas	
-	P. aceris	See: P. syringae pv aceris
-	P. aptata	See: P. syringae pv aptata
C	P. caryophylli	Carnation bacterial wilt
C	P. cattleyae	Bacterial leaf spot of orchids
C	P. cichorii	Bacterial leaf spot of chicory/endive
-	P. coronafaciens	See: P. syringae pv coronafaciens
-	P. delphinii	See: P. syringae pv delphinii
-	P. eriobotryae	See: P. syringae pv eriobotryae
-	P. lachrymans	See: P. syringae pv lachrymans
-	P. lapsa	See: Erwinia chrysanthemi pv zeae

-	P. maculicola	See: P. syringae pv maculicola
C	P. marginalis	Marginal blight of lettuce
C	P. marginata	Gladiolus scab
-	P. mori	See: P. syringae pv mori
-	P. phaseolicola	See: P. syringae pv phaseolicola
-	P. pisi	See: P. syringae pv pisi
-	P. primulae	See: P. syringae pv primulae
-	P. savastanoi	See: P. syringae pv savastanoi
Q	P. solanacearum	Southern wilt, bacterial wilt
-	P. syringae	See: P. syringae pv syringae
C	P. syringae pv aceris	Bacterial leaf spot of maple
C	P. syringae pv aptata	Black streak/blight of beets
C	P. syringae pv coronafaciens	Halo blight of oats
C	P. syringae pv delphinii	Black spot of delphinium
C	P. syringae pv eriobotryae	Loquat canker
B	P. syringae pv lachrymans	Angular leafspot of cucurbits
C	P. syringae pv maculicola	Bacterial leafspot of cauliflower
C	P. syringae pv mori	Bacterial blight of mulberry
B	P. syringae pv phaseolicola	Halo blight of bean
C	P. syringae pv pisi	Bacterial blight of pea
C	P. syringae pv primulae	Bacterial leafspot of primrose
C	P. syringae pv savastanoi	Olive knot, oleander knot
C	P. syringae pv syringae	Bacterial canker of stone fruits
C	P. syringae pv syringae	Citrus blast
C	P. syringae pv tomato	Bacterial speck of tomato
-	P. tomato	See: P. syringae pv tomato

Xanthomonas

-	X. begoniae	See: X. campestris pv begoniae
-	X. beticola	See: X. campestris pv beticola
-	X. campestris	See: X. campestris pv campestris
C	X. campestris pv begoniae	Leaf spot of begonia
C	X. campestris pv beticola	Bacterial pocket of beets
B	X. campestris pv campestris	Black rot of crucifers
C	X. campestris pv carotae	Bacterial blight/scab of carrot
A	X. campestris pv citri	Citrus canker
C	X. campestris pv dieffenbachiae	Bacterial leaf spot of dieffenbachia
C	X. campestris pv fragariae	Angular leafspot of strawberry
C	X. campestris pv hederae	Bacterial leaf spot of English ivy
C	X. campestris pv incanae	Bacterial blight of garden stocks
C	X. campestris pv juglandis	Walnut blight
C	X. campestris pv maculifoliigarden.	Bacterial leaf spot of gardenia
B	X. campestris pv malvacearum	Angular leaf spot of cotton
C	X. campestris pv pelargonii	Bacterial leaf spot of geranium
Q	X. campestris pv phaseoli	Common blight of bean
B	X. campestris pv phaseoli (fuscans)	Fuscous blight of bean
Q	X. campestris pv pruni	Bacterial spot of stone fruits
C	X. campestris pv tardicrescens	Bacterial blight of iris
C	X. campestris pv translucens	Black chaff of barley
B	X. campestris pv vesicatoria	Bacterial spot of tomato and pepper
C	X. campestris pv vitians	Bacterial wilt of lettuce
-	X. carotae	See: X. campestris pv carotae
-	X. citri	See: X. campestris pv citri
-	X. dieffenbachiae	See:X. campestris pv dieffenbachiae
-	X. fragariae	See: X. campestris pv fragariae
-	X. hederae	See: X. campestris pv hederae
-	X. incanae	See: X. campestris pv incanae
-	X. juglandis	See: X. campestris pv juglandis
-	X. maculifoliigardeniae	See: X. campestris pv maculifoliigarden.
-	X. malvacearum	See: X. campestris pv malvacearum
-	X. pelargonii	See: X. campestris pv pelargonii
-	X. phaseoli	See: X. campestris pv phaseoli
-	X. phaseoli var. fuscans	See: X. campestris pv phaseoli (fuscans)
-	X. pruni	See: X. campestris pv pruni
-	X. tardicrescens	See: X. campestris pv tardicrescens
-	X. translucens	See: X. campestris pv translucens
-	X. vesicatoria	See: X. campestris pv vesicatoria
-	X. vitians	See: X. campestris pv vitians

STATE OF CALIFORNIA
DEPARTMENT OF FOOD AND AGRICULTURE
DIVISION OF PLANT INDUSTRY

JANUARY 1, 1985

PEST RATING LIST - PLANT PATHOGENS: BACTERIA

KEY TO GENERIC NAMES - A. = Agrobacterium
C. = Corynebacterium
E. = Erwinia
P. = Pseudomonas
X. = Xanthomonas

RATING	DISEASE	PATHOGEN
B	Angular leaf spot of cotton	X. campestris pv malvacearum
B	Angular leafspot of cucurbits	P. syringae pv lachrymans
C	Angular leafspot of strawberry	X. campestris pv fragariae
C	Bacterial blight of chrysanthemums	E. chrysanthemi pv chrysanthemi
C	Bacterial blight of garden stocks	X. campestris pv incanae
C	Bacterial blight of iris	X. campestris pv tardicrescens
C	Bacterial blight of mulberry	P. syringae pv mori
C	Bacterial blight of pea	P. syringae pv pisi
C	Bacterial blight/scab of carrot	X. campestris pv carotae
C	Bacterial canker of stone fruits	P. syringae pv syringae
B	Bacterial canker of tomato	C. michiganense pv michiganense
C	Bacterial leaf spot of English ivy	X. campestris pv hederae
C	Bacterial leaf spot of chicory/endive	P. cichorii
C	Bacterial leaf spot of dieffenbachia	X. campestris pv dieffenbachiae
C	Bacterial leaf spot of gardenia	X. campestris pv maculifoliigarden.
C	Bacterial leaf spot of geranium	X. campestris pv pelargonii
C	Bacterial leaf spot of maple	P. syringae pv aceris
C	Bacterial leaf spot of orchids	P. cattleyae
C	Bacterial leafspot of cauliflower	P. syringae pv maculicola
C	Bacterial leafspot of primrose	P. syringae pv primulae
C	Bacterial pocket of beets	X. campestris pv beticola
C	Bacterial speck of tomato	P. syringae pv tomato
Q	Bacterial spot of stone fruits	X. campestris pv pruni
B	Bacterial spot of tomato and pepper	X. campestris pv vesicatoria
C	Bacterial wilt of alfalfa	C. michiganense pv insidiosum
C	Bacterial wilt of lettuce	X. campestris pv vitians
C	Bark canker of walnut	E. nigrifluens
C	Black chaff of barley	X. campestris pv translucens
B	Black rot of crucifers	X. campestris pv campestris
C	Black spot of delphinium	P. syringae pv delphinii
C	Black streak/blight of beets	P. syringae pv aptata
C	Brown rot of Cypripedium orchids	E. cypripedii
C	Cane gall of brambles	A. rubi
C	Carnation bacterial wilt	P. caryophylli
C	Citrus blast	P. syringae pv syringae
A	Citrus canker	X. campestris pv citri
Q	Common blight of bean	X. campestris pv phaseoli
C	Crown gall	A. tumefaciens
C	Drippy nut disease of live oak	E. quercina
C	Fasciation	C. fascians
C	Fireblight	E. amylovora
B	Fuscous blight of bean	X. campestris pv phaseoli (fuscans)
C	Gladiolus scab	P. marginata

C	Hairy root	A. rhizogenes
B	Halo blight of bean	P. syringae pv phaseolicola
C	Halo blight of oats	P. syringae pv coronafaciens
C	Leaf rot of dieffenbachia	E. chrysanthemi pv dieffenbachiae
C	Leaf spot and leaf rot of philodendron	E. chrysanthemi pv philodendri
C	Leaf spot of begonia	X. campestris pv begoniae
C	Loquat canker	P. syringae pv eriobotryae
C	Marginal blight of lettuce	P. marginalis
C	Olive knot, oleander knot	P. syringae pv savastanoi
C	Phloem canker of walnut	E. rubrifaciens
C	Potato black leg, soft rot	E. carotovora pv atroseptica
B	Ring rot of potato	C. michiganense pv sepidonicum
C	Soft rot	E. carotovora pv carotovora
Q	Southern wilt, bacterial wilt	P. solanacearum
C	Stalk rot of corn	E. chrysanthemi pv zeae
C	Walnut blight	X. campestris pv juglandis
C	Wetwood disease of elm	E. nimipressuralis

STATE OF CALIFORNIA
DEPARTMENT OF FOOD AND AGRICULTURE
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JANUARY 1, 1985

PEST RATING LIST - PLANT PATHOGENS: BACTERIA

"A" - An organism of known economic importance subject to state (or commissioner when acting as a state agent) enforced action involving eradication, quarantine regulation, containment, rejection, or other holding action.

Xanthomonas campestris pv *citri*	Citrus canker

"B" - An organism of known economic importance subject to eradication, control or other holding action at the discretion of the individual county agricultural commissioner, *or* subject to state endorsed holding action and eradication only when found in a nursery.

Corynebacterium michiganense pv. *michiganense*	Bacterial canker of tomato
Corynebacterium michiganense pv. *sepidonicum*	Ring rot of potato
Pseudomonas syringae pv. *lachrymans*	Angular leafspot of cucurbits
Pseudomonas syringae pv. *phaseolicola*	Halo blight of bean
Xanthomonas campestris pv. *campestris*	Black rot of crucifers
Xanthomonas campestris pv. *malvacearum*	Angular leaf spot of cotton
Xanthomonas campestris pv. *phaseoli* (fuscans)	Fuscous blight of bean
Xanthomonas campestris pv. *vesicatoria*	Bacterial spot of tomato and pepper