What's Cropping Up?

A NEWSLETTER FOR NEW YORK FIELD CROPS & SOILS

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Potato Leafhopper: Will They Return in Mass in 1998?

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Predicting the arrival of migratory insects is a difficult task. Successful migration as observed with potato leafhopper in 1997 requires a timely development of large spring insect populations in the southern United States and the occurrence of large active weather fronts capable of transporting the insects a long distance in a relative short period of time. During the course of a spring (April-May), at least one storm front per week moves across the U.S. which is capable of moving potato leafhopper into New York from the southern spring breeding grounds. However, potato leafhoppers are not present in every storm front. The key to predicting potato leafhopper migration is to develop an understanding of the factors influencing spring population buildup in the southern US during March-May and to identify the environmental cues used by migratory leafhoppers to select the storm front used for long-ranged transport. Active research efforts are focused on these two areas.

In 10 of the last 12 years, potato leafhopper has arrived in New York either in the last week of May or the first week of June. In 1997, potato leafhopper arrived during the first week of June. In most years, the intensity of the leafhopper migration is light to moderate and economic injury does not start to occur until early July; after at least one local generation has been completed. In 1997, a very heavy migration arrived during a short period of time and economic damage started occurring almost immediately. Surprises similar to the potato leafhopper arrival in 1997 can be prevented with a few simple field sampling procedures.

Since potato leafhopper arrives after first harvest, sampling for potato leafhopper should begin when the regrowth from 1st cutting is 3-4 inches tall. The presence and population levels of potato leafhopper in an alfalfa field are monitored using a 15 inch insect sweep net. Sampling procedures for potato leafhopper in alfalfa are listed in "1998 Cornell Recommends for Integrated Field Crop Management" (pg. 59-61). Early detection of leafhopper populations is essential since young regrowth is more sensitive to leafhopper injury than older regrowth. This increased sensitivity of young regrowth is reflected in the lower treatment thresholds. In most years, new seedings are the most sensitive to losses from leafhoppers. However, all alfalfa fields should be monitored because each year individual established fields suffer economic losses from leafhoppers.

Leafhopper injury and the associated yellowing of the alfalfa leaves is caused by the injection of a salivary toxin by the leafhopper. The presence of the toxin in the leaves indirectly causes the shutdown of plant photosynthesis resulting in both yield and quality losses. The yellowing of alfalfa in July and early August is often misdiagnosed as "drought" and ignored by producers. Economic potato leafhopper populations need to be managed before yellowing is detected in the field. Once yellowing of alfalfa foliage is observed, yield and quality of the forage has already been impacted. Management of potato leafhopper is essential in the production of high quality forage.

As a general rule, fields with young regrowth are usually the fields which exceed the treatment threshold and need to be treated with insecticide. On the infrequent occasion where a field nearing harvest exceeds treatment threshold, leafhopper populations can be controlled utilizing an early harvest. Several effective, inexpensive insecticides are available to control leafhoppers. Please refer to "1998 Cornell Recommends for Integrated Field Crop Management" (pg. 60) for the current recommended insecticides.

Crop Management

Grass Management for Lactating Cows II. Forage Quality

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Properly managed perennial grass can produce high quality grass for lactating dairy cows as well as improve the manure/nutrient management situation on most dairy farms. Grass species, varieties, cutting management, manure management, and commercial fertilizer treatments are among the factors being evaluated relating to grass quality for lactating dairy cows. Three feeding trials have been completed comparing low fiber grass, high fiber grass and alfalfa. This is a summary of our results to-date.

Fertilization and Harvest Management

Grass management for quality begins as soon as the grass begins growth, with application of 75 lbs of actual N/acre or an equivalent amount of manure, if possible (depends on form of the manure). Nitrogen fertilizer or manure should be applied as soon after subsequent harvests as possible (50 lbs actual N/acre or equivalent). Manure should be applied such that no manure ends up in the harvested forage. High forage potassium content is not a problem for lactating dairy cows, as it is for dry cows. We harvested grass between 50 and 60% NDF with four harvests per year. Optimum forage quality (55% NDF) occured in very early to early boot stage and is likely to occur the last week of May (earlier for early to medium maturity orchardgrass). This compares to 40% NDF in alfalfa (ideal) which may occur from late May to June 10 or so.

We found that regrowth should be harvested as soon as there is sufficient regrowth to justify a harvest. At this time, the NDF content will likely be between 50 and 60%. Second harvest may occur 30 to 35 days after 1st harvest, depending on available moisture. An early first harvest often resulted in an equal amount of dry matter yield in the second harvest as was obtained in the first harvest. We found little carryover of N from the previous application to permit regrowth (that is, N applied after lst cut will benefit 2nd cut regrowth, but will not benefit 3rd cut regrowth).

Forage Quality

Neither grass species nor varieties varied much in neutral detergent fiber (NDF) when compared at similar maturity stages. Nitrogen fertilization delayed maturity and tended to lower forage NDF if harvest date was not delayed. With recommended applications of nitrogen, crude protein (CP) content ranged between 16 and 20%. Recommended N applications will rarely result in nitrate accumulations dangerous to livestock. Nitrogen applications exceeding recommended levels will greatly increase the risk of unacceptable nitrate levels in forage. Timothy was consistently 1-2 percentage units lower in CP than other perennial grass species, when compared at similar maturity stages. While tall fescue has very good yield potential, the palatability of new varieties for high producing dairy cows has yet to be evaluated sufficiently. Recent results from a grass grazing experiment in Wisconsin indicated that tall fescue was less palatable than orchardgrass.

Feeding Grass

Grass forage can be used in balanced rations to yield similar milk production to high quality alfalfa. Several feeding trials in Ohio and New York state have supported this. A New York study involved feeding alfalfa and orchardgrass hay at two maturities to mid-lactation dairy cows (Table 1). Milk yield was actually higher with the mature orchardgrass ration compared to the alfalfa ration, due to higher dry matter intake and higher concentrate intake. Rations were balanced

(see FORAGE, page 7)

Table 1. Milk yield of balanced rations utilizing alfalfa, immature orchardgrass and mature orchardgrass hay fed to mid-lactation dairy cows.

	Alfalfa	Orchardgrass (immature)	Orchardgrass (mature)
NDF, % of DM	43	54	67
CP, % of DM	21	16	10
Lignin, % of DM	8	5	6
% of diet consisting of forage	57	46	37
Milk, lb/day	64	66	70

Update on Gray Leaf Spot of Corn

Disease Management

Gary C. Bergstrom
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Gray leaf spot has been the subject of two previous reports in What's Cropping Up? (Vol. 1, No. 4, 1991; and Vol. 6. No. 5, 1996). This fungus disease of corn, associated primarily with reduced tillage, continuous corn production, continues as a serious problem in areas of the central corn belt and Appalachian Mountain states . It remains a potential , but as yet unrealized , threat to corn production in certain areas of New York (especially river valleys in the Southern Tier and Hudson Valley regions). A national network of corn pathologists has studied this problem and published their most recent findings. The full text of this report, plus a feature article, a press release aimed at the general media, and high quality color pictures of the disease symptoms can be viewed and downloaded from the APSnet web site (http://www.scisoc.org/). I recommend that you check this out, at least to see the diagnostic photos. The following information is excerpted from the Technical Committee Report by P. E. Lipps, D. G. White, J. E. Ayers, and L. Dunkle.

Newest Findings:

1. The fungus may only complete a few cycles of secondary spread in a single growing season compared to the many cycles completed by most other corn leaf blight pathogens. If a tillage system leaves sufficient previously diseased corn residue on the soil surface, then enough spores may be available to produce severe levels of gray leaf spot. If a region has a large percentage of land in conservation tillage, corn in conventionally tilled fields or corn planted following soybeans may be damaged by gray leaf spot as a result of spores wind-blown from fields where conservation tillage is used. Corn debris in fields planted in soybeans also is an important, and sometimes unrecognized, source of spores.

2. There is no relationship between the increased incidence and/or severity of disease and use of any particular susceptible commercial hybrid. Most widely used corn hybrids over the past 20 years have a similar degree of susceptibility to gray leaf spot that may result in economic loss under conditions favorable for the disease. Only some recently available 'resistant' hybrids have a level of resistance sufficient to protect yield under conditions favorable for disease.

3. A national survey for the gray leaf spot fungus revealed the presence of two genetically distinct populations of the fungus (both types are present in New York). The good news is that resistant hybrids now being developed and tested across the country are resistant to both fungus types and over many locations.

Current Recommendations:

The Technical Committee on Corn Diseases recommends that growers continue to use conservation tillage methods wherever practical. At this point, unless environmental conditions are extremely favorable for gray leaf spot development, the economic and environmental advantages of this prac-

(see UPDATE, page 7)

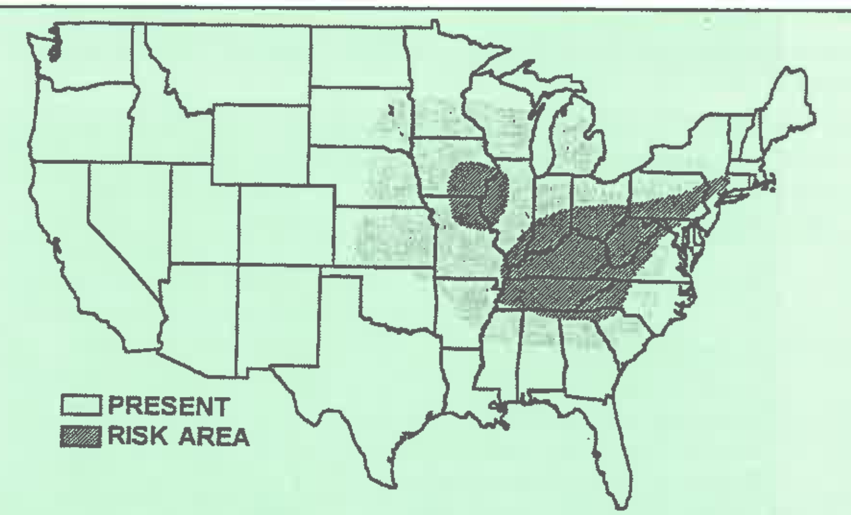

Figure 1. Current gray leaf spot distribution as determined by members of the Technical Committee on Corn Diseases. Risk areas were identified based on reactions of susceptible hybrids, severity of past epidemics, the likelihood of favorable environmental conditions and use of conservation tillage.

Crop Management

Economics of Narrow Row Corn Silage Production

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Considerable interest exists in New York for narrow row corn silage production. Some dairy producers report that 15 compared with 30-in. row spacing increases corn silage yields by up to 3 tons/acre. Nevertheless, corn silage producers, who need to purchase a new corn planter and forage harvester, must invest greater initial capital costs for narrow row equipment. Let's examine the economics of narrow row corn silage production with a partial budget analysis to determine what silage yield responses on how many acres must be obtained to realize a profit from the investment on narrow row equipment.

Greater initial capital costs for 15 compared with a 30-in. corn planter and forage harvester results in greater subsequent annual fixed and repair costs (Tables 1 and 2). For example, the 15-row planter for 15-in. row spacing had greater annual fixed costs ($4874) and repair costs ($3.05/acre) than costs of the 8-row planter for 30-in. row spacing ($3227 and $2.08/acre, respectively). Likewise, the 7-row self-propelled forage harvester with a rotary head for 15-in. row spacing had greater annual fixed costs ($23,592) and repair costs for corn silage ($7.32/acre) and perennial forage harvest ($7.32/acre) than costs of a 4-row self-propelled forage harvester for 30-in. row spacing ($20,187, $6.15/acre, and $5.47/acre, respectively).

Table 3 lists the added income (for 1, 2, and 3 ton/acre yield responses at $23.50/ton), added costs, and

Table 1. Annual ownership and operating costs for 6-row (30 in.), 11-row (15 in.), 8-row (30 in.), and 15-row (15 in.) planters on 200, 400, and 800 acre farms.

	200 and 400 Acre		800 Acre	
COSTS	6-Row	11-Row	8-Row	15-Row
	$			
Initial Capital Cost†	22,950	31,170	26,550	38,970
Depreciation and Interest (5%)	2790	3862	3227	4737
Insurance (0.7%)	80	111	93	136
Total Annual Fixed Costs	2870	3973	3320	4874
Field Capacity (hr/acre)	0.19	0.19	0.14	0.14
Repair Cost/hour	12.75	17.65	14.75	21.64
Repair Cost/acre	2.40	3.32	2.08	3.05

† John Deere (Model 1750) for 30-in. rows and John Deere (Model 1780) for 15-in. rows.

Table 2. Annual ownership and operating costs for 4-row (30 in.), 7-row (15 in.), 6-row (30 in.), and 11-row (15 in.) self-propelled forage harvesters on 200, 400, and 800 acre farms.

	200 and 400 Acre		800 Acre	
COSTS	4-Row	7-Row	6-Row	11-Row
	$			
Initial Capital Cost†	149,400	174,600	182,250	199,350
Depreciation and Interest (5%)	19664	22981	23988	26239
Insurance (0.7%)	523	611	638	698
Total Annual Fixed Costs	20187	23592	24626	26936
Field Capacity (hr/acre)	0.31	0.31	0.31	0.31
Repair Cost/hour - corn silage	19.56	23.28	23.94	26.58
Repair Cost/acre - corn silage	6.15	7.32	7.52	8.35
Repair Cost/hour - alfalfa hay	17.40	23.28	20.70	26.58
Repair Cost/acre - alfalfa hay	5.47	7.32	6.51	8.35

† John Deere (Model 6610) with a 4-row corn head and 7 ft. windrow unit, and John Deere (Model 6810) with a 6-row corn head and 7 ft. windrow unit for 30-in. rows. John Deere (Model 6610) and John Deere (Model 6810) with a 5 ft. rotary head for 15-in. rows.

the expected change in net farm income for the conversion from 30 to 15-in. row spacing on farms that produce 200, 400, and 800 acres of corn silage. For a 200-acre corn silage producer, who would have to invest about $205,000 for 15-in. equipment ($31,170 for a corn planter and $174,600 for a forage harvester), even a 3 ton yield advantage for 15-in. compared with 30-in. rows would result in an expected change in net farm income of only $8704, a 4.2% annual return on the original investment. Obviously, the 200-acre corn silage producer could realize a more profitable return by investing $205,000 in other endeavors.

The 400-acre corn silage producer, who would also invest about $205,000 for 15-in. equipment (assuming the producer would opt for the smaller-size equipment complement), would realize an expected change in net farm income of $21,916, about a 10.5% annual return on the original investment, with a 3-ton yield response. A yield advantage of 2 tons/acre would result in an expected change of $12,516, a 6.1% annual return, which probably is not sufficient to justify the $205,000 investment.

The 800-acre corn silage producer, however, who would invest about $238,000 for narrow-row equipment, would realize an expected change in net farm income of $30,424, about a 13% annual return, with a 2 ton/acre yield response. Obviously, economy of scale strongly influences the economics of narrow row corn silage production.

Our partial budget analyses indicate that dairy farmers would probably need to produce about 400 acres or more of corn silage before considering an investment in narrow row equipment. Likewise, dairy producers must average a 2 to 3-ton yield advantage for 15 compared with 30-in. row spacing to realize a significant return on the equipment investment. Our partial budget analyses did not include additional seed or N costs for narrow row production because our research has shown that corn silage responds similarly to plant populations or N rates at 15 and 30-in. row spacing. If narrow row corn silage producers planted and fertilized at higher rates, expected changes in net farm incomes would be less than what is presented in this article.

Table 3. Partial budget analyses for farms that produced 200, 400, and 800 acres of corn silage based on mean corn silage price ($23.50) in New York from 1994 to 1996, the added fixed (ownership) and variable (operating) costs of a new planter and forage harvester, and additional silage production at 15 vs. 30-in. row spacing.

Added Costs/Income	200 Acre	400 Acre	800 Acre
	---------------------	$/year	---------------------
Added Income (1 ton/acre)	4700	9400	18800
(2 tons/acre)	9400	18800	37600
(3 tons/acre)	14100	28200	56400
Added Fixed Costs			
Planter	1103	1103	1554
Harvester	3405	3405	2310
Added Variable Costs			
Planter-Repairs & Maintenance	184	368	776
Harvester - Repairs & Maintenance			
Corn Silage	234	468	664
Perennial Forage	370	740	1472
Hauling	100	200	400
Added Total Costs	5396	6284	7176
Expected Change in Net Farm Income			
(1 ton/acre)	-696	3116	11624
(2 tons/acre)	4004	12516	30424
(3 tons/acre)	8704	21916	49224

WEED CONTROL

Postemergence Yellow Nutsedge Control in Roundup Ready Soybeans

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The introduction of Roundup Ready® soybeans in 1996 immediately raised questions about yellow nutsedge control with up to 2 qt/A of Roundup Ultra (the maximum application rate allowed). These questions surfaced because the Roundup Ultra label suggests that 3 qt/A is needed for control of this perennial weed.

MPO and LPO Compared

A field experiment was conducted in Columbia County in 1997 to compare mid and late postemergence (MPO and LPO) applications of Basagran, the standard for postemergence nutsedge control in soybeans, with Classic and Roundup Ultra alone and in combination. Soybeans 'Pioneer 9294' were planted in 14-inch rows on June 5. A preemergence application of 2 pt/A of Prowl plus 0.5 lb/A of Sencor DF was made to the entire plot area for annual weed control.

MPO and LPO treatments were applied 22 and 33 days after planting when nutsedge was 7 and 13 inches tall respectively and under severe drought stress. Treatments included 1 qt/A of Basagran, 0.75 oz/A of Classic, 2 qt/A of Roundup Ultra, and a combination treatment of 2 qt/A Roundup Ultra plus 0.37 oz/A of Classic. There was also a MPO application of 1 qt/A of Basagran followed by a sequential LPO application of 1 qt/A of Basagran. All treatments were made in 22 gallons/A of spray solution with 1% (v/v) of crop-oil concentrate.

Control Ratings

Time of application had a significant effect on late season (September 4) nutsedge control ratings. Control with MPO applications averaged 83% while control with LPO treatments averaged 71% respectively (Table 1). Sequential MPO and LPO applications of 1 qt/A of Basagran provided 99% nutsedge control at this time. There were no differences in nutsedge control among the MPO applications of Basagran, Classic, Roundup Ultra, and the combination treatment of Roundup Ultra plus Classic.

Yields

Favorable rainfall in August resulted in surprisingly good soybeans yields. When averaged over herbicide treatments, yields were 55 and 43 Bu/A for MPO and LPO treatments respectively and there were no significant differences among the MPO treatments. Yield from the sequential MPO plus LPO Basagran treatments was 59 Bu/A compared with 35 Bu/A from the untreated check.

Although these preliminary results suggest that yellow nutsedge control may be adequate with Roundup Ultra applications as low as 2 qt/A, additional research is underway to confirm these favorable results.

Table 1. Late-season yellow nutsedge control ratings and soybean yields following mid and late postemergence herbicide applications in Roundup Ready soybeans in 1997.

		Nutsedge Control (%)		Soybean Yields (Bu/A)	
Herbicides*	Amt/A	MPO	LPO	MPO	LPO
Basagran	1.0 qt	77	41	54	40
Classic	.75 oz	86	86	50	39
Roundup Ultra	2.0 qt	84	77	57	49
Roundup Ultra	2.0 qt				
+ Classic	.37 oz	85	80	58	45
LSD (0.05)		24	24	8	8

* All treatments included 1% (v/v) of crop-oil concentrate.

(FORAGE, from page 2)

for fiber, protein and energy such that similar milk yields were expected from all rations.

A second feeding trial involved 60 Holstein cows in mid-lactation fed diets containing alfalfa-corn silage, immature orchardgrass-corn silage, or mature orchardgrass-corn silage as the forage source. All forages had been ensiled. Forages comprised 53, 47 and 44% of the total diet dry matter for alfalfa, immature and mature orchardgrass, respectively, with resulting milk production of 77, 86, and 73 lb/day.

A third feeding trial involved 50 early-lactation Holstein cows fed immature or mature orchardgrass silage in balanced rations. The immature orchardgrass silage ration produced 77 lb milk/day compared to 68 lb milk/day for the mature orchardgrass silage ration. Quality of orchardgrass silage affected DM intake, which subsequently affected milk production. Grass is a slightly higher quality source of protein than alfalfa protein, resulting in less total protein required in the diet with grass compared to alfalfa. That is, alfalfa at 20% CP has the protein equivalent of grass at 19% CP.

Summary

If perennial grass is managed for production of high quality forage, milk production similar to that found using alfalfa forage, can be achieved. Good grass haylage however, tends to be more difficult to make than good alfalfa haylage. High quality grass, in general, requires a higher level of management than does alfalfa. Intensive, aggressive perennial grass management and feeding is essential for economic survival on dairy farms with soils not suited to alfalfa production. Future dairy feeding trials are planned comparing tall fescue to alfalfa and other grasses.

(UPDATE, from page 3)

tice clearly outweigh the risk of loss due to the disease. Growers should consider improving crop rotations in their farming system. A one or two year rotation away from corn would help reduce spore levels of the gray leaf spot fungus. Growers should select the newer gray leaf spot resistant hybrids for use in fields where the potential for gray leaf spot is high. Good progress has been made by seed corn companies in developing hybrids with improved resistance to gray leaf spot. Selection should be based on yield potential and standability under gray leaf spot pressure. Fields should be monitored throughout the growing season for disease development and harvested early if high amounts of disease develop during grain fill. The economic benefit of controlling the disease with fungicides in grain production fields is marginal except in high risk areas with significant yield losses each year.

Calendar of Events

June 24	Seedgrowers' Field Day, Ithaca, NY
June 28 - July 1	Northeastern Branch ASA Annual Meeting, Amherst, MA
July 8-12	Northeastern Division, American Phytopathological Society, Burlington, VT
July 10	Aurora Field Day, Musgrave Research Farm, Aurora, NY
July 14	Weed Science Field Day, Musgrave Research Farm, Aurora, NY
July 15	Weed Science Field Day, Thompson Research Farm, Freeville, NY
October 18-22	ASA, CSSA, SSSA Annual Meetings, Baltimore, MD
November 8-12	Joint Meeting of American Phytopathological Society and Entomology Society of America, Las Vegas, NV
January 4-7	Northeastern Weed Science Society Annual Meeting, Cambridge, MA

What's Cropping Up? is a bimonthly newsletter distributed by the Department of Soil, Crop and Atmospheric Sciences at Cornell University. The purpose of the newsletter is to provide timely information on field crop production and environmental issues as it relates to New York agriculture. Articles are regularly contributed by the following Departments at Cornell University: Soil, Crop and Atmospheric Sciences, Plant Breeding, Plant Pathology, and Entomology. **To subscribe, send a check for $8.00 along with the form at the right.**

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