What's Cropping Up?

A NEWSLETTER FOR NEW YORK FIELD CROPS & SOILS VOLUME 1, NUMBER 3, 1991

Management of Potato Leafhopper for Maximum Forage Quality

Elson Shields
Department of Entomology

Potato Leafhopper

Current emphasis on high quality alfalfa forage production has made many growers and agricultural consultants aware of the economic importance of potato leafhopper (PLH) on forage quality/yield and a focus for Integrated Crop Management programs on alfalfa during the second and third cuttings.

Damage and Economic Loss

All life stages of PLH use their piercing-sucking mouthparts to extract juices from host plants. During feeding, PLH secrete a salivary toxin into the plant tissue disrupting the plant's physiology resulting in a wedge-shaped yellow (sometimes reddish) area at the leaf tip. This discoloration is often referred to as "hopper burn." As increased damage occurs, yellowing spreads over the entire leaf and plant growth is stunted. A field of damaged plants takes on a yellowish coloration. PLH feeding damage may result in losses of several types.

1) Plant Quality/Yield Losses. Protein reduction from PLH feeding damage is the most serious impact. The salivary toxin injected by the PLH during feeding causes the plant to produce less protein and more sugars, resulting in a major loss of nutritional value to livestock.

2) Plant Vigor. PLH feeding damage drains alfalfa of its vigor, resulting in serious carryover effects as observed in: a) Slow regrowth following harvest; b) Winter kill and stand loss, caused by plants entering dormancy in a weakened condition; c) Loss of yield the following season.

Preventing Losses from PLH

To successfully avoid PLH losses, it is important to detect a leafhopper problem as early as possible. Loss occurs quickly on young regrowth before visible symptoms appear. Once symptoms are visible, further damage can be prevented but loss which has already occurred cannot be recovered. The need for PLH control in alfalfa is based on the PLH population and the height of the alfalfa. Sweep samples are taken to estimate the PLH population and stem samples are taken to estimate plant height. Damaging PLH populations are detected by sampling the field with a standard 15-inch diameter insect sweep net. (Insect sweep nets can be obtained through Ward's Natural Science, 5100 W. Henrieta Rd., P. O. Box 92912, Rochester, NY 14692-9012 (716)-359-2502. Order Heavy Duty Beating Net, Catalog #10 W 0560, $35 each). Estimates of the populations are made by sampling a number of sites throughout the entire field and counting the number of PLH captured in the sweep net at each location.

Recent research at Cornell University has shown the 10-field site using 10 sweeps/site sampling regime to be the most precise and time efficient due to increased counting accuracy and decreased counting time per field site. (See Cornell Ext. Fact Sheet 500.00).

Field sampling should begin shortly after first cutting has been removed. When sampling each site within a field, use the Pendulum Sweeping Method, in which the net is used like a pendulum sweeping down into the alfalfa in a side-to-side fashion as you walk. In each sample, count adult and nymph PLH and determine the average number per sweep of the net. Estimate alfalfa crop height by measuring 5 stems at each location. To prevent a biased sample of alfalfa stems, look away while selecting stems.

(See LEAFHOPPER, page 7)

Table 1. Ranking of potato leafhopper materials based on effectiveness and cost.

	Rate (lb A1/ac)	Efficacy Ranking	Pre-Harvest Interval	Approx. Cost/Acre	Overall Ranking
Ambush™	0.1	Fair	0 days	$5.00	3
Cygon™	0.5	Excellent	10 days	$4.50	1
Furadan™	0.25	Fair	7 days	$4.40	4
	0.5	Excellent	14 days	$8.80	5
Lorsban™	0.5	Excellent	14 days	$5.20	2
Penncap M™	0.5	Excellent	15 days	$5.45	2

SOIL FERTILITY

Using Organic Nitrogen to Reduce Fertilizer Input

Stu Klausner
Department of Soil, Crop and Atmospheric Sciences

Background

Nitrogen (N) comes in many forms but for all practical purposes it falls into two main categories: fertilizer N which is readily available to plants, and organic N which becomes slowly available over years. Soil organic matter, animal manure and green manure (sod crops) contain appreciable amounts of organic N. Recycling of this N makes good sense from an economic and environmental standpoint.

Organic N must be mineralized (decomposed) by microorganisms to ammonium or nitrate before it can be used by crops. The amount and rate at which N becomes available depend on the quantity and age of the organic N, temperature, moisture, and soil properties. The amount of N released is variable, but a conservative estimate of availability, determined from research, allows agronomists to make a reliable recommendation.

Most growers are confident in the yield response obtained from fertilizer N, but many are reluctant to rely heavily on organic sources. As a consequence, N may be over applied as insurance against a deficiency. Fertilizer N should be applied at a rate to maximize profit and minimize loss to surface or groundwater. The economic rate of application depends on the amount of available soil N.

Economic Value

The Table to the right shows the economic rate of N fertilization for several corn production systems, and emphasizes the importance of organic N as a substitute for fertilizer. The requirement for fertilizer N decreased as the use of manure and sod crops in the rotation increased. An economic rate of 145 to 160 pounds per acre at a cost of about $35 is typical for continuous corn grown on very productive soils without manure (trials 1 and 2). The fertilizer N requirement in trials 3 and 4, as compared to continuous corn, was reduced by 50% for a single application of manure to 75% when manure was applied annually for 6 years. Fertilizer savings were $18 to $26 per acre due to N contributed from organic N in manure.

The economic fertilizer N rate for the first year of corn following a grass or legume sod was 20 to 45 pounds per acre (trials 5 to 7), or about 15 to 30% of the amount needed for continuous corn without manure. The fertilizer requirement for the second year of corn following alfalfa (trial 8) was only 60 pounds, because N was still being supplied from residual organic N in the alfalfa plowed down two years ago. Trial 9 typifies most dairy farms where N is contributed from both animal and green manure, and the fertilizer N requirement was minimal.

Management

Timing and placement of N effect how efficiently it is used by crops. Corn will use fertilizer N more effectively if 10-30 pounds of the requirement is applied in the starter fertilizer at planting, and the remainder sidedressed, rather than applied as a preplant application.

We are currently evaluating the usefulness of a new N soil test for corn (see *What's Cropping Up?*, Vol.1 No.1) in hopes of further improving our estimates of organic N availability. In the absence of a reliable soil test, the accuracy of our fertilizer N recommendation depends on your knowledge of the amount of manure applied, and the history of the previous sod crop. Accuracy will improve if the manure is analyzed to determine its N content. Contact your Cooperative Extension Agent if you need help.

A detailed discussion of the availability of N from organic sources is explained in the *Field Crops and Soils Handbook*. A copy can be obtained from your Cooperative Extension Office.

Fertilizer N requirement and cost for several corn production systems

Trial No.	Cropping Practice	Economic N rate	Cost of N
	Continuous corn	lb/ac	$/ac
1.	no manure	160	37
2.	no manure	145	33
3.	manure (for 1 yr.)	75	17
4.	manure (for 6 yrs.)	40	9
	Corn in rotation		
5.	1st yr. after timothy	30	7
6.	1st yr. after alfalfa	45	10
7.	1st yr. after alfalfa	20	5
8.	2nd yr. after alfalfa	60	14
9.	2nd yr. after alfalfa + manure (for 50+yrs)	0	0

Alfalfa Harvest Management

CROP MANAGEMENT

Jerry Cherney
Department of Soil, Crop and Atmospheric Sciences

Alfalfa and alfalfa/grass harvest management has been a controversial topic for many years. The timing of the first cut of the season, the number of cuts per season, and the timing of the last cut in the fall have been the subject of numerous research studies in most alfalfa-growing states. Harvest management recommendations may be based on calendar date, a fixed regrowth interval, or on the maturity stage of the plant.

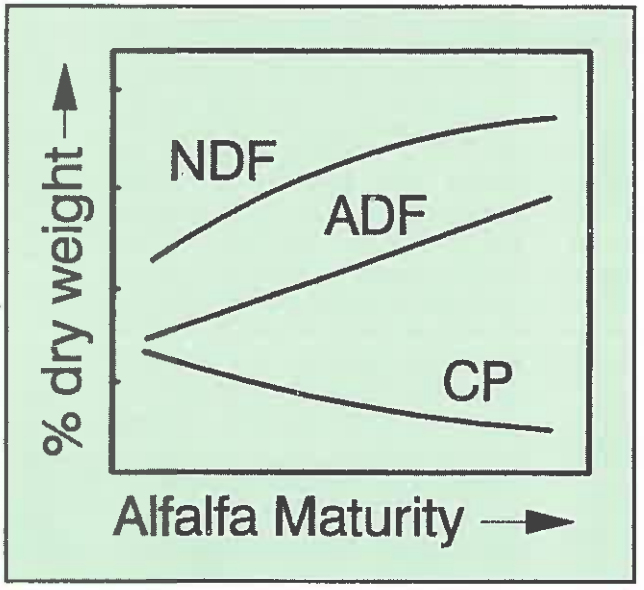
Forage Quality vs. Stand Persistence

Although breeding for forage quality is just beginning, considerable improvement has been made in breeding for improved resistance to the many diseases which shorten the life of an alfalfa stand. Today's alfalfa variety is capable of withstanding a more demanding cutting management than older varieties. Although harvest management in the past has stressed stand persistence, it is now time to consider forage quality first if the forage is being fed to high-producing dairy cows.

Forage Quality and Plant Maturity

High-producing dairy cows are very susceptible to digestive disorders. Higher than optimum forage fiber levels require expensive supplementation. Below optimum fiber levels can result in rumen dysfunction. Plant maturity is the most important factor affecting forage fiber.

The three major chemical components of forages used most frequently in evaluating quality are neutral detergent fiber (NDF), acid detergent fiber (ADF), and crude protein (CP). A very predictable relationship is found between these components and plant maturity (Figure 1). Currently, a value of 40% NDF (dry weight basis) is considered the optimum fiber level in alfalfa. This generally corresponds closely to a value of 30% for ADF. At this stage, CP will be above 20%.



Seeding Year Management

The primary goal of seeding year management is to establish the desirable forage species. A secondary goal for the seeding year is to maximize yield of high quality forage. For clear seedings of alfalfa or alfalfa-grass, the first harvest should be made at a flowering stage (generally 8 to 10 weeks after emergence) to promote plant vigor. Depending on the year, one or two more harvests may be possible, taken at a flowering stage to encourage plant establishment. It may be advisable to avoid cutting alfalfa during the critical period between September 1 and October 15 to allow for accumulation of root reserves for the winter. Recent research in a number of states, however, has found that cutting during this critical period was not always detrimental.

If a small grain or small grain/field pea mixture is used as a companion crop for alfalfa, it should be harvested no later than at head emergence stage of the small grain. This will result in forage of sufficiently high quality for dairy cattle, and will minimize the threat to the new seeding.

The use of the term "nurse crop" should be discouraged, since it implies that a small grain crop helps alfalfa. Quite the contrary, the small grain tries its best to smother alfalfa, just as a crop of weeds would, only the small grain is generally less successful. The term "companion crop" is more appropriate.

After the Seeding Year

First cutting of an established alfalfa stand ideally should be taken at approximately 40% NDF. In New York, this generally will be in late May, depending on the year. Consider taking a forage quality sample in mid-May, to help judge how the season is progressing. Harvest scheduling should be based on alfalfa and not on any grass growing with it. Subsequent regrowth cuttings also should be made at 40% NDF. In New York, this management scheme may mean two or four cuttings per season, depending on the environment.

Consider sacrificing some persistence and yield in order to produce a high quality feed. ■

WEED CONTROL

Cultivation: It Has a Place in Corn Weed Management

Jane Mt. Pleasant
Department of Soil, Crop and Atmospheric Sciences

Before the widespread use of herbicides in corn, weeds were controlled primarily through cultivation. Effective weed control often required as many as three or four trips across the field. Controlling weeds in the row was particularly difficult and timeliness was critical for successful control. The use of herbicides in corn has provided tremendous savings in labor and time for New York farmers.

But concern over environmental risks associated with herbicides and increased regulation of herbicides have caused many growers to reevaluate cultivation. Despite labor and time costs, cultivation can be an effective and advantageous weed control practice. For example, weeds that escape preemergence herbicides can be removed with cultivation, eliminating the need for expensive post emergence application. Cultivation often has beneficial effects on soil properties. Cultivating crusted soils may increase water infiltration and lead to increased corn yields.

Integrating Mechanical and Chemical Weed Control

Recent research suggests some options for integrating mechanical and chemical weed control in ways that highlight the advantages of cultivation and minimize its drawbacks.

Band Application Plus Cultivation

A 10- to 12-inch band of herbicide, applied over the corn row at planting, can be combined with one or two cultivations to provide effective weed control (Table 1). Timeliness of cultivation is not as critical with this practice because the banded herbicide provides a weed-free zone around the young corn plants. If the field is wet or labor is short, cultivation can be delayed without hurting corn yields. This weed control strategy reduces herbicide use by two thirds, but requires only one or two cultivations. Cost of this treatment is similar to broadcast herbicide without cultivation. Another advantage of this strategy is that it may be combined with interseeding a cover crop in corn. A number of forage species (ryegrass, red clover, white clover, hairy vetch) can be successfully seeded at cultivation to provide substantial cover after corn harvest. Banding the herbicide eliminates the problem of herbicide compatibility with interseeded species.

Broadcast Herbicide Plus Cultivation

Broadcast preemergence applications may be followed by cultivation in order to remove weeds that escaped chemical control. Cultivation can be performed while sidedressing nitrogen, eliminating the need for an additional trip through the field.This cultivation can also break up crusted soils, providing better growing conditions for corn. In 1989 at the Aurora Research Farm, broadcast herbicide plus cultivation increased corn yields by 14 bu/A over broadcast herbicide alone, although weed levels were not different in the two treatments (Table 1). In 1990 this 'cultivation effect' was not observed, but weed levels were lower in the broadcast plus cultivation treatment because cultivation removed hedge bindweed, a species not controlled by the herbicide.

Summary

1. Band application of herbicide plus cultivation provides acceptable weed control while reducing herbicide use by 65%. It offers a good compromise between chemical and mechanical weed control.
2. Cultivation after broadcast preemergence applications can control escaped weeds and break up crusted soils.
3. If cultivation is your major weed control tool:
   - timeliness is essential;
   - two to four cultivations will probably be required for good control;
   - controlling weeds in the row may require additional equipment such as a rotary hoe.

Table 1. Corn grain yield, population and weed cover under four weed control treatments at the Aurora Research Farm, 1989-1990.

Weed Control Treatment	Yield bu/A 15%	Population Plants/A	Weed Cover %
	1989		
Broadcast Herbicide*	122	25,269	8
Broadcast Herb. + Cultiv.** (1x)	136	24,641	7
Cultivation (2x)	124	23,517	21
Band Herb. + Cultiv. (2x)	129	24,641	4
	1990		
Broadcast Herbicide	121	23,991	25
Broadcast Herb. + Cultiv. (1x)	108	23,610	5
Cultivation (2x)	125	24,829	36
Band Herb. + Cultiv. (2x)	117	24,802	10

* Herbicide application consisted of Atrazine (1.0 qt/A) plus Prowl (1.5 qt/A)
** A row crop cultivator was used for the cultivation treatments.

What Caused the Skips?

CROP MANAGEMENT

Bill Pardee
Plant Breeding and Biometry

Do you have skips in your corn rows? Was it bugs, birds, borers or bad luck? Usually, it's easy to find out, with the aid of a shovel. Here are some tips for troubleshooting. Some detective work now may identify a problem you can correct next year.

First, scan the pattern of damage in the field. If sections of rows are missing, then suspect planter problem. Or, suppose whole sections in the field didn't come up. Are these in wet spots, where seedlings drowned? Or, are they on knolls that dried out? Were these spots cloddier at planting time? Were there other differences you can recall?

How about those missing plants? One here, two over there. Most every field shows a few skips. Some have too many. Usually, you can identify the problem by digging up seeds. Some symptoms are giveaways.

Suppose you find the following:

- *Ungerminated seeds are normal and not swollen.* You may find these in dry soils and in dry springs. These kernels can still germinate if they get rain. But they will make late plants.

- *The kernels are swollen and have soaked up water.* They are not rotten and some show a sprout. Probably, it's been too cold or too wet. Chances are they will come on when the soil gets warmer. Some hybrids germinate better in cold soils and may be preferred for early planting.

- *Some kernels are swollen, water soaked, and rotten.* These seeds may have been dead to begin with. You will always have a few seeds that do not germinate, since no seed lot germinates 100%.

  The seed is easy to blame, and normally it's the first target. But I've looked at hundreds of problem corn stands. Only once did I find a problem due to dead seed, and that was where a farmer had planted a seed he'd had in the barn for three years. A few swollen, ungerminated seeds are normal. Unless you find lots of them, they are not your real problem.

- *Are the kernels hollowed out?* This is a common finding these days. Seed corn maggots are probably guilty. Wireworms are also suspect if the crop follows a plowed sod. Consider using a planter box insecticide next year.

- *Are plants up but cut off at ground level?* Probably, cutworms are to blame. Dig around the base of the plants and look for the worms. Cutworms are 1-2 inches long, smooth and dull colored, and they will curl up when you uncover them. They hide in the soil during the day and come out at night to feed at the base of corn plants. Treatment may pay if 5% or more of seedlings are cut, and worms are still small, 1/2 inch long or less.

- *Plants are pulled up, and the kernels are gone.* Birds are the likely culprits. They pull up the plants to get the seeds. Usually, this happens right after seedlings emerge, before roots develop enough to anchor the plant. Birds can thin a stand badly, particularly if your field is near a woods, or in a flyway. Not much you can do once you see the damage.

- *Seeds are dug up and partially eaten.* The germs of the seed are eaten out. This is rodents, probably mice. These will go right down in a row, and can really clean an area. Damage is most severe near fencerows or other shelter. About all yo can do is replant if loss is severe.

- *Plants came up, but are not growing well.* Seedling roots are short, gnarled, and may look burned. Sounds like fertilizer burn. This can happen if you put over 80 pounds total of nitrate and potash (both are salts) through your planter. Or, your fertilizer placement may be out of line, so that your fertilizer is going right under your seed. This is most often seen when dry weather follows planting. Hope for rain this spring and plan to change your fertilizer rate or placement next year.

- *Leaves opened underground and did not emerge.* Seed was planted too deep, soil was crusted, or the soil was cloddy permitting light to filter down to the seed. Rotary hoes make good tools for breaking up crusts, or freeing up plant leaves. In severe cases replanting may be needed.

Should you replant given any of the above? You will need to decide this on a field-by-field basis. Make stand counts before you decide. If you have over 16,000 plants per acre, you should probably keep your stand.

Remember: Your existing plants have good root systems, and a big head start over corn you might replant. The earlier planted corn will out-yield late planted corn on a plant-for-plant basis. Do not replant unless your stand is badly thinned.

SOIL FERTILITY

Zinc Deficiency In Corn

Shaw Reid
Department of Soil, Crop and Atmospheric Sciences

Zinc (Zn) deficiency symptoms are commonly observed at the 4 to 6 leaf stage of corn grown in New York. Zn deficiency is most common on soils limed to pH >6. The deficiency also occurs on the high lime and high pH muck soils. The probability of a deficiency increases as the pH increases. The deficiency frequently occurs where the subsoil has been exposed or mixed with the surface soil such as severely eroded areas, near ditches or tile lines, or areas that have had very deep plowing. It also occurs on soils low in organic matter. Any soil condition such as a plow pan or fragipan that causes a restriction in root growth will increase the probability of Zn deficiency.

Zn Deficiency Symptoms

The symptoms of Zn deficiency in corn consist of yellow or white stripes parallel to the midrib of the leaf. Usually there are several narrow (about 1/8 inch wide) stripes but sometimes one single large (1/2 to 1 inch) wide stripe will occur (see photo). The area near the leaf tip may not show the deficiency symptoms. The symptoms occur during the spring when the soils are cold and root growth is slow. The plants slow or stop growing before or when the deficiency symptoms appear and do not resume normal growth until the soil warms. The Zn deficient plants are shorter than normal. Once the soils warm and root growth increases, the new leaves on the corn plant do not appear Zn deficient, but the older leaves retain the stripping until the leaves die.

Zn deficient symptoms on corn are usually as narrow stripes, but can be a broad band parallel to the midrib.

The Zn deficient plants tassel several days later than normal and this delays maturity. If frost kills the plant before maturity, Zn deficiency reduces the yields even more than normal. This delay in maturity is more important to the sweet corn grower than the field crops producer because all ears are not marketable at the same time.

Effects on Yield

The response to added Zn on a very Zn deficient area of Mt. Pleasant Research Farm, Tompkins County, New York varied from 5 to 30 bu/acre per year during 1979 to 1986. The yields on a nearby area, with a higher soil Zn level, have varied from 0 to 10 bu/acre for 1987 to 1990. In both areas, some plants had Zn deficiency symptoms each year. When the Zn deficiency symptoms appear on the corn leaves, yields are likely reduced.

Zn deficient symptoms on corn are usually as narrow stripes, but can be a broad band parallel to the midrib.

Correcting Zn Deficiency

On soils very low in soil test Zn, Zn deficiency was corrected by adding 10 lbs Zn/acre as zinc sulfate or zinc chelate and discing it into the surface. This one application has been sufficient for at least 8 years. The yield response to the added Zn was greater during the second year (1980) than in the year of application (1979), probably because the Zn became more thoroughly mixed with the entire soil surface.

Spraying the plants with either chelated zinc or zinc sulfate has not successfully corrected the Zn deficiency in any of several years; however, increases of 1 to 4 bushels have been obtained. Applying the Zn in the fertilizer band required about 4 years of Zn applications at 3 lbs Zn per acre per year to completely correct the Zn deficiency. When soil applied, the source of Zn is usually not important as long as the Zn is water soluble. For example, zinc sulfate was as effective as zinc chelate for soil applications.

Soil Test Zn

The Zn extracted by pH 4.8 Morgan's solution (the Cornell extractant) indicates the Zn is low for corn when the Zn value is below 0.5 #/A and high above 1.0 #/A. If the soil test Zn is below 0.5 and Zn deficiency symptoms have been observed, a yield response is likely to occur. Thus, the high rate (about 10 #/acre) of Zn applied broadcast and disced or plowed is the fastest way to correct the deficiency.

When the Zn deficiency conditions are not as likely to produce a large yield response, such as with a low to medium soil test Zn level and no plant deficiency symptoms, the Zn can be applied in the fertilizer band at rates of 1 to 3 #/A per year, until about 10 #/A of Zn has been applied. This will increase the soil test Zn very slowly because only about 5 to 10% of the added Zn is re-covered in the soil test by one year after application.

(See ZINC, page 7)

RESIDUES

LEAFHOPPER, from page 1

Stem Hgt in Inches	*No. of PLH per 10 Net Sweeps*
under 3	2 adults
3 to 6	5 adults
7 to 10	10 adult or nymph
11 to 14	20 adult or nymph

Treatment Thresholds and Control Decisions

Control decisions are made by comparing the number of PLH captured per sweep and the height of the alfalfa with treatment thresholds. If the PLH population in the field equals or exceeds the treatment thresholds for the crop height category, control measures are recommended. If the alfalfa crop is within 10 days of harvest, an early harvest is an alternative to the use of insecticide for control of PLH. However, the early regrowth must be closely monitored to prevent damage to this tender and susceptible regrowth from surviving PLH. However, if the alfalfa crop is more than 10 days away from harvest, the application of an insecticide is the only satisfactory method to control PLH. Before selecting an insecticide, compare the available insecticides for applicator safety level, ease of application, days until harvest and cost of the insecticide. Considerable difference exists between materials in cost, user safety and preharvest interval (Table 1). ◘

ZINC, from page 6

Plant Tissue

In the Mt. Pleasant study, the aboveground portion of the corn plant at the 6 to 8 leaf stage was deficient when the zinc concentration was less than 16 ppm or when the ear leaf at tassel was less than 14 ppm of zinc. Adding zinc to the soil increased the plant zinc above the critical level, but did not reach the 20 ppm of tissue zinc suggested in the literature as normal even when 10#/A of zinc was applied annually for 8 years (80 #/A of zinc).

Further information on this experiment is given in *Journal of Production Agriculture* 3:502-507, 1990, or can be obtained by writing the author. ◘

AURORA FIELD DAY - JULY 12

We have scheduled a number of new programs for this year's Field Day. First, we will rename the Aurora Research Farm to the Robert B. Musgrave Research Farm in honor of the late Bob Musgrave who conducted pioneering research at Aurora in the 1950's and 1960's. Second, we will have a tour of the newly-constructed Leon Field Laboratory. And third, the following tours of ongoing research will take place:

Walking Tour - Computer Programs/Tillage
1. Conservation Planning with GIS - Bill Waltman
2. NY Agricultural Weather - Dave Masonis
3. Tillage & Soil Compaction - Harold van Es

Walking Tour - Crop and Soil Management
1. Pre-Sidedress Soil Test for Nitrogen - Stu Klausner
2. Timing of Nitrogen on Corn - Shaw Reid
3. Soybean Testing - Madison Wright
4. New Oat Varieties - Bill Pardee
5. Seed Treatment of Small Grains - Gary Bergstrom
6. Corn Plant Populations - Bill Cox

Walking Tour - Weed Control/Forage Mgmt.
1. Corn Weed Control - Russ Hahn
2. Long-Term Herbicide x Tillage x Rotation Study - Dean Linscott/Rick Vaughan
3. Alfalfa/Grass Establishment Options - Jerry Cherney

Bus Tour - Sustainable Agriculture
1. Cultivator Demonstration for Corn Weed Control - Bob Burt/Jim Fritch
2. Nitrogen Dynamics of Interseedings in Corn - Tom Scott
3. Selecting Corn Hybrids for Sustainable Agriculture - Margaret Smith/Tom Barker
4. Sustainable Agricultural Systems - Jane Mt. Pleasant/Rich Zobel ◘

SUSTAINABLE AGRICULTURE VIDEO

A new 12-minute video entitled "Sustainable Agriculture Practices for Field Crop Production in the Northeast" outlines practices which enable farmers to grow profitable crops in an environmentally sound manner. These practices, which include crop rotation, nutrient management, tillage, pest management, interseeding and cover crops, and record keeping, can reduce the use of agricultural chemicals. Their use will safeguard our natural resources while providing greater profitability for farmers.

Jane Mt. Pleasant, assistant professor in the Dept. of SCAS, was project coordinator of this program. It can be used by farmers, farm organizations and others interested in agricultural practices and their effects on the environment. For more information on the video or its use, contact Cornell University Resource Center, Rich Gray, AV Div., 8 Business & Technology Park, Ithaca, NY 14850. ◘

NEW PUBLICATION

"*Appearance and Chemical Composition of Soybean Seedlots from Statewide Variety Tests in 1990*" (Extension Series No. E91-2) by Madison J. Wright and Gary C. Bergstrom is now available through the Department of Soil, Crop and Atmospheric Sciences, 142 Emerson Hall, Cornell University, Ithaca, NY 14853.

Calendar of Events

June 6, 1991	**Small Grain Management Field Day, Aurora, NY**
July 2	**Cornell Seed Growers Field Day, Ithaca, NY**
July 7-10	**Northeast Agronomy Meeting, Rugters U., New Brunswick, NJ**
July 12	**Aurora Field Day, Aurora, NY**
July 15-16	**Empire State Soil Fertility Association 1991 Summer Tour**
July 17	**Cornell Weed Science Field Day, Aurora, NY**
July 18	**Cornell Weed Science Field Day, Freeville *and* Ithaca, NY**
August 4-7	**46th Annual SWCS Meeting, Lexington, KY**
August 18-22	**American Phytopathological Society Annual Meeting, St. Louis, MO**

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 for 1991 send a check for $8.00 along with the form at the right.

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