What's Cropping Up?

A NEWSLETTER FOR NEW YORK FIELD CROPS & SOILS VOLUME 1, NUMBER 5, 1991

CORN PRODUCTION PRACTICES THAT REDUCE FUSARIUM MYCOTOXIN CONTAMINATION

Gary C. Bergstrom
Department of Plant Pathology

Current Situation

Contamination of 1990 harvest corn by mycotoxins (= mold-produced poisons) resulted in major economic losses for New York corn and livestock producers. The problems trace back to an epidemic of *Fusarium* ear molds in the field last summer. Mold content at harvest is affected by the amount of infection (occurs primarily during wet conditions at silk emergence) and the period of mold colonization (from silking to harvest). The colonization period was abnormally long in 1990 because of the late planted crop (often with longer season hybrids than appropriate) and an extremely wet fall. Inefficiencies in handling and storing high moisture grain and silage further promoted mold growth and mycotoxin production.

Acute animal production problems (in swine, dairy cattle, and poultry) were associated with feeding 1990 harvest corn. It has not yet been established what mycotoxin(s) is responsible for the animal problems. Deoxynivalenol (DON or vomitoxin) was a widespread contaminant at low to moderate levels and, although it may or may not be the culprit, it was the only mycotoxin consistently identified. Major grain buyers either stopped purchasing corn from certain regions of New York, purchased only 'DON-free' (testing at less than 500 parts per billion, based on sensitivity of swine to DON) corn or purchased 'DON-contaminated' (usually at between 500 and 1,000 parts per billion) corn at substantially discounted prices. Corn with DON in excess of 1,000 parts per billion was nearly impossible to market.

Strategies for Mycotoxin Reduction

Red ear rot, caused by the fungus *Fusarium graminearum* (also the main cause of corn stalk rot and wheat scab), is endemic in the Northeast. It can be observed in most fields in most years, but severe epidemics occur, on average, one out of every 4 to 6 years. The intensity of disease and resulting contamination of harvested grain can be reduced significantly by the following combination of integrated cultural practices. These practices serve to reduce the infection of ears at silking or reduce the period of time (silking to harvest) in which *Fusarium* can continue to colonize the ears.

1. Hybrid selection. While no hybrid is immune, hybrids vary considerably in partial resistance to *Fusarium graminearum* ear infection. Seed companies made valuable observations on the performance of their hybrids during the red ear rot epidemic of 1990. Consult your seedsman for information concerning ear rot resistance. Hybrids should also be of the appropriate maturity group for the growing site. If planting is delayed, a shorter season hybrid should be grown.

2. Crop sequence/tillage decisions. Infected crop debris on the soil surface can continue to discharge pathogen spores for 2 years. A 2-year rotation between susceptible crops (corn and small grain cereals) will reduce the threat but is often not feasible. Incorporation of debris by moldboard plowing is often necessary in continuous corn/cereal production, especially following corn with severe stalk rot and lodging. Of course, this is inadvisable on erodible soils. Strip crops and small fields present a special problem for *Fusarium* control as spores can be blown onto corn silks from debris or standing cereal crops in adjacent fields or strips.

3. Timely planting. Planting as early as soil temperature and moisture allow will ensure mature grain at harvest.

4. Balanced fertilization. Correct soil pH (6.0 or above) and fertilizing based on soil test results will reduce the impact of ear molds. Ear molds have been shown to be more severe under excessive nitrogen fertilization.

(See MYCOTOXIN, page 7)

SOIL MANAGEMENT

Rye Cover Crop Provides Many Benefits

Jane Mt. Pleasant
Soil, Crop and Atmospheric Sciences

Winter rye seeded after corn silage harvest was once a common practice on New York farms. Its use has declined in recent years, but farmers may want to reconsider this practice as part of an integrated soil/crop management strategy. Cover crops can reduce soil erosion, add dry matter to the soil, recycle excess nitrogen, and limit fall weed invasions. These are important factors in ensuring the long-term productivity and stability of New York agriculture.

Reduces Erosion

The use of cover crops is particularly critical where corn is harvested as silage. Soil is left bare in these fields at a time when they are most vulnerable to erosion from fall and winter precipitation. Rye seeded after silage harvest can provide substantial cover (Table 1), reducing soil losses from erosion.

Adds Dry Matter

Corn harvested as silage returns only small amounts of crop residue to the soil. Soils cropped to continuous or long-rotation corn silage may show significant reduction in organic matter levels that result in reduced water infiltration, compaction, and lower yields. A well established rye cover crop contributes about a ton of dry matter per year to the cropping system (Table 2). This addition may be particularly important to offset deteriorating soil physical conditions in fields continuously cropped to corn silage.

Table 1. Ground Cover from Winter Rye

Year	Fall	Spring
	%*	
1979-80	50	76
1980-81	22	70
1981-82	16	43
1982-83	36	67
1983-84	40	40
1984-85	49	61
Mean	36	60

* Includes 10-15% cover from corn residue and weeds.

Source: Scott, T.W. et al. 1987. Agron. J. 79:792-798.

Table 2. Dry Matter and Nitrogen in Winter Rye - Pre-plowdown, May

Year	Roots	Tops	Total	N
	- - - - - - - lbs/A - - - - - - -			
1980	573	1820	2392	46
1981	553	1692	2225	28
Mean	563	1758	2309	38

Source: Scott, T.W. et al, 1987. Agron. J. 79:792-798.

Decreases Nitrate Leaching

Nitrogen contamination of ground and surface waters is of widespread concern, particularly on farms that receive heavy manure applications. Cover crops that are actively growing in the fall can take up excess nitrogen left in the soil profile after corn harvest. On bare fields this nitrogen would leach to ground water before spring. A well established rye cover contains about 40 lb/A nitrogen in May, prior to plow down (Table 2). About half of that nitrogen was taken up in the fall and represents a significant reduction in nitrate leaching.

Other Considerations

Although rye cover crops provide many benefits to the cropping system, some aspects of their management require additional attention. The amount of dry matter accumulated in a rye cover crop is directly related to when it is plowed down in the spring. Delaying plowdown from May 1 to June 1 will double the amount of rye vegetation, but corn yields may be significantly reduced because of late planting. Delayed plowdown can also result in problems incorporating the large amounts of grassy residues.

Even with timely planting, corn yields may be reduced following a rye cover crop. Decomposition of rye residues can temporarily tie up nitrogen, making it unavailable to the young corn plant. If soil nitrogen is limited, there will be a yield reduction. As much as 20-40 lb/A additional nitrogen may be required to offset the immobilized nitrogen. Corn grown on heavily manured fields will not likely be affected by this nitrogen immobilization because of the large pool of nitrogen supplied by manure. However, cash crop farmers who routinely sidedress nitrogen may want to consider other non-grass species as cover crops. Legumes can also be used as cover crops in corn, but they need to be seeded earlier in the growing season (at cultivation time). Additional information concerning this practice will be provided in another issue of *What's Cropping Up*.

(See COVER CROP, page 7)

Planting Winter Wheat

GRAIN CROP MANAGEMENT

Bill Cox
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Two fall management practices that influence the yield potential of winter wheat are planting date and seeding rate. The optimum planting date and seeding rate depend greatly on environmental conditions of the growing season. Nevertheless, long-term research data can provide general guidelines for planting winter wheat.

Planting Date

Wheat growers should plant the crop after the Hessian fly-free date to minimize the potential for Hessian fly infestation as well as aphid infestation which transmits Barley Yellow Dwarf Virus (BYDV). On the other hand, wheat growers should plant the crop within 2 to 3 weeks after the fly-free date to ensure adequate fall growth for winter survival. From 1984 to 1991, Geneva averaged 5 bu/A higher grain and 0.4 tons/A higher straw yields when planted about September 18 compared to October 8 (Table 1). The yield penalty for delayed planting after September 18 thus averaged 0.25 bu/A/day for grain and 0.02 tons/A/day for straw. In 1991, however, when fall conditions were exceptionally mild, the September-planted wheat exhibited severe BYDV symptoms and yielded 7 bu/A lower. Apparently, planting wheat during the first week after the fly-free date does not guarantee avoidance of BYDV infection. Nevertheless, given the uncertainty of weather conditions in late September/early October and the potential for significant yield reductions with the October 8 planting date, winter wheat should be planted sometime between September 16 and October 1 in most areas of New York.

Seeding Rate

Growing season, planting date, and variety selection greatly influence the response of winter wheat to seeding rates (Table 2). In 1989 and 1991, Geneva did not respond to seeding rates above 1.5 bu/A on the September planting date. Pioneer 2555 actually yielded lower in both years at higher seeding rates, especially in 1991 when the 3 bu/A seeding rate yielded only 39 bu/A because of lodging. In 1990, however, Geneva yielded 8 bu/A higher on the September planting date when seeding rates increased from 1.5 to 3 bu/A.

In contrast to the September planting date, growing season had less influence on the response of both varieties to seeding rates on the October planting date. Geneva showed a consistent yield response across years as seeding rates increased from 1.5 to 3 bu/A. Likewise, Pioneer 2555 generally increased yields when seeding rates increased from 1.5 to 2.5 bu/A.

Conclusion

Planting date and seeding rate greatly influence the yield potential of winter wheat. The data suggest that wheat growers should plant Geneva between September 16 and October 1 at a seeding rate of about 2 bu/A. If planting is delayed until October 10 or later, growers should increase Geneva seeding rates to 2.5 to 3 bu/A. If growers select Pioneer 2555, they should plant between September 16 and October 1 at a seeding rate of 1.5 bu/A. If the planting date is delayed until October 10, growers should increase seeding rates to 2 to 2.5 bu/A.

Table 1. Grain and straw yield of Geneva wheat seeded at 2.5 bu/A on about September 18 and October 8.

Year	Grain Yield		Straw Yield	
	Sept. 18	Oct. 8	Sept. 18	Oct. 8
	- - - bu/A - - -		- - - tons/A - - -	
1984	81	74	1.6	1.2
1985	94	95	1.7	1.5
1986	82	76	1.8	1.5
1987	83	79	1.9	1.4
1988	89	81	2.6	2.1
1989	70	58	2.1	1.9
1990	81	69	1.6	1.2
1991	<u>56</u>	<u>63</u>	<u>2.1</u>	<u>1.5</u>
	78	73	1.9	1.5

Table 2. Grain yield of Geneva and Pioneer 2555 at two planting dates and four seeding rates in 1989, 1990, and 1991.

Planting Date	Seeding Rate	Geneva 1989	Geneva 1990	Geneva 1991	Pioneer 2555 1989	Pioneer 2555 1990	Pioneer 2555 1991
		- - - bu/A - - -					
Sept. 20	1.5	74	77	63	76	82	62
	2.0	72	77	63	72	83	57
	2.5	70	81	56	71	86	56
	3.0	71	85	62	69	84	39
Oct. 10	1.5	54	58	60	63	66	71
	2.0	55	65	63	60	70	66
	2.5	58	69	68	70	73	71
	3.0	61	72	68	69	72	71

AGRICULTURAL METEOROLOGY

The Northeast Regional Climate Center

Keith Eggleston
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The Northeast Regional Climate Center (NRCC) was established in 1983 at Cornell University in Ithaca, New York. Its purpose is to facilitate and encourage the collection and wise use of climate data in the 12 northeastern states. Accurate, long-term data on climatic conditions are essential for assessing climate changes and their environmental and economic impacts, for the planning and safe design of buildings, water supplies and drainage systems, highways and bridges, and energy use.

Products and Services

NRCC's service program is built upon a knowledgeable and experienced staff, and a comprehensive regional climate database maintained on a networked array of computers with communications facilities and national network connections. The NRCC database includes continuously updated weather observations, forecasts, warnings and advisories, as well as an extensive collection of current and historical climate data for the northeastern states. The climate data and information are acquired from many sources and distributed by a variety of means. In addition to data collected by Cooperative Observers and National Weather Service offices in the region, the NRCC database includes data from adjoining Canadian Provinces and special data sets from networks that measure climatic elements that affect agricultural production, hydrology, and environmental quality.

CLIMOD

Information in the database is immediately available to any user through the CLIMOD - *CLimate Information for Management and Operational Decisions* - software system. The CLIMOD system was developed by the Northeast Center to provide users with direct, interactive access to regional weather and climate information. Some examples of products available through the CLIMOD system include: daily temperature and precipitation data for several hundred sites in the Northeast, up-to-date summaries of climatic conditions for most cities and towns, maps illustrating spatial variations of climatic variables for states in the region, and extended forecasts and seasonal outlooks for climatic conditions. Additional products, derived from the basic climatic data, that are useful for planning and operational decision-making, e.g., heating degree days and growing degree days, are also available for most locations through the CLIMOD system. At present there is no charge for the use of CLIMOD, but each user must establish a personal account and pay for their own telephone service.

Publications and Educational Materials

Informational and educational publications are a major component of NRCC's service activities. Each month the NRCC compiles and publishes *New York Climate* which summarizes climatic data from about 250 cooperative observers, National Weather Service offices, and sites maintained by state and private institutions located in New York State. A third NRCC monthly publication, *Northeast Climate Impacts*, highlights the past months climate conditions and summarizes their effects on agriculture, transportation, energy use and water resources. During the winter months, NRCC compiles data on snow cover and distributes a publication entitled *New York Cooperative Snow Survey* on a monthly or bi-weekly basis as needed during the cold season. This publication contains tables and maps of average snow depth and water equivalent of the snow cover for all major drainage basins in New York State.

Research Activities

The Northeast Regional Climate Center conducts, supports and coordinates applied research studies focusing on:

- characterization of regional climate and climate variability;
- assessment of the impacts of climatic variations on agriculture, water resources, environmental quality and energy needs;
- development of new techniques for using climate data in planning and operational decision making;
- improvement of computerized methods of collecting, managing and disseminating climate data and information.

Current research projects include:

- Development of a snowfall and snow cover atlas of the Northeast;
- Methodological research in the statistics of extreme precipitation events;
- Development of a soil moisture model for the Northeast;
- Analysis of growing degree days for the northeastern United States and southeastern Canada;
- Development of a precipitation climatology for the Wallkill-Rondout watershed for use in improving the agricultural use of water in Orange and Ulster Counties;
- Inventory the soil moisture and soil temperature data sets in the Northeast.

How to Contact NRCC

Readers who need climate information for use in planning or management can contact us at the following address or phone numbers:

Mail: Northeast Regional Climate Center, 1113A Bradfield Hall, Cornell University, Ithaca, NY 14853; or, Phone: (607) 255-1751; FAX: (607) 255-2106.

Soil Compaction II: The Subsoil

SOIL MANAGEMENT

Harold van Es and Robert Schindelbeck
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In an earlier edition of this newsletter (Vol. 1, No 2), causes, effects and alleviation of plow layer compaction were discussed. This article follows up with a discussion on subsoil compaction.

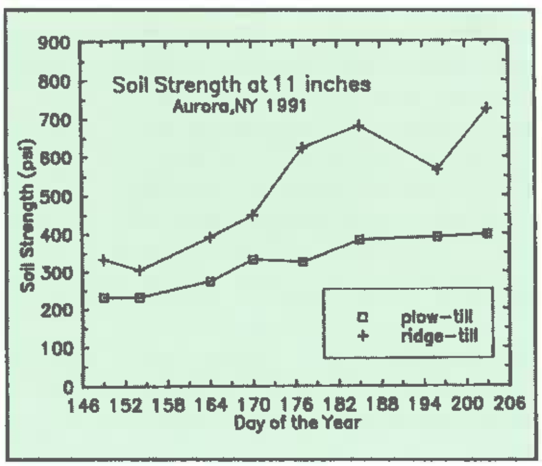
Subsoil compaction, often referred to as plow pans, is not readily diagnosed because it is, unlike plow layer compaction, invisible from the soil surface. It may be the result of either natural or human-induced processes. In some areas, dense subsoils occur naturally as dense basal tills, tight clays, or fragipans. With few exceptions, such natural compaction cannot be economically alleviated. Human-induced compaction is primarily related to the use of heavy field equipment, especially on wet soils. Severity and depth of compaction increase with increasing loads and soil wetness, but also depend on factors such as soil texture and particle smoothness. The newer, heavier equipment is typically poorly adapted to conditions in humid regions such as New York where field work often occurs on marginally wet soils. Studies have shown that axle loads in excess of 10 tons may cause compaction to a depth of 20-30 inches. Large tractors, grain-filled combines, wagons, manure spreaders and dump trucks may therefore cause considerable damage. Subsoil compaction is also caused by plowing with wheels in the open furrow. Even tillage implements themselves, especially disks, may cause plow pans due to high pressures at the bottom contact points.

Effects

Subsoil compaction results in reduced drainage and root proliferation. Slower internal drainage causes delays in field workability and may cause lower populations and increased denitrification losses during periods of flooding. Reduced root growth from hard subsoils limits the plant's ability to explore water and nutrients from deeper soil layers, which may be very critical during dry spells. In general, root growth is severely reduced at soil strengths in excess of 300 psi. Sensitivity to subsoil compaction, however, varies by plant species. For example, corn is less sensitive than soybeans, and small grains are less sensitive than field beans and potatoes.

Diagnosis

It is important to recognize that soil strength depends on soil moisture content in that soils become harder as they dry during the growing season. The figure below shows changes in subsoil soil strength from May 24 to July 22, 1991 under ridge-till and plow-till. Both treatments show measures in strength to levels well above 300 psi. The subsoil under ridge-till, however, was more severely compacted and strengths doubled from late May until early July after which rainfall provided some softening. In the middle of the summer, many soils show high strengths in the subsoil and may be wrongly interpreted as severely compacted. It is therefore advised to use a penetrometer in the spring when the soil is uniformly moist. If penetrometer readings are 250 psi or higher for the subsoil, then compaction is likely to become a problem. Additional measurements should be made during the dryer part of the season to verify high soil strengths. Subsoil compaction can also be diagnosed by digging up roots when corn has reached its maximum height (tassel stage to full maturity). If few roots are found in the subsoil or they have crooked, strangulated paths with few fine lateral roots, then subsoil compaction is causing a suboptimal rooting environment.



Prevention and Alleviation

Subsoil compaction is best prevented by:

(1) No field traffic on wet soils. It is often not recognized that subsoils may still be wet when the plow layer appears dry enough for traffic. Our recent experiments have shown that early field traffic significantly increases subsoil compaction compared to a 2-3 day delay.

(2) Reducing axle loads through use of lighter equipment and trailed vs. 3-point hitch equipment (to reduce loads on the tractor rear axle), and by avoiding overfilled harvesting equipment.

(3) Better weight transfer through use of dual wheels (although not on a planter tractor), low ground pressure tires, larger wheels, or track wheels.

(4) Reducing unnecessary heavy traffic (e.g. dump trucks) on the field.

(5) Avoiding wheel traffic in open furrows when plowing.

(6) Varying the depth of tillage and tillage type. For example, chiseling may reduce compaction from plowing and/or disking.

(See SUBSOIL, page 7)

OILSEED CROP MANAGEMENT

Action In Oilseeds

Madison Wright
Soil, Crop and Atmospheric Sciences

Several crops whose seeds are rich in oil can be grown in New York. Soybeans, sunflowers, canola and even peanuts are reasonably well suited to the soils and climate in parts of our state. And products made from these oils move through our supermarkets to consumers.

These facts have not, however, led to much production of any oilseed here in decades past. Until recently, the only oilseed acreage was about 20,000 of soybeans and a few thousand of sunflowers, on New York's approximately 4 million acres of harvested cropland.

Recent developments are changing two of the oilseed acreages.

Our expansion in soybean acres is due not so much to the fact that soybean seeds contain oil, as to the fact that they are rich in protein. Typically, soybean seeds contain about twice as much protein as oil. In our livestock industry, some soybeans are being fed raw while others are being fed after heating in the roasters and extruders that are now distributed across our major crop areas. These "full fat" products are being substituted for fat-free meal (SBOM) that is the residue from conventional processing of soybeans. Because the oil has been subtracted, SBOM is an even more concentrated source of protein than the whole seeds. But it is lower in energy content.

The differences in composition between SBOM and whole soybeans rule out a one-for-one substitution in livestock rations. They also draw attention to the fact that the percentages of oil and protein in the soybean seed are not constant. Both variety and environment affect the composition. *(A report on the composition of soybean varieties grown at five locations in New York in 1990 is available from the Department of Soil, Crop and Atmospheric Sciences. Ask for SCAS Extension Series Publication E91-2.)* Now that there are instruments that can make almost instantaneous analyses of oil and protein content on small samples, the soybean industry is gearing up to perform these analyses routinely. Someday we may see the processors publishing schedules of premiums and discounts, so as to encourage growers to supply beans with desired composition. And plant breeders are beginning to develop lines with altered proportions of valuable components.

The second development in New York oilseed production involves canola, and in this case it is the oil, rather than the meal or protein, that is emphasized. Major food processors are backing canola because its oil is lower in saturated fatty acids than any other food-grade oil, and therefore enjoys an endorsement by some nutritionists. Demand for the oil has outrun U.S. production. Canola is available in quantity from Canada, where it originated, but domestic production is being stimulated. Agway, Inc. is cooperating with a seed supplier and seed processors to encourage the planting of winter canola on some New York farms this fall.

We tested both winter (fall-sown) and spring canolas on a small scale from 1984 to 1989. Our testing relied heavily on the pioneering work at the University of Guelph in Ontario, where for over 15 years they have been breeding and testing canola. Although their experience demonstrates that both forms of the crop have encouraging prospects, the mills in Ontario continue to rely mainly on spring canola shipped in from Manitoba and Saskatchewan because farmers in Ontario have yet to grow large acreages with consistency.

The SCAS publication *"Growing Canola (Oilseed Rape) In New York"* has just been revised. It, and reports of trials conducted in the past at Aurora, Canton and Chazy, may be obtained through field crops agents or by ordering directly from the Department of Soil, Crop and Atmospheric Sciences, Cornell University, 142 Emerson Hall, Ithaca, NY 14853.

RESIDUES

MYCOTOXIN, from page 1

5. Stress reduction. Stressed corn is more susceptible to ear molds. Plant populations should not exceed those recommended for a particular hybrid. Weeds, insects, and foliar diseases should be managed in a manner that reduces crop stress.

6. Harvest planning. Corn crops should be scouted in the fall to determine the potential for lodging due to stalk rot and insects as well as the maturity of the grain. Harvest as silage (which also eliminates most of the crop debris on which *Fusarium* overwinters in the field) or grain for anaerobic storage are good solutions for crops with delayed maturity or high potential for lodging. Grain bins and silos should be cleaned thoroughly prior to storing the new crop. Shelled corn should be dried to 13% moisture content before aerated storage and should be screened carefully to remove fines.

For further information on this problem, ask your cooperative extension agent for a copy of Plant Pathology Extension Report 91-1 entitled, *Fusarium molds and mycotoxins associated with corn.* ■

COVER CROP, from page 2

Summary

1. Winter rye seeded after corn harvest can reduce soil erosion, add dry matter to the soil, and recycle excess nitrogen. Fields planted to continuous or long-rotation corn silage will benefit most from a cover crop.

2. Seed rye before October 1 in order to ensure adequate growing season in the fall.

3. Delayed plowdown in the spring will greatly increase total dry matter, but may compromise corn yields.

4. Rye residues can tie up soil nitrogen, making it unavailable to corn. This is not a problem on heavily manured fields, but cash crop producers may want to consider a non-grassy cover crop. ■

SUBSOIL, from page 5

Subsoil compaction is not easily alleviated by natural processes such as freeze/thaw cycles or biological activity. The effect of a single loading may therefore last for 6-8 years. Alleviation may be achieved through deep tillage if it is performed properly. It should occur when soils are dry enough for good shattering. Ideally, it is followed by the establishment of a deeply-rooted crop (e.g. alfalfa). Use of deep tillage, however, is questionable and may even have negative effects if subsequent traffic is not changed to avoid recompaction. Deep tillage appears most successful on sandy soils. ■

ESSFA

The Empire State Soil Fertility Association, Inc. will be meeting at the Auburn Holiday Inn, Auburn, New York, *January 14 and 15.* For more information about the event or ESSFA, contact W. Shaw Reid, 803 Bradfield Hall, Cornell University, Ithaca, NY 14853, (607) 255-1722. ■

NEW PUBLICATION

"*Growing Alfalfa the IPM Way*" (IPM Publication No. 305) by J. Keith Waldron is now available through Cornell Media Services Distribution Center, 7 Research Park, Ithaca, NY 14850. This manual is a producers guide to using integrated pest management (IPM) techniques for evaluating and improving management of insect, disease and weed pest problems of alfalfa. ■

1991 FIELD CROP DEALER MEETINGS

The 1991 Field Crop Dealer Meetings are scheduled for the week of October 7 at the following locations:

October 7	Holiday Inn, Waterloo-Seneca Falls, NY
October 8	Best Western University Inn, Canton, NY
October 9	Kozel's Restaurant, Ghent, NY
October 10	Utica, NY
October 11	Holiday Inn, Batavia, NY

Registration will begin at 9:15 a.m. and the program will begin at 10:00 a.m. The agenda at each site will feature topics of current interest on field crop production in New York as well as changes in the *1992 Cornell Recommends for Field Crops*. For more information, please contact Pam Kline at 607-255-2177.

Calendar of Events

Oct. 7-8, '91	7th Annual NYS GIS Mtg., Albany. Contact M. Courneen 716-692-6977
Oct. 7-11	Field Crop Dealer Meetings (see page 7). Contact P. Kline 607-255-2177
Oct. 27-Nov. 1	Amer. Soc. of Agronomy Mtgs., Denver. Contact ASA 608-273-8080
Nov. 7-8	Empire St. Chap. SWCS Annual Mtg., Canandaigua. Contact J. Whitney 716-652-8480
Nov. 11-14	Cornell Pest Management Conference, Ithaca. Contact K. Waldron 607-255-8469
Jan. 14-15, '92	Empire State Soil Fertility Assoc., Inc. Meeting, Auburn Holiday Inn

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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