What's Cropping Up?

A NEWSLETTER FOR NEW YORK FIELD CROPS & SOILS VOLUME 8, NUMBER 6, 1998

Agricultural Environmental Management Certification Update

Barbara Bellows
Dept. of Agriculture and Biological Engineering

In response to federal regulations, New York State will soon initiate a permitting program for concentrated animal feeding operations (CAFO). To ensure that farm plans developed under this permitting process are comprehensive and consistent, individuals conducting these farm plans will be certified. In the previous issue of *What's Cropping Up*, I reported on the draft guidelines for the Agricultural Environmental Management (AEM) certification program. Since that article was submitted, the guidelines have undergone major revisions. Following is a summary of the revised and final guidelines.

The AEM program, in conjunction with the Natural Resources Conservation Service (NRCS) and the Northeast Region Certified Crop Advisors (CCA), has created a program to certify environmental farm planners. Individuals successfully completing certification criteria will be designated as NRCS 3rd party vendors, able to provide assistance to farmers that has traditionally been provided by NRCS. They will be certified to develop Waste Management System plans (NRCS Standard 312) for concentrated animal feeding operation (CAFO) permits in New York State. CAFO permits will be required of all farms with more than 300 animal units (1 animal unit = 1000 pounds of live body weight).

In order to become certified to develop plans for CAFO permits, an individual must:

- Be a Certified Crop Advisor in good standing in the Northeast Region.
- Complete the NRCS Skills Inventory Form. This form provides an inventory of a planner's educational and professional experience related to conservation, agriculture, and farm planning.
- Complete the NRCS Conservation Planning Course. This is a computer-based training and testing session that covers NRCS conservation programs, the NRCS nine-step planning process and the conservation planning environment. This training module can be accessed via the world wide web at: www.ftw.nrcs.usda.gov/nedc/homepage.html
- Attend a 4-day session for training in Agricultural Management, Agronomy (environmental emphasis), Animal Science, Agricultural Engineering, Natural Resources, and Water Quality. The first training will be held March 9-12, 1999 in Utica, NY.
- Complete 3 plans and have NRCS review plans for consistency with NRCS standards and AEM tiered planning guidelines.

Information packets, including an application form for 3rd party vendor certification, the NRCS Skills Inventory Form, and contact information for all certification components, has been sent to all Cornell Cooperative Extension, Soil and Water Conservation District, and Natural Resource Conservation Service offices as well as to all Certified Crop Advisors and members of the NY State Agribusiness Association. Additional packets can be obtained by contacting Barbara Bellows (bcb5@cornell.edu).

If you have any questions about this process, please contact the following members of the AEM Certification Subcommittee: Barbara Bellows (bcb5@cornell.edu), Peter Wright (pew2@cornell.edu), or Lee Telega (swt2@cornell.edu).

Insect Management

Food Quality Protection Act: Will Field Crop Production Be Affected?

E. J. Shields
Dept. of Entomology

The Food Quality Protection Act (FQPA) is a law passed in 1996 to establish a strong health-based safety standard for pesticide residues in foods. The focus of this law is to establish a "single safe, reasonable certainty of no harm" standard for both raw and processed foods. This law also considers the aggregate exposure (including food use and drinking water), and exposure to all other pesticides with a common mechanism of toxicity when setting tolerances. The new law requires the review of all current tolerances at a rate of 10% of the tolerances per year and the entire task is to be completed in 10 years. In addition, FQPA establishes a list of specific factors to be evaluated when new tolerances are established and the FQPA also includes special provisions for the safety of children. The law also makes changes to the pesticide registration program which a) requires EPA to review all pesticide registrations on a 15 year cycle to ensure that current safety standards are met and b) requires an expedited review of safer pesticides to help them reach the market place sooner and thereby help replace older, potentially risker pesticides.

The new law also contains Consumer "Right-to-Know" provisions which include printed material prepared by EPA covering

a) risks and benefits of pesticides,

b) tolerances established based on benefits, and

c) recommendations on reducing exposure to pesticide residues and maintaining a healthy diet.

These pamphlets are to be available to the public in displays located in retail grocers.

At this early date, it is hard to predict exactly what impact this new law will have on the availability of pesticides for field crop production. Already, a number of registrations on older riskier compounds have been canceled by the manufacturer in response to FQPA. The first group of pesticides to be reviewed by EPA will be in the organophosphate, carbamate and organochlorine classes. Examples of the insecticides used in field crop production which fall into these groups would be: organophosphates: (Corn) Lorsban, Counter, Fortress; (Alfalfa) Penncap-M, dimethoate; carbamates: Furadan, Sevin. In addition, EPA will examine pesticides classified as probable or possible carcinogens.

The impact on field corn production could be serious since the four of the five soil insecticides registered for the control of corn rootworm in New York are either organophosphates or carbamates. However since nationally the corn market for soil insecticides is a major market for the insecticide manufacturers, the manufacturers of Lorsban, Counter, Fortress and Furadan are expected to work with EPA on retaining the registration of these compounds for corn. Loss of the organophosphate and carbamate soil insecticides would leave only a single pyrethroid compound (Force). The management of a widespread single insect pest (corn rootworm) using a single compound or class of compounds is not a good idea due to the increased selection pressure for the insect to develop insecticide resistance. Since corn rootworm has recently demonstrated its ability to develop insecticide resistance, insecticides with different sites of action need to be available to delay the development of insecticide resistance in the population

A different situation is thought to exist in alfalfa. With the newer insecticides less expensive to use than the older organophosphates and carbamates compounds, several of the older compounds like dimethoate are expected to be lost. Several of these insecticides are used on only a small portion of the acreage and are sold as generics. As the true impact of FQPA unfolds, updates will be passed along.

Herbicide Classification for Weed Resistance Management

Weed Management

Russell R. Hahn
Dept. of Soil, Crop and Atmospheric Sciences

Herbicide-resistant weeds have been a concern since triazine-resistant common groundsel (*Senecio vulgaris* L.) was first reported in 1968. Since that time there have been numerous discussions and several definitions for "herbicide resistance" and how it differs from "herbicide tolerance." Unfortunately, the terms have often been used interchangeably. During the 38th meeting of the Weed Science Society of America (WSSA) in February 1998 the WSSA Board of Directors approved the Herbicide Resistance Committee and the Terminology Committee recommendations of definitions for "herbicide resistance" and "herbicide tolerance."

"Herbicide resistance is the inherited ability of a plant to survive and reproduce following exposure to a dose of herbicide normally lethal to the wild type. In a plant, resistace may be naturally occurring or induced by such techniques as genetic engineering or selection of variants produced by tissue culture or mutagenesis." This definition clearly includes weed populations with resistant biotypes as well as crop hybrids/varieties that have been developed to be resistant to certain herbicides.

"Herbicide tolerance is the inherent ability of a species to survive and reproduce after herbicide treatment. This implies that there was no selection or genetic manipulation to make the plant tolerant; it is naturally tolerant." Although these are the currently accepted definitions for these terms, increased understanding and changes in technology could result in further refinement.

Since the first reports of triazine resistance in 1968, herbicide resistance has been reported to most herbicide chemical classes. In 1989 the Herbicide Resistance Action Committee (HRAC) was formed by agri-chemical industry technical representatives to develop a comprehensive herbicide resistance management plan. Among the recommendations in most resistance management plans is to rotate herbicides with different sites of action and/or to use tank mixes or sequential applications that involve herbicides with different sites of action. This means that everyone involved in the decision making process about weed control must be familiar with the modes of action and even the sites of action for the different herbicides that might be used.

Weed scientists in Manitoba, Canada met in 1991 to develop a classification to standardize herbicide groups according to their site of action. With widespread and complicated herbicide resistance problems, Australia began requiring herbicide labels to identify herbicides by group or groups according to their site of action(s) in1994. In 1995, the Herbicide Resistance Committee of WSSA laid the groundwork for a herbicide classification system that would draw on these early systems. The system that resulted was developed with the cooperation of the HRAC and was reviewed by weed scientists in the U.S., Canada, and Europe (1). The HRAC is also developing a herbicide classification for use in Europe. Unfortunately, the WSSA classification uses numbers to designate the herbicide groups while the HRAC classification uses letters. The WSSA classification with the group number, site of action, chemical family, active ingredient, and U.S. trade name(s) are shown in Table 1.

While there are reports of herbicide-resistant weeds for most all of these herbicide groups, only triazine-resistant weeds have been confirmed in NY State. This does not mean that growers and the agribusiness community should be complacent. Growers will have to deal with the widespread occurrence of triazine-resistant common lambsquarters and pigweed for years and will have to make adjustments in their weed management practices for the increasing occurrence/distribution of triazine-resistant biotypes of common groundsel and common ragweed. The increasing number of and use of ALS (acetolactate synthase) inhibitors is also of concern. There are currently herbicides from three different herbicide families that have the ALS enzyme as the site of action registered for use in NY State. They are the sulfonylureas, imidazolinones, and triazolo-pyrimidines. The occurrence of ALS-resistant weed biotypes after as few as four annual applications and the possibility of cross-resistance among these herbicide families should provide the incentive to implement herbicide resistance management plans whenever these herbicides are being used.

Literature Cited

1. Retzinger, E.J., Jr., and C. Mallory-Smith. 1997. Classification of herbicides by site of action for weed resistance management strategies. Weed Technol. 11:384-393.

Weed Management

Table 1. Herbicide Classification According to Primary Site of Action (1).				
Group*	**Site of Action**	**Chemical Family**	**Active Ingredient**	**U.S. Trade Name**
1	ACCase Inhibition	Aryloxyphenoxy	diclofop	Hoelon, various
(A)		propionates	fenoxaprop	Whip, Aclaim
			fluazifop-P	Fusilade DX
			quizalofop-P	Assure
		Cyclohexanediones	clethodim	Select, Prism
			sethoxydim	Poast, Poast Plus
2	ALS Inhibition	Sulfonylureas	chlorimuron	Classic
(B)	AHAS Inhibition		halosulfuron	Permit
			nicosulfuron	Accent
			primisulfuron	Beacon
			thifensulfuron	Pinnacle
		Imidazolinones	imazapyr	Arsenal
			imazethapyr	Pursuit
		Triazolopyrimidine	flumetsulam	Broadstrike, Phyhon
		Pyrimidinylthio-benzoate	pyrithiobac	Staple
3	Microtubule assembly	Dinitroanilines	benefin	Balan
(K_1)	inhibition		pendimethalin	Prowl
			trifluralin	Treflan
		Pyridazines	dithyopyr	Dimension
	Unknown	None	DCPA	Dacthal
4	Synthetic auxins	Phyenoxys	2,4-D, 2,4-DB	various
(O)			MCPA, MCPB	various
		Benzoic acids	dicamba	Banvel, Clarity
		Carboxylic acids	clopyralid	Reclaim, Stinger
			triclopyr	Garlon
		Quinoline carboxylic acid	quinclorac	Facet
5	Photosynthesis inhibition	Triazines	atrazine	AATrex
(C_1)	at photosystem II		cyanazine	Bladex
			simazine	Princep
		Triazinones	hexazinone	Velpar
			metribuzin	Sencor, Lexone
		Uracils	bromacil	Hyvar X
			terbacil	Sinbar
		Pyridazinone	pyrazon	Pyramin
		Phenyl-carbamates	desmedipham	Betanex
			phenmedipham	Bentanal
6	Photosynthesis inhibition	Nitriles	bromoxynil	Buctril
(C_3)	at photosystem II - same	Benzothiadiazole	bentazon	Basagran
	site, different binding	Phenyl-pyridazine	pyridate	Tough
7	Photosynthesis inhibition	Ureas	diuron	Karmex, various
(C_2)	at photosystem II - same		linuron	Lorox, various
	site, different binding		tehuthiuron	Spike
		Amide	propanil	Stam
8	Lipid synthesis inhibition -	Thiocarbamates	butylate	Sutant
(N)	not AACase inhibition		cycloate	Ro-Neet
			EPTC	Epstam, Eradicane
	Unknown	None	bensulide	Prefar
(Z)		None	difenzoquat	Avenge
9	EPSP synthase inhibition	None	glyphosate	Roundup
(G)				Touchdown
10	Glutamine synthetase	None	glufosinate	Liberty
(H)	inhibition			

11 (F_3)	Bleaching: Inhibition of carotenoid biosynthesis (unknown target)	Triazole	amitroie	Amitrol T,Amizol
12 (F_2)	Bleaching: Inhibition of cartenoid biosyntheis at the phytoene desaturase step (PDS)	Pyridazinone Nicotinanilide Others	norflurazon diflufanican fluridone flurochloridone	Zorial, various Sonar
13 (F_3)	Bleaching: Inhibition of all diterpenes	Isoxazolidinone	clomazone	Command
14 (E)	PPO inhibition	Diphenylethers N-phenyl-phthalimides Oxadiazole Triazolinone	fomesafen lactofen oxyfluorfen fluthiacet-methyl flumiclorac oxadiazon carfentrazone sulfentrazone	Reflex, Flexstar Cobra Goal Action Resource Ronstar Aim Authority
15 (K_3)	Unknown	Chloroacetamides Acetamides Oxyacetamides	acetochlor alachlor metholachlor pronamide dimethenamid napropamide	Harness, Surpass, Lasso, Micro-Tech Dual, Dual II Magnum Kerb Frontier Devrinol
16 (N)	Unknown	Benzofuran	ethofumasate	Nortron
17 (Z)	Unknown	Organoarsenicals	DSMA MSMA	various various
18 (I)	DHP inhibition	Carbamate	asulam	Asulox
19 (P)	Inhibition of indoleactic acid action	Phthalamate	naptalam	Alanap
20 (L)	Cellulose synthase inhibition	Nitrile	dichlobenil	Casoron
21 (L)	Inhibition of cell wall synthisis site B	Benzamide	isoxaben	Gallery
22 (D)	Photosystem I - electron diversion	Bypyridiliums	diquat paraquat	Diquat Gramoxone
23 (K_2)	Mitosis inhibition	Carbamates	chlorpropham propham	
24 (M)	Uncoupling membrane disruptors	Dinitrophenol	dinoseb	
25 (Z)	Unknown	Arylamino-propionic acid	flamprop-methyl	
26 (N)	Unknown	None	TCA	
27 (Z)	Unknown	Various	bromobutide cinmethylin	
28 (F_2)	4-HPPD inhibition	Triketone Isoxazole Pyrazole	sulcotrione isoxaflutole pyrazolynate	Balance

* Letter in (   ) HRAC (Herbicide Resistance Action Committee) group.

Crop Management

Recommended Soybean Varieties for Central and Western New York

Bill Cox and Dill Otis
Dept. of Soil, Crop & Atmospheric Sciences

New York growers harvested about 100,000 acres of soybeans in 1998, which was similar to the 1997 harvested acreage. The selection of Roundup Ready varieties increased significantly in 1998 and is expected to increase greatly in 1999. Usually, we recommend soybean varieties once the variety has been tested for 2 years and at two sites. Because of the demand for Roundup Ready varieties in 1999, we will recommend Roundup Ready soybeans based on only 1 year of testing at two sites. As with the non-Roundup Ready varieties, we only recommend those varieties that have a statistical yield advantage. We will limit the discussion in this article to the results from central and western New York, and will discuss the results from Northern New York in the next issue.

Enterprise from Hyland Seeds in Ontario Canada, has yielded exceptionally well in the Group 0 tests at Aurora and Mt. Morris (Table 1). Other outstanding varieties include OAC Bayfield, Korada, and APK 020. Promising new varieties in the Group 0 tests are Telstar, PR9746, and E098. The Group 0 varieties yielded as well as the Group I and Group II varieties at Aurora this year because the earlier varieties did not suffer as great a yield loss from the extended dry period at Aurora in August and September. Nevertheless, we still recommend that growers plant only 10-20% of the acreage to Group 0 varieties because of their lower yield potential.

APK 184 has also yielded exceptionally well in the Group I tests at Aurora and Mt. Morris (Table 1). In fact, APK 184 has yielded 4 bu/acre greater than S19-90, the long-standing outstanding variety in New York. Promising new Group I varieties include E158, APKX 151, CX195, and TS107. Group I varieties are well-adapted to central and western New York growing conditions so we recommend that growers plant about 50% of the acreage to Group I varieties.

APK 243, APK 250, and CX232 have yielded the greatest among Group II varieties at Aurora and Mt. Morris in 1997 and 1998 (Table 1). Promising new Group II varieties include S24-92, A2247, and APK 283. This was the first year that the yield of any test variety exceeded 100 bu/acre (Table 1). Despite the higher yield potential of Group II varieties, we recommend that growers plant Group II varieties on only 30 to 40% of the acreage because of maturity risks in cooler years. We also recommend that growers plant Group II varieties by the last week of May.

Roundup Ready Soybean Varieties

When averaged across all the varieties within each Maturity Group, Roundup Ready varieties yielded

Table 1. Yields of recommended early (Group 0), medium (Group I), and late non-Roundup Ready soybean varieties at Aurora and Mt. Morris in 1998.

	AURORA		MT. MORRIS		
Variety	1997	1998	1997	1998	Mean
	bu/acre				
Early					
Enterprise	47	57	65	91	65
Bayfield	44	56	68	74	61
Korada	40	56	59	81	59
APK 020	40	56	55	78	57
Telstar*	-	59	-	89	-
PR 9746*	-	59	-	85	-
E098*	-	53	-	91	-
Medium					
APK 184	54	59	66	97	69
S19-90	52	53	67	88	65
E158*	-	59	-	92	-
APKX 151*	-	53	-	90	-
CX195*	-	55	-	86	-
TS107*	-	54	-	85	-
Late					
APK 243	51	62	68	100	70
APK 250	53	61	63	99	69
CX232	50	57	72	95	69
S24-92*	-	62	-	104	-
A2247*	-	56	-	102	-
APK 283*	-	58	-	90	-

* Promising new variety

about 5% less than the non-Roundup Ready varieties at each site. We do not believe that the lower yield is associated with a yield drag, but rather because the genetic yield potential of the Roundup Ready varieties does not yet equal that of the non-Roundup Ready varieties. As new Roundup Ready varieties are introduced, we expect the yield difference to disappear.

The Group I varieties, APK 198RR, CX191RR, P91B91, and APKX 170RR, yielded well in 1998 (Table 2). All four varieties yielded the highest at both sites, which indicates excellent yield stability, because the varieties yielded well in the droughty Aurora environment as well as the high-yielding Mt. Morris environment. The outstanding Group II Roundup Ready varieties include AG2301, E1980RR, H-1266RR, P92B21, APKX 123RR, CX208RR, and CX257RR. As in the Group II non-Roundup Ready trial, a Roundup Ready Group II variety (AG2301) topped 100 bu/acre at Mt. Morris.

We expect that growers will plant close to 50% of the acreage to Roundup Ready varieties in 1999. A row spacing x seeding rate study indicates that the three Roundup Ready varieties evaluated in the study yielded best at about 200,000 seeds/acre, regardless of row spacing (Table 3). We recommend that growers should seed Roundup Ready varieties at about 200,000 acres in 7", 15", or 30" row spacing.

Table 2. Yields of medium (Group I) and late (Group II) Roundup Ready soybean varieties at Aurora and Mt. Morris in 1998.

Variety	AURORA	MT. MORRIS	Mean
	bu/acre		
		Medium	
APK 198RR	54	88	71
CX191RR	52	90	71
P91B91	55	83	69
APK 170RR	52	85	69
		Late	
AG2301	47	104	76
E1980RR	47	98	73
H-1266RR	46	97	72
P92B21	48	94	71
APKX 123RR	52	90	71
CX208RR	48	91	70
CX257RR	50	89	70

Table 3. Average yield of three Roundup Ready varieties at three seeding rates and three row spacings in 1997 and 1998 at Aurora.

Seeding Rate (seeds/acre)	Row Spacing 7"	15"	30"	Mean
	bu/acre			
		1997		
150,000	37	39	37	37
200,000	42	42	40	41
250,000	40	40	37	39
Mean	40	40	38	
LSD0.05		2[†]		3
		1998		
150,000	45	45	42	44
200,000	48	48	45	47
250,000	47	47	44	46
Mean	47	47	44	
LSD0.05		2[†]		2

[†] LSD compares means among row spacings.

Calendar of Events

January 4-7	Northeastern Weed Science Society Annual Meeting, Cambridge, MA
January 5-6	New York State Agri-Business Association Annual Meeting, Waterloo, NY
January 19	Western New York Corn Congress, Holiday Inn, Batavia, NY
January 20	Finger Lakes Corn Congress, Holiday Inn, Waterloo, NY
January 21	Field Crop Congress, Ithaca area
February 7-10	Weed Science Society of America Conference, San Diego, CA
February 23	North Country Corn Congress, Miner Institute, Chazy, NY

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.**

What's Cropping Up? - Subscription

Name:

Affiliation:

Address:

City: State: Zip:

Make check payable to: **CORNELL UNIVERSITY** and return to:

Department of Soil, Crop and Atmospheric Sciences - Extension
144 Emerson Hall, Cornell University, Ithaca, NY 14853

Cornell Cooperative Extension

Dept. of Soil, Crop and Atmospheric Sciences
144 Emerson Hall
Cornell University
Ithaca, NY 14853

Helping You Put Knowledge to Work