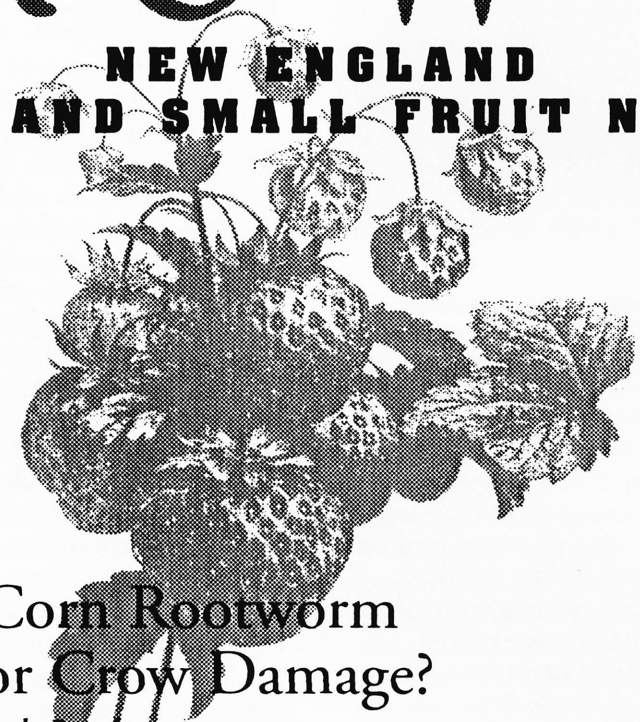
Volume 96-4

April 1996

GROWER

NEW ENGLAND VEGETABLE AND SMALL FRUIT NEWSLETTER

CONTENTS



Corn Rootworm or Crow Damage?

Jude Boucher
Vegetable Crops IPM Program Coordinator
University of Connecticut
Cooperative Extension System

Last summer, I saw two cases where corn seedlings pulled by crows were misdiagnosed as western corn rootworm (WCR) damage. In the first case, the grower guessed wrong. Possibly, he had recently read a lot in the popular press about WCR moving into the Northeast. By getting a correct diagnosis from Extension, this grower may have avoided the costly mistake of including unnecessary soil-applied insecticides for rootworm control in future plantings for years to come.

In the second instance, the damage was misdiagnosed by a pesticide salesman, who then recommended the wrong cure. The salesman seemed genuinely surprised and thankful to find out what crow damage to corn seedlings could look like. The grower was relieved to find out he could drop the $17 per acre treatment.

Continued on page 2

EDITORS

Richard A. Ashley
Patsy W. Evans
Norman L. Gauthier
Jude Boucher
Rose Hiskes
University of Connecticut

COLLABORATORS

Maine
Wilfred Erhardt
David Handley

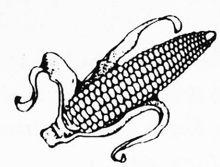
Massachusetts
John C. Howell Jr.
R. Alden Miller

New Hampshire
William G. Lord
Otho S. Wells

Rhode Island
Will Reynolds

Vermont
Vern Grubinger

This publication is produced through the combined efforts and resources of the Cooperative Extension organizations of the New England Land-Grant universities.



Corn Rootworm

Continued from page 1

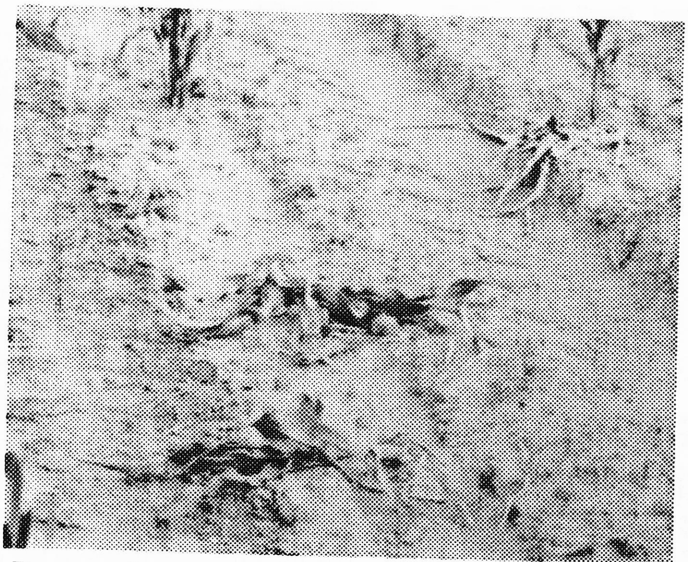


Figure 1. Crow damaged sweet corn seven weeks after feeding occurred.

It is crucial to be able to correctly diagnose such problems on your farm to protect your future profitability and the environment.

With the withdrawal of mesurol as a seed treatment, crow damage after planting has become much more common. Crows will not restrict their corn seed feeding to the pregermination or pre-emergence stage. They will pull up small corn plants to feed on the remains of the attached seed. When the birds drop the plant, most of the roots are left exposed to the air and simply stop growing. These stunted (1/8- to 1-inch-long) roots remain in contact with the soil and continue to grow. A single root can keep the plant alive, lying on the soil surface for a week or longer, until the corn is more than a foot in length (Figure 2). Obviously, this type of damage is limited to seedlings, during or shortly after the corn planting season (May to early July).

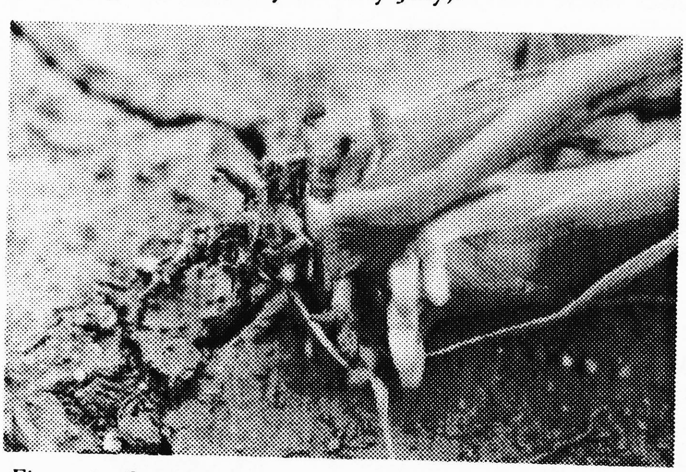


Figure 2. Corn roots that have stopped growing because they are no longer in contact with the soil following crow feeding at seedling stage.

The larvae of northern corn rootworm and WCR usually feed on the corn roots for about three weeks from mid-June through mid-July. Lodging (rare in the Northeast) does not occur until the corn is full grown in late summer, when high winds blow the root-pruned plants over. Rootworm injury leaves the feeder and brace roots brown to black in color and chewed off almost flush to the stalk.

A 1992 Animal Plant Health Inspection Service (USDA-APHIS) survey found WCR in all six New England states, but at extremely low population levels. One researcher reported that WCR composed only three to four percent of the total rootworm population. The New England site with the highest number of beetles in the survey had less than 1/10 the population found in Maryland. The populations at all sites were far, far below economic thresholds. Is WCR anything to worry about in New England? Not yet!

If you receive a sales pitch expounding rootworm as a reason for applying soil-applied chemicals, keep in mind that this is simply a new twist on an old theme. In the past, soil-applied insecticides have been promoted for European corn borer control or cutworm control. Ironically, the three worse cases of cutworm damage to corn and peppers that I have ever seen or heard of (directly from the grower) were treated with three different soil-applied chemicals. While teaching people to scout these crops in IPM programs, I have demonstrated to growers that there is no reduction in the infestation of these pests in treated versus untreated fields. While the benefits of many of these chemicals are questionable, there are possible environmental costs.

Most of the materials traditionally used for soil applications are rated as potentially high or moderate leachers. Due to their direct application to the soil, such insecticides are also considered more of a risk to reach groundwater than foliar-applied materials with similar leachability ratings.

There are also the possible adverse effects on predators, parasites and soil microorganisms which compete with, or feed on, disease spores, insects, mites and nematodes. There is more and more evidence accumulating that it is the diversity of the soil from fauna and flora which suppress insect pests. These pests include white grubs and diseases like damping-off caused by *Pythium* and *Rhizoctonia*, and *Phytophthora*. In short, applying an unnecessary, preventative, soil insecticide does not eliminate risk and may not help your bottom line.

Bird Control Options

As for crow damage, bird-shot, in-season hunting, hawk-kites/balloons, shellcrackers (fireworks for 12-gauge shotguns) and propane canons may provide some relief but are usually less than perfect solutions. A combination of bird-scare devices, each used for a short duration, will generally be more effective than relying on one technique.

Thiram (fungicide) seed treatment is supposed to function as a bird repellent to some degree. Some growers think it works well. If your seed companies do not use Thiram, you might request that it be used on all your corn and vine crop seeds or treat them yourself.

The chemical 4-aminopyridine (Avitrol) is a restricted-use pesticide that may only be used by individuals trained in bird control (in Connecticut) by the Department of Environmental Protection Wildlife Division. The label states that Avitrol is a poison with flock alarming properties... and birds that react and alarm a flock usually die. Growers who have tried this product report inconsistent results. One article published in the *Journal of Wildlife Management* compared Avitrol with propane exploders and visual hawk kites for control of red-winged blackbirds and grackles on field corn. The author found that the latter two were much more effective than the chemical and that the canon was the most cost effective and functioned almost as well as the kites.

Another possible control device that may fit into some growers' management systems is an electronic bird distress system called BirdGard. This system has up to three species-specific distress calls recorded on a microchip and is suppose to be more effective than older auditory devices which rely on a generic bird distress sound. It is often advertised in *American Fruit Grower* magazine and sells for around $300. In Connecticut, you must obtain a permit from the Department of Agriculture to operate any noise-making device to control wildlife.

References

Conover, M. 1984. *Comparative Effectiveness of Avitrol, Exploders, and Hawk-kites in Reducing Blackbird Damage to Corn.* J. Wildlife Management. 48(1):109-116.

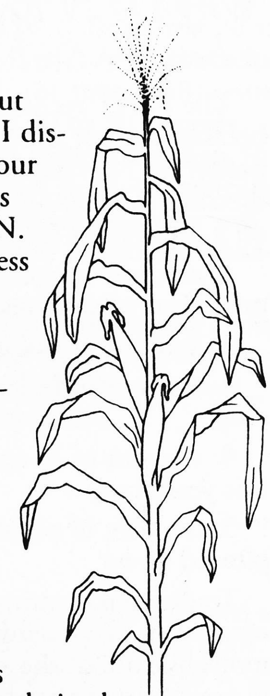
Hollingsworth, C. *New England Western Corn Rootworm Survey.* 1992. University of Massachusetts Cooperative Extension System.

Quarles, W. and J. Grossman. *1995. Alternatives to Methyl Bromide in Nurseries—Disease Suppressive Media.* The IPM Practitioner. Vol. XVII. No. 8:1-13.

USDA-APHIS Wildlife Services. *ShellCrackers for Bird Control.* 463 West Street, Amherst, MA 01002.

Past, Present and Future of Nitrogen Management—Part 2

Tom Morris
Soil Fertility Specialist
University of Connecticut



In the November article about nitrogen (N) management, I discussed the development of our traditional N recommendations and told of a new soil test for N. The test is called the presidedress nitrate test (PSNT). It is available for field and sweet corn growers. Use of the soil test usually results in N recommendations that are about one-third lower, on average, than recommendations derived from traditional methods that are not based on a soil test. This does not mean that every field in every year will require one-third less N fertilizer than you applied in the past. It does mean that N recommendations derived from the soil test can vary among fields in the same year and for the same field in different years. Although, on average, across a number of years, the recommendation will be much lower. This is different from the traditional N recommendations for sweet corn that are constant from field to field and year to year. (This assumes unmanured fields with no legume in the rotation.)

Why are Traditional N Recommendations Constant?

Traditional N recommendations, without a soil test, are constant from year to year because the recommendations are not adjusted for differences in N available to the crop at the time of sidedressing. For example, the *New England Vegetable Management Guide* recommends 60 lbs/acre of N applied broadcast before planting, 40 lbs N/acre banded with the planter and 60 lbs N/acre sidedressed when corn is about 12 inches tall. This recommendation is the same for all fields in all years, and it probably is higher than needed for many fields in many years. Traditional recommendations frequently are higher than needed because of a lack of information about field-specific N availability. Without this information, recommended N rates had to be set high

Continued on page 4

Nitrogen Management

Continued from page 3

enough so that in years of low N availability, the crop had sufficient N for optimum yield. (See *Grower,* November 1995 for a more detailed explanation of how N rates were developed.)

Why Do N Recommendations Vary when the Soil Test is Used?

The PSNT recommendations are not constant because the test allows adjustment of the recommendation for N available to the crop at the time of sidedressing. The amount of N available is dependent on a number of factors. The primary factors are:

1. amount of rainfall, especially from March 1 until time of sidedressing
2. amount of soil organic matter
3. amount of N fertilizer applied for last year's crop
4. amount of N applied before sidedressing for this year's crop
5. the date of plowing and amount of cover crop plowed down

Traditional recommendations assume that the amount of N available from these sources is constant, but use of the soil test has demonstrated that N availability varies substantially from year to year and field to field.

If a field had a history of manure application or had a legume in the rotation, these also would be major factors affecting N availability. I am discussing only unmanured fields with no legume in the rotation, which is the most common situation for sweet corn fields in New England.

One example of how rainfall can affect the PSNT recommendations is shown in a review of recommendations for field corn in Connecticut. In relatively low-rainfall springs such as 1988 and 1995, the percent of fields tested that required sidedressed N fertilizer was about 25 percent. In a relatively high-rainfall spring such as 1989, about 75 percent of the fields tested required sidedressed N.

How Can I Best Use the Information Provided by the PSNT?

The best way to use all soil testing results, including your routine P, K and limestone recommendations, is to maintain records of each field's results. This will provide a historical context to evaluate new results. To make the most use of the PSNT result, you should record a number of other easily available items. The items I recommend you record are:

1. the amount and timing of N fertilizer applications
2. spring rainfall; three categories of rainfall are probably sufficient—normal, much greater than normal and much less than normal
3. unusually high rainfall shortly before or after soil sampling
4. previous crop
5. amount and date of plowing of cover crop
6. date of planting
7. depth of sampling
8. date of soil sampling
9. height of corn at time of soil sampling
10. N recommended by soil test
11. date and method N application
12. rate and type of N fertilizer applied
13. evaluation of the N status of the crop at harvest and the yield of the crop

If you keep this type of information for a number of years, you will develop a good picture of how much nitrogen you should apply before planting and at sidedress time.

The list of information seems long, but some of this information, such as the depth of sampling or height of corn at time of soil sampling, does not need to be reported for every field in every year. You only need to record this if you have not followed the recommended procedure. For example: the test is less reliable if the depth sampling is greater than or less than 12 inches or if the soil sample is collected when corn is less than 6 inches tall or greater than 12 inches tall. Noting any deviations from the recommended procedure will help interpret the results at the end of the season.

Interpretation of Soil Nitrate Concentrations

Soil nitrate concentrations that are consistently greater than 30 ppm N mean that you are consistently applying more N than needed. Nitrate concentrations consistently below 10 ppm mean that you should apply more N before planting. For environmental reasons, it would be best to have all fields test below 10 ppm. That usually means that little or no N was applied before the time of sidedressing and that little or no leaching of nitrate occurred during spring rainfall. I believe that it is too economically risky to wait to apply all your N at time of sidedressing. If wet weather delays N application much beyond the 12-inch growth stage, yields can be substantially reduced. I also believe the soil test is most useful if some N is applied before planting to ensure that soil nitrate concentrations are consistently greater than 10 ppm.

You have not gained much new information by using the soil test, compared with using the traditional recommendation system, if soil nitrate concentrations are consistently less than 10 ppm. The nitrogen recommendations for the PSNT and for the traditional methods are almost identical when soil test values are less than 10 ppm. I prefer to have soil nitrate concentrations in the 20 to 30 ppm range. You frequently can have most of your fields test in this range if you:

1. maintain a record of the information suggested,
2. apply N at the rate suggested by the data in the historical record and
3. apply the needed N as close to planting time as possible.

In some years, on some fields, you will apply a little more N than needed, and the soil might test above 30 ppm. In this situation you will not have the expense of sidedressing. In some years, on some fields, you will apply less N than you need, and the soil might test between 15 and 30 ppm. Sidedress N will be required.

The amount of rainfall will be the main factor affecting the nitrate concentrations. You cannot control rainfall, but if you maintain records, you will be able to estimate the effect of rainfall on soil nitrate concentrations in your fields. You will also be developing a database to guide the sidedress N recommendations on your farm. Our research database in Connecticut shows that soils testing 25 to 30 ppm rarely need sidedress N. Soils testing 20 to 25 ppm need 30 to 40 pounds of N/acre about half the time and no N about half the time. Soils testing between 15 and 20 ppm need 30 to 90 pounds N/acre most of the time. Soils testing less than 15 ppm are erratic in their response to N. Combining your farm's database with a research database will allow you to make more accurate N recommendations for your farm.

In a future article, I will discuss managing N for crops that do not have a N soil test. I will also look at some new tools for managing N that are currently being evaluated by researchers.

Sweet Corn Weed Management—1996

Understanding Bicep/Dual Formulations

A. Richard Bonanno
Senior Extension Specialist
University of Massachusetts Extension System

There are currently two formulations of Dual (metolachlor) and three formulations of Bicep (metolachlor + atrazine) on the market. Following is a brief summary of each.

Dual:	metolachlor (8 lb/gal), nothing added, PPI, PRE, OT
Dual II:	metolachlor (8 lb/gal) with a safener added to increase safety to the corn, PPI, PRE. The safener was designed with field corn in mind and is not intended to allow growers the option of planting sweet corn in soils that are too cold.
Bicep:	metolachlor (3.28 lb/gal) + atrazine (2.67 lb/gal), PPI, PRE, OT
Bicep II:	metolachlor (3.22 lb/gal) with a safener added to increase safety to the corn + atrazine (2.67 lb/gal), PPI, PRE
Bicep Lite:	metolachlor (3.33 lb/gal) + atrazine (1.67 lb/gal), PPI, PRE, OT
PPI = preplant incorporated PRE = soil surface application after planting OT = over top of corn before it is 5" tall	

For many years, Extension has recommended a maximum of 1 lb atrazine per acre on sweet corn. This low rate of atrazine is usually effective if it is combined with a grass herbicide such as Dual (metolachlor). Other grass herbicides include Lasso, Eradicane and Sutan+. The grass herbicide is usually recommended at the label rate. When formulated mixes such as Bicep are used, it is not always possible to apply the rate of each herbicide accurately. To keep the rate of atrazine low, many growers lower the rate of the formulated mix which also lowers the rate of Dual. These lower rates of Dual often result in poor grass control, especially on heavier soils. The correct rates of Dual for various soil types and organic matter (OM) contents are listed below.

	PPI or PRE		Over Top of Corn	
Soil Type	< 3% OM	> 3% OM	< 3% OM	> 3% OM
	Pints of Dual Per Acre			
Coarse	1.25 to 1.5	1.5	1.5 to 2	2
Medium	1.5 to 2	2	2 to 2.5	2 to 2.5
Fine	2	2.5	2 to 2.5	2.5 to 3
Conversion: 1.25 pints = 20 ounces 1.5 pints = 24 ounces 2 pints = 32 ounces 2.4 pints = 40 ounces 3 pints = 48 ounces				
Note: Remember that Dual II cannot be applied over top of corn.				

Continued on page 8

Germination Problems with se and sh_2 Corn

John Howell and A. Richard Bonanno
University of Massachusetts Extension

Se and sh_2 (collectively known as high sugar) varieties are in high demand in both wholesale and retail sweet corn markets. Compared to standard varieties, se (sugar enhanced) types contain about 1-1/2 times as much sugar and sh_2 (shrunken gene or supersweets) types contain about twice as much. Most consumers like the increased sweetness although some feel that the sh_2's are too sweet. Marketers prefer them because they have a longer shelf life than standard sweet corn varieties. They retain their flavor longer, allowing for a bigger harvest window. However, these high-sugar varieties have their drawbacks. Yields are typically lower than standard varieties, and early planted fields sometimes suffer moderate to severe stand reductions.

Corn germination and emergence proceed slowly or not at all in cool soils. If seed imbibes water but doesn't grow, it is susceptible to decay. Sugar is an ideal food for decay organisms, and seed of high sugar varieties is especially likely to decay when the soil is cool and moist. High sugar seeds have brittle pericarps (seed coats). A broken or cracked pericarp permits easy entry of decay organisms into the seed.

Avoiding Problems

Select fields that are well drained and warm early. Delay planting until soil reaches 60°F for se's and 65°F for sh_2's. This will reduce the likelihood of decay. There is little to be gained by planting earlier when soil temperature is too low for proper germination and emergence. Waiting until soil temperature is appropriate for germination and growth may interfere with planting schedules, but the consequences of a poor stand should be of more concern.

Plastic mulch and floating row covers warm the soil and can greatly improve stands of early planted high sugar corn. However, these measures may not adequately warm the soil under cool and cloudy conditions. There are indications that the soil must be warmed within 12 to 48 hours after planting to avoid problems. One option is to lay plastic in advance to warm the soil before planting. This requires equipment capable of seeding through plastic.

High sugar corn seed should be handled with extra care to avoid damage to the brittle pericarp. High sugar seed is often small and inconsistent in size. Some growers feel that using precision vacuum planters alleviates these problems.

It is important to do everything you can to provide optimum conditions for germination and growth. Although we can't control the weather, we have control over soil fertility and pH. We have seen too many fields with poor emergence and uneven growth only to discover that the soils were very acid. Any factor unfavorable for growth can increase susceptibility to decay.

Seed Germination Tests

Standard germination tests are conducted under ideal laboratory conditions. They are useful in predicting germination when field conditions are good, but they have little relationship to cool, wet soils. Some labs offer a cold test as well as the standard test. This can be useful in testing certain varieties and seed lots. You can have these tests performed at Geneva Seed Testing Laboratory, Sturtevant Hall, NYS Ag Experiment Station, Geneva, NY 14456. Standard test is $8.00; Cold test is $15.00.

Weed Management Considerations

Several commonly-used sweet corn herbicides have also been shown to further reduce high sugar corn emergence and growth in cool and wet soils. These herbicides include Dual, Lasso, Sutan+, Eradicane and prepacks of these herbicides including Bicep, Lariat and Sutazine. Use of Atrazine, Bladex or Princep alone does not appear to result in the same type of injury. In studies, including some excellent work by Drs. Stan Gorske and Mark Bennett of The Ohio State University, where the combination of both cool soils and herbicides have been studied, the following results were noted. At soil temperatures above 57°F, no reduction in emergence of high sugar corn was noted. Herbicides included were Lasso, Dual, Sutan+ and Eradicane. At soil temperatures of 50°F and below, several problems were noted. All of these herbicides reduced seedling emergence. In addition, Sutan+ and Eradicane reduced seedling size.

If high-sugar corn must be grown and soil temperatures are less than ideal, it may be possible to reduce the injury potential of the herbicides. Most growers apply a triazine herbicide, such as Atrazine, Bladex or Princep, for broadleaf weed control and a thiocarbamate or chloracetamide herbicide, such as Sutan+, Eradicane, Dual or Lasso, for grass control. These grass herbicides, as previously mentioned, have the greatest potential for increasing cool soil problems with high sugar corn. With less than ideal soil temperatures, growers should not use preplant incorporated herbicides such as Sutan+ or Eradicane in their earliest plantings. This applies not only to these two herbicides but also to all generic forms of these herbicides as well as prepacks containing these herbicides.

Application of either Dual or Lasso in these early plantings should be delayed until after the sweet corn emerges. Since Dual and Lasso are used primarily for annual grass control and since grasses will generally not germinate in cool soils, delaying the application can greatly reduce the cool soil problem with high sugar corn. The Dual and Lasso labels both allow application after the sweet corn emerges as long as they are applied before the sweet corn reaches five inches in height. Also remember that the Dual or Lasso must be applied before the grasses emerge.

In conclusion, remember that it is difficult to separate the effects of cool soils and herbicides since most growers are applying herbicides to their sweet corn plantings. The best way to avoid problems is to not plant high-sugar corn in cool soils or to not plant any sweet corn varieties until the soil temperature is at least 60° to 65°F. Delaying herbicide applications will reduce the herbicide part of the problem, but germination and emergence may still be reduced by the cool soils alone. Finally, remember to read and follow all label directions before using any pesticide.

Understanding and Avoiding Resistance to Herbicides

A. Richard Bonanno
Senior Extension Specialist
University of Massachusetts
Extension System

Weed problems can change over time in a given field. Weed species may change. For example, grasses may tend to become less of a problem and broadleaf weeds may take over. Changes may also occur within a weed species.

Changes in species over time can be chemical related or nonchemical related. Nonchemical-induced species shifts are influenced by three factors—the type of crop grown, crop rotation patterns and cultivation practices.

Corn crops tend to have greater grass problems than broadleaf problems. A broadleaf crop, such as potato, may tend to have more broadleaf problems than grass problems, especially if it is planted early in the season. Annual crops, such as vegetables, will have more annual broadleaf problems than perennial crops, such as blueberries or asparagus, which will develop more perennial weed problems. Frequent cultivations may tend to create a shift to weeds that do not die quickly after a cultivation, such as galinsoga or purslane. All of these changes occur slowly, over many growing seasons.

Chemical-induced species shifts can occur when a herbicide does not control all weeds present. Apparently overnight, a new weed becomes a problem that was not seen as a problem in the past. For example, galinsoga is not very competitive with other weed species such as lambsquarters or pigweed. If a herbicide is used which controls these two species and galinsoga is present in a field, it can quickly become a serious problem. This change can occur quickly, especially if crop rotation is not practiced.

Changes within a species can occur over time with the use of herbicides. This is known as herbicide resistance. Resistance to pesticides is a problem that is not new. It has occurred for many years with many insecticides and fungicides. Only over the last two decades has it been a problem with some herbicides.

The sequence of events that result in herbicide resistance is as follows, using the example of lambsquarters. Many growers use atrazine in corn production. Atrazine is effective on common lambsquarters. There are times, however, when all of the lambsquarters in a field may not die. Some of the plants that do not die may be slightly different from the rest of the population. These differences occur naturally in nature but may not be noticeable, since these different individuals are usually less competitive that the regular lambsquarter plants. Since these different plants do not die, they produce seed. The seed is predominantly like the parent plant and will likely not die with an application of atrazine. If corn is planted each year with an application of atrazine each year, these different lambsquarter seeds will grow, produce seed and multiply over time. The grower notices that lambsquarters is becoming more and more of a problem in the corn field. This lack of control is usually blamed on the herbicide, the weather or some other cause. If fact, a resistant population of lambsquarters has developed.

Resistance to herbicides was first discovered in the 1970s in the triazine family. The triazine family contains atrazine, simazine (Princep) and cyanazine (Bladex). Usually, resistance occurs across all herbicides within a family. To date, over 53 weed species have been documented as being resistant to atrazine. In 1982, resistance was noted in the family that contains trifluralin (Treflan). In this case, goosegrass has been the only species that is resistant to this family. Other cases of resistance have been noted.

As was mentioned earlier, resistance to insecticides has occurred more frequently and with much greater speed than with herbicides. Why is this the case? Insects usually have multiple generations within a given year allowing resistant individuals to multiply fast. Insecticides are also usually applied more than once a season to kill of any remaining normal individuals that may not have been contacted by the insecticide the first time. (Maybe they were behind a leaf or out of the field during a previous application that year.) Insects are also highly mobile, allowing resistant individuals to move to other areas. Finally, insects cannot lay dormant for several years, as can weed seeds. This persistent weed seed bank allows continual germination of normal individuals for many years, keeping the resistant individuals limited, since they are usually less competitive.

Avoiding resistance to any pesticide requires good management. Seek less than 100% control. This will ensure that the normal population does not die out. Rotate pesticides and chemistry as much as possible; do not use the same pesticide or group of pesticides over and over again. In the case of herbicides, use cultivation and hand weeding to control escaped plants. Rotate crops as much as possible. When resistance is already present, all of the advise above still applies. In addition, rotate to new crops, pesticides or cultural practices (such as mulches or cultivation) to further attack the problem.

Sweet Corn Weed Management

Continued from page 5

Assuming that the rate of atrazine is to stay at 1 lb active ingredient per acre, the following table shows how much of each Bicep formulation should be applied to provide 1 lb of atrazine.

	Bicep	Bicep Lite	Bicep II
amount/acre	3 pints =	5 pints =	3 pints =
atrazine/acre	1 lb +	1 lb +	1 lb +
Dual/acre	1.2 pints	2.1 pints	1.2 pints
Conversion: 1.2 pints = 19 ounces 2.1 pints = 34 ounces			

As you can see from the table, Bicep Lite comes closest to providing the right rate of Dual for most soil types. If Bicep or Bicep II is used, many growers will need to add some additional Dual to the tank so that sufficient Dual is used per acre.

Remember that many growers apply Bicep or Bicep Lite over the top of newly emerged corn in the spring to minimize cold soil Dual injury and improve overall atrazine and Dual activity. This cannot be done with Bicep II. Bicep II can only be applied before the corn emerges. Therefore, for non-plastic spring applications where overtop applications would be the treatment of choice, Bicep II is not recommended. If the Bicep must be applied before corn emergence in the early spring (especially for corn planted under row covers), Bicep II may improve crop safety over Bicep or Bicep Lite.

One sure way to avoid all this confusion is to buy the herbicides separately. By tank mixing the herbicides yourself, you can then apply the correct rate of each with as little guesswork as possible. Soil-applied broadleaf herbicides registered for use in sweet corn include atrazine (AAtrex), cyanazine (Bladex) and simazine (Princep). Soil-applied grass herbicides include metolachlor (Dual), alachlor (Lasso), EPTC + safener (Eradicane) and butylate (Sutan+). Many growers apply one broadleaf herbicide and one grass herbicide in a tank mix. Some postemergence options are also available.

For further information on sweet corn weed management, consult the following sources:

1. Product labels. (Remember that the label is the law!)

2. *A Guide to Weed Management in Sweet Corn.* 1992. M. J. Else and A.R. Bonanno. UMass Extension. 6 pp. (1996 revision expected)

3. *New England Vegetable Management Guide. 1996-1997.* Extension Services of the six New England land-grant universities. 96 pp.

430254
University of Connecticut
Richard A. Ashley
1376 Storrs Road, U-67
Storrs, CT 06269-4067

Nonprofit
Organization
U.S. Postage
PAID
Permit No. 3
Storrs, CT