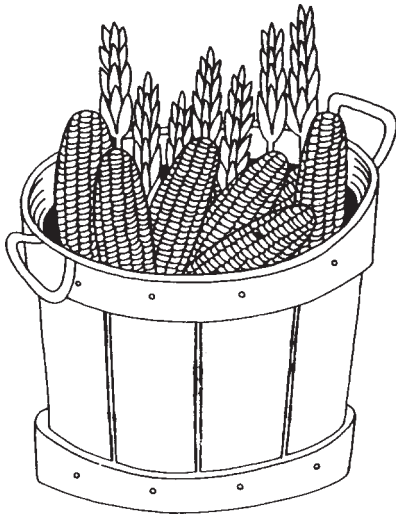


PLANT & PEST ADVISORY

FIELD CROPS/LIVESTOCK EDITION \$1.50

AUGUST 6, 1998



INSIDE

Corn Yield Losses - Moisture Stress 1

Bt Corn and Borers 2

Resources for Soil Testing and Plant Analysis 2

Twilight Meeting 3

Weekly Pest Summary 3

Corn Yield Losses - Moisture Stress

Jeremy W. Singer, Ph.D., Field and Forage Crops

Seldom do we experience the “ideal” growing season. This year, above average precipitation in May, average precipitation in June, and considerably below average precipitation in July for most of the state has seriously affected the dryland corn crop in New Jersey.

Corn that was planted in late April and early May suffered from poor and uneven germination due to the two weeks of continual rain in early May. Corn planted in mid to late May germinated rapidly and established a closed canopy by mid-July.

Since then, however, dry conditions have slowed growth and caused irreversible yield losses. During dry soil conditions, corn rolls its leaves in an attempt to minimize exposed surface area to reduce light interception. Additionally, the stomates, the small pores on both sides of the leaves close to minimize water loss. Consequently, carbon dioxide cannot enter the plant and photosynthesis rates decline.

What does this mean? If growth rates slow down, ultimately yield will decline. Water stress during late vegetative growth, from approximately rapid stem elongation to tasseling, usually 3-to 4 weeks prior to silking, will result in 2-3 percent per day yield reduction.

Stress, both moisture and temperature, during tasseling, silking, and pollination affects the most critical stage in corn development. Moisture stress during this growth stage delays silking and increases the time for pollination. As a result, sometimes all of the pollen may be shed prior to silk emergence. At this growth stage, low soil moisture availability can result in yield losses of 5 percent per day. Severe moisture and temperature stress during this period can result in losses up to 10 percent per day. During the early grain-filling period, approximately 20 to 30 days after silking, moisture stress can reduce final yield 3-4 percent per day.

With December corn at 2.23 per bushel, reductions in a hybrid’s potential yield will hurt the back pocket. In the short term, let’s hope for timely rains for the remainder of the growing season to minimize further yield reductions. And in the long term, spreading out hybrid maturity dates is the best management tool to reduce risk in future growing seasons. □

Bt Corn and Borers

Daniel Kluchinski, Mercer County Agricultural Agent

Genetically enhanced corn has been widely accepted and used by farmers in New Jersey and across the United States. Most growers are eager to plant these enhanced crops to improve yield, reduce insect damage and the need for field applied insecticide. For farmers fighting corn borers, one of the most welcome arrivals in their fields was Bt-enhanced corn.

Bt corn uses a portion of the genes of the bacterium *Bacillus thuringiensis*, which produces a crystal-like protein that kills the insect when it mixes with enzymes in the insect's gut. The crystal protein has no effect on people, animals or even other insects that don't belong to the Lepidopterous group of stalk-boring pests.

Farmers who see corn borers munching through their genetically enhanced crop are initially concerned and confused. Did I really get Bt enhanced corn like I paid for? Has resistance developed already? Should there be any feeding by corn borer in this Bt enhanced corn? Purdue University entomologists caution farmers not to jump to the wrong conclusions at the sight of a few caterpillars in their corn.

Although there are concerns that the corn borers may eventually develop resistance to Bt-enhanced corn, Purdue Extension entomologist Larry Bledsoe says some crop damage is to be expected even in the genetically modified crops. "No bag of Bt seed is pure. No quality control can manipulate the amount of control in each plant," he says. "If a farmer was in a field and found a couple of plants being chewed up by corn borers, that would be normal."

Scientists have moved the gene for this protein from the Bt bacterium into corn plants. This allows the leaves and stalks of the plants to produce the protein and fight a pest which has accounted for corn losses exceeding \$1 billion annually in the United States. Typically seed lots of Bt-corn contain a small amount — less than 4 percent — of plants that produce little or none of the protein. "This means that a few plants aren't expressing the Bt gene. That's to be expected," Bledsoe says.

Another explanation for finding corn borer caterpillars in resistant corn may lie in where the Bt-corn is planted. "If you plant next to a field with no resistance, some of those corn borers are going to come into the resistant field and feed along the edges for a while before they are killed," Bledsoe says.

A third reason for corn borers in resistant corn is that the amount of resistance in the plants isn't consistent through the growing season. "There's a slow loss of resistance in the plant," Bledsoe says. "It's very strong at the beginning of the season, but later in the season the amount of resistance drops."

There are no known incidents of corn borer developing widespread resistance to Bt crops, but scientists know that it is possible, because they've created Bt-resistant caterpillars themselves.

If a farmer has taken all of this into account and still suspects that corn borers have developed resistance in a particular field, Bledsoe recommends that he or she take the following steps:

- Double check field records to be sure that Bt corn was planted in the field.
- Read the grower's guide for your seed and follow the company's procedure for investigating suspected resistance failures.
- Contact seed company representatives and the county Extension agent as soon as possible. "Just try to keep a cool head," Bledsoe suggests. "You should call your seedsman, who will take samples from the area so that the corn borers can be tested to see if any type of resistance has developed."

Adapted from "Don't Assume Your Bt is Broken Because Borers are Biting," Amy H. Raley, Purdue University's Ag Answers Mail Group, August 4, 1998. □

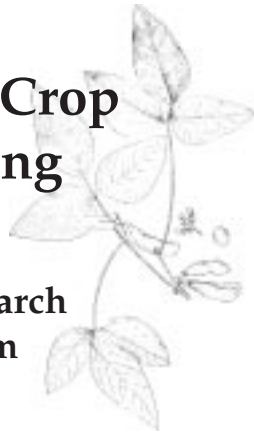
Farmers who see corn borers munching through their genetically enhanced crop are initially concerned and confused.

Resources for Soil Testing and Plant Analysis

A factsheet entitled "Laboratories for Soil Testing and Plant Analysis" provides a list of laboratories and what testing services they conduct. The factsheet can be obtained from Dr. Joseph Heckman, Plant Science Department, Foran Hall, Rm., 167, 59 Dudley Road, New Brunswick, NJ 08901-8520, (732)-932-9711, ext. 119. □

Field and Forage Crop Twilight Meeting

August 11, 1998
Rutgers' Snyder Research
and Extension Farm
Pittstown, NJ



5:30 - 6:30 p.m. Registration and Dinner
6:30 - 9:00 p.m. Meeting and Farm Tour

Speakers and a farm tour of current research and demonstration projects.

Topics will include:

- ◆ corn and soybean variety trials
- ◆ phosphorus fertilizer recommendations for corn
- ◆ nitrogen management in cool-season grasses
- ◆ matua grass evaluation, manure management
- ◆ Bt corn and potato leafhopper resistant alfalfa

- Pesticide license recertification credits will be available.
- Prior to the wagon tour, a free buffet dinner will be held.
- The event is being sponsored by Rutgers Cooperative Extension and North Jersey Resource Conservation and Development.
- Pre-registration is required by August 4.

Field Crops Weekly Pest Summary 8/6/98

Field Crops Working Group

Water, or lack of it, remains the primary concern around the state. Growers who received appreciable amounts of rain last week are generally fairing well now. In the middle and northern parts of the state on either sandy or shaley ground, crops are not doing well.

Alfalfa

Potato leafhopper numbers appear to be declining for the southern half of the state. In the northern areas leafhoppers have been controlled by taking third cutting and populations may rebound there. There are still plenty of nymphs in fields.

Corn

Fall armyworm populations have been found in two Gloucester County fields with 50 to 60% of the plants infested and damaged. Larvae range from newly hatched to mature larvae. The corn was pre-tassel in both fields. Anyone with late, pre-tassel corn should be watching their fields.

Corn rootworm numbers continue to remain high in Hunterdon and Warren Counties. The majority of the scouted continuous corn fields have reached thresholds. About 90% of the beetles are western corn rootworm, which is the more injurious of the two species of rootworm in the state.

Soybean

Spider mites are a concern in Delaware, and there have been questions about them in Burlington County. Matt Myers, RCD/USDA reports finding a few spider mites in a field in Mercer County. Otherwise, where there has been sufficient rainfall, soybeans look good. □

Rutgers Cooperative Extension - NJAES
U.S. DEPARTMENT OF AGRICULTURE
Rutgers - The State University of New Jersey
88 Lipman Drive
Cook College
New Brunswick, N.J. 08901-8525

PLANT & PEST ADVISORY FIELD CROPS/LIVESTOCK EDITION CONTRIBUTORS

Rutgers Cooperative Extension Specialists

George Hamilton, Ph.D., Pest Management
Joseph R. Heckman, Ph.D., Soil Fertility
Bradley A. Majek, Ph.D., Weed Science
Jeremy Singer, Ph.D., Field and Forage Crops
Michael L. Westendorf, Ph.D., Animal Science

RCE County Agricultural Agents and Program Associates

Field Crops IPM Prog., Joseph Ingerson-Mahar (609-769-0090)
Burlington, William J. Bamka (609-265-5757)
Mercer, Daniel Kluchinski (609-989-6830)
Salem, David L. Lee (609-769-0090)
Program Associate, Miles Huffaker
Sussex, Robert C. Mickel (973-579-0985)
Program Associate IPM, Susan Eck-Jones
Warren, Everett A. Chamberlain (908-475-6503)

North Jersey Resource Conservation & Development Council

Brian Aldrich (908-852-5450)

Newsletter Production

Jack Rabin, Assistant Director, NJAES
Cindy Rovins, Editor and Designer

Rutgers Cooperative Extension provides information and educational services to all people without regard to sex, race, color, national origin, disability, handicap or age. Rutgers Cooperative Extension is an Equal Opportunity Employer.

Pesticide User Responsibility: Use pesticides safely and follow instructions on labels. The user is responsible for the proper use of pesticides, residues on crops, storage and disposal, as well as damages caused by drift. For specific labels, special local-needs label 24(c) registration, or section 18 exemption, contact Rutgers Cooperative Extension in your County.

Use of Trade Names: Trade names are used in this publication with the understanding that no discrimination is intended and no endorsement is implied. In some instances a compound may be sold under different trade names, which may vary as to label clearances.