Pest & Crop

August 31, 2001 - No. 24

In This Issue

Insects, Mites, and Nematodes

Black Moths Flying - (*John Obermeyer, Rich Edwards, and Larry Bledsoe*) -

Numerous black moths are being reported around farms, homes, and yards throughout the state. Most likely, these are the adults of the green cloverworm (Noctuidae: *Hypena scabra*). These moths are mottled grayish-black and have a stealth jet fighter shape. They are often noted around lights at night.

Green cloverworm parasitized by wasp

Green cloverworm caterpillars have been plentiful in some soybean fields over the past month. In most years, fungal diseases as well as insect parasites and predators keep green cloverworm populations in check. We've noted parasitized larvae while walking through soybean fields over the past month.

Green cloverworm moth

Homeowners should understand that, although these moths are a nuisance and sometimes find their way into homes, they won't harm people, houses, or yards. These moths will pass the winter in leaf litter or other sheltered areas.

Purdue Cooperative Extension Service

Grain Bin Clean-Up - (*Linda Mason and John Obermeyer*) -

- Stored grain insect infestations usually begin from poor sanitation
- Procedures are given to prevent infestations
- Now is the time to carry out bin clean-up procedures

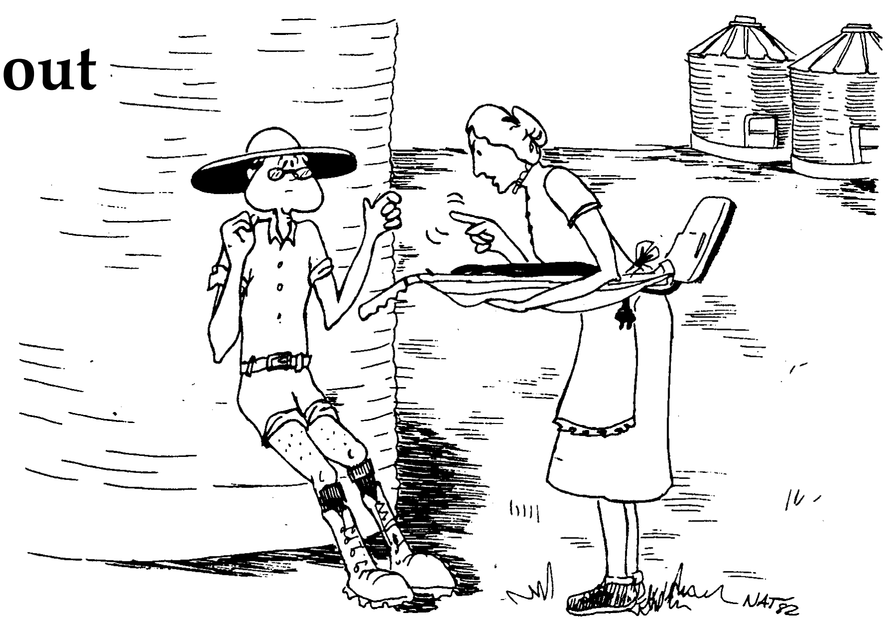
While driving Indiana's county roads, it is very apparent that harvest is fast approaching. Yields are expected to be good and storage facilities should be readied for corn that will likely carryover to next spring or summer. Preparing bins for storage now goes a long way toward preventing insect infestations. Several species of insects may infest grain in storage. The principal insects that cause damage are the adult and larval stages of beetles, and the larval stage of moths. Damage by these insects includes reducing grain weight and nutritional value, and by causing contamination (as live or dead insects), odor, mold, and heat damage that reduce the quality of grain.

Newly harvested corn may become infested with insects when it comes in contact with previously infested grain in combines, truck beds, wagons, other grain-handling equipment, augers, bucket lifts, grain dumps, or grain already in the bin. Insects may also crawl or fly into grain bins from nearby accumulations of old contaminated grain, livestock feeds, bags, litter, other cereal products, or rodent burrows.

Insect infestations can be prevented by employing good management practices. Now that many grain bins are empty, the following guidelines should be used before the 2001-grain is placed in bins:

- Brush, sweep out and/or vacuum the combine, truck beds, transport wagons, grain dumps, augers, and elevator buckets to remove insect-infested grain and debris.
- In empty bins, thoroughly sweep or brush down walls, ceilings, ledges, rafters, braces, and handling equipment and remove debris from bins.
- Inside cleaned bins, spray wall surfaces, ledges, braces, rafters, and floors with an approved insecticide (Chlorpyrifos-methyl, methoxychlor, cyfluthrin, or diatomaceous earth) to create a perimeter barrier. Outside, complete this barrier by treating the bases and walls up to 15 feet high, plus the soil around the bins.
- Remove all debris from fans, exhausts, and aeration ducts (also from beneath slotted floors, when possible). Fumigate the false floor area if the bin has a history of insect infestation or you have not cleaned the false floor area recently. Only certified fumigation applicators may purchase and apply these.
- Remove all debris from the storage site and dispose of it properly according to area, state, and/or federal guidelines (the debris usually contains insect eggs, larvae, pupae, and/or adults, ready to infest the newly harvested grain).
- Remove all vegetation growing within ten feet of the bins (preferably the whole storage area). Then spray the cleaned area around bins with a residual herbicide to remove all undesirable weedy plants.
- Repair and seal all damaged areas to the grain storage structure. This is not only to prevent insect migration into the bin, but also to prevent water leakage, which leads to mold growth.
- Do not store newly harvested grain on old grain already in storage.
- Whenever fans are not operated, they should be covered and sealed. This reduces the opportunity for insects and vertebrates to enter the bin through the aeration system.

Bug Scout



Don't let me catch you with my vacuum cleaner in that grain bin again!

Black Light Trap Catch Report (Ron Blackwell)														
County/Cooperator	8/14/01 - 8/20/01							8/21/01 - 8/27/01						
	VC	BCW	ECB	GC	CEW	FAW	AW	VC	BCW	ECB	GC	CEW	FAW	AW
Clinton/Blackwell	1	27	212	174	4	0	2	16	0	148	140	16	0	4
Dubois/SIPAC	0	16	14	175	22	1	9	2	45	20	191	159	0	12
Jennings/SEPAC	0	2	18	140	5	0	2	3	0	24	165	20	0	2
LaPorte/Pinney Ag Center	0	4	1026	69	9	0	5	6	4	103	15	9	0	0
Lawrence/Feldun Ag Center	2	33	17	66	5	2	10	2	10	20	44	67	1	4
Randolph/Davis Ag Center	2	14	117	43	4	1	8	15	15	70	145	4	2	9
Whitley/NEPAC	11	10	386	165	0	2	4							

BCW = Black Cutworm ECB = European Corn Borer GC = Green Cloverworm CEW = Corn Earworm
AW = Armyworm FAW = Fall Armyworm VC = Variegated Cutworm

Agronomy Tips

Post-Maturity Grain Drydown in the Field - (*Bob Nielsen*) -

- Early maturation of corn grain means greater drying rates
- Indiana corn harvest likely to begin earlier than usual

Given the percentage of Indiana's corn crop that is rapidly approaching physiological maturity and the early time frame in which it is occurring, there is much talk down at the Chat 'n Chew Café about the opportunities for reducing or eliminating grain drying costs this fall. Indeed, early maturation of the corn crop typically results in faster drydown of grain simply because it is occurring in a time frame that is relatively warmer than usual.

Grain moisture content continually decreases as the kernel develops. Loss of grain moisture occurs partially through the plant (cob and ear shank), partially through the husk leaves and partially through the exposed end of the ear.

Hybrid variability for the rate of grain moisture loss during post-maturity drydown and the resulting grain moisture content at harvest are of great interest to grower and seed industry alike. Growers desire hybrids with superior yielding ability (maximum gross income) that also dry very quickly in the fall (minimum drying or grain shrinkage costs). For an excellent discussion on grain weight shrinkage, see Hicks and Cloud, 1991. *Calculating Grain Weight Shrinkage in Corn Due to Mechanical Drying*. NCH-61. Purdue Univ. Cooperative Extension Service, W. Lafayette, IN 47907 (on the Web at <http://www.agcom.purdue.edu/AgCom/Pubs/NCH/NCH-61.html >).

The seed industry also uses grain moisture loss data to rate hybrids for relative maturity. Many seed companies assign relative hybrid maturity ratings on the basis of relative harvest moisture differences among a group of hybrids. Two hybrids that differ in one 'day' of relative maturity will typically vary by about 0.5% grain moisture if planted and harvested on the same days. Relative hybrid maturity ratings are most consistent within, not among, seed companies.

Certain hybrid characteristics interact to influence grain moisture loss rates. The relative importance of each trait varies throughout the duration of the field drydown process.

- **Husk Leaf Number**. The fewer the number of husk leaves, the more rapid the grain moisture loss.
- **Husk Leaf Thickness**. The thinner the husk leaves, the more rapid the grain moisture loss.
- **Husk Leaf Senescence**. The sooner the husk leaves senesce (die), the more rapid the grain moisture loss.
- **Husk Coverage of the Ear**. The less the husk covers the tip of the ear, the more rapid the grain moisture loss.
- **Husk Tightness**. The looser the husk covers the ear, the more rapid the grain moisture loss.

- **Ear Declination**. The sooner the ears drop from an upright position to a downward position, the more rapid the grain moisture loss.
- **Cob Diameter**. The narrower the cob diameter, the more rapid the grain moisture loss.
- **Kernel Pericarp Thickness** The thinner the pericarp, the more rapid the grain moisture loss.

Grain moisture loss in the field occurs at a nearly linear rate within a range of grain moisture content beginning at about 40 percent and ending at 15 to 20 percent, then tapers off to little or no additional moisture loss after that. Figure 1 illustrates changes in grain moisture content over time for an adapted medium maturity hybrid grown in Indiana in 1992 (unusually cool fall) and 1994 (more typical fall temperatures). Grain moisture loss was linear in both years until early to mid-October when loss rates leveled off to near zero.

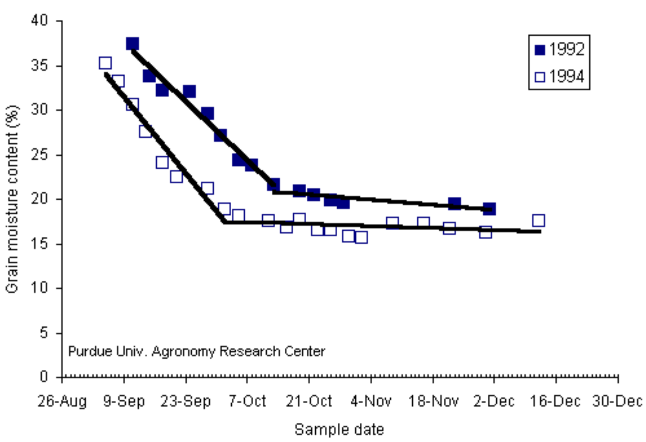


Figure 1. Change in grain moisture content in the field for 111-day corn hybrid grown in westcentral Indiana in 1992 (cool fall) and 1994 (more "normal" fall).

As you might expect, the exact rates of grain moisture loss in the field are closely related to air temperature during the dry down period. The warmer the drydown period, the faster the grain will dry. In fact, there is a close relationship between the average rates of grain moisture loss per day and the average daily heat unit accumulation during grain drydown (Fig. 2).

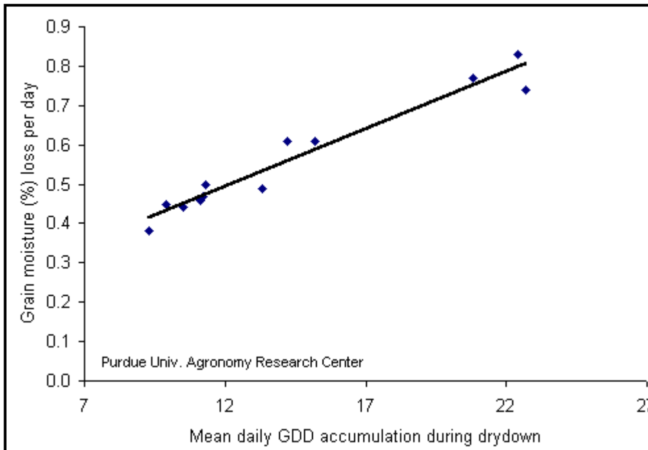


Figure 2. Average rates of grain moisture loss in the field relative to mean daily GDD accumulation during drydown for three corn hybrids planted in late April to early May, 1991-94, in westcentral Indiana.

Bear in mind that grain moisture loss for any particular day may be quite high or low depending on the exact temperature, humidity, sunshine, or rain conditions that day. It is not unheard of for grain moisture to decline more than one percentage point per day for a period of days when conditions are warm, sunny and dry. By the same token, there may be zero drydown on cool, rainy days.

Since heat unit accumulations are closely related to calendar date, there is also a close relationship between the average rates of grain moisture loss per day during the drydown period and the date when the grain nears physiological maturity (approximately 30 % moisture content). Average daily drydown rates will range from about 0.8 percentage point per day for grain that nears maturity in late August to about 0.4 percentage point per day for grain that nears maturity in mid- to late September (Fig 3).

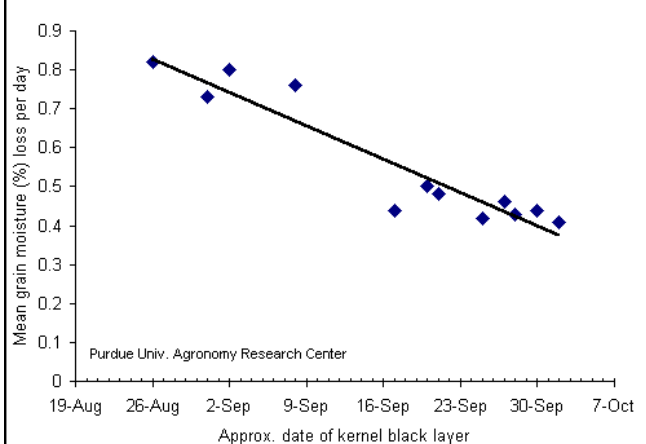


Figure 3. Average rates of grain moisture loss in the field relative to the date of kernel black layer for three corn hybrids planted in late April to early May, 1991-94, in westcentral Indiana.

Given the opportunity for early maturation of corn in Indiana in 2001, it is quite likely that grain drydown rates will be favorably high. Be prepared for an early start to grain harvest.

Don't forget, this and other timely information about corn can be viewed at the Chat 'n Chew Café on the World Wide Web at <http://www.kingcorn.org/cafe>. For other information about corn, take a look at the Corn Growers' Guidebook on the World Wide Web at <http://www.kingcorn.org/ >.

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Winter Wheat Decisions 2001 - I. Rotation Benefits Resulting from Winter Wheat – (*Tony J. Vyn*) -

Indiana's recent 25% reduction in wheat acreage in 2001, relative to that harvested in 2000, is the latest in a long series of acreage reductions for what used to be Indiana's premier grain crop. The 2001 acreage was less than half of that a decade earlier.

Although planting less wheat may have been the most prudent financial decision relative to the short-term economics associated with corn and soybean alternatives, crop sequence choices should always be made in the context of profitability over the whole rotation cycle. The following benefits of winter wheat need to be factored in to grower decisions regarding wheat planting intentions:

1. Winter wheat generally increases corn yields relative to corn after soybeans alone in the rotation. In the few long-term experiments conducted, the corn yield increase after wheat (versus after soybeans) ranges from 0 to 10%. The additional corn yield advantage with wheat in rotation compared to soybeans alone are most frequent when soils are high in clay content and (or) lower in organic matter contents, and when corn plants encounter moisture stress in mid-season. Corn yield gains of 5% or more after wheat versus soybeans are more consistent when winter wheat is followed by cover crops such as red clover.

2. The nitrogen credit normally applied to soybeans is generally also appropriate when winter wheat is the prior crop. Nitrogen fertilizer rates recommended after wheat are often 40 lb/ac less than those for corn after corn. Although wheat doesn't fix nitrogen like soybeans, wheat straw and stubble immobilizes much less nitrogen the following spring than decomposing corn residues do.

3. Soybean yields are also higher when in rotations involving winter wheat versus just corn-soybeans. The most conclusive evidence for the advantage of a 3-year (corn-soybean-winter wheat) versus a 2-year rotation (corn-soybean) is that resulting from a USDA-sponsored experiment at the Agronomy Research Center near West Lafayette (Table 1). In that study, soybean yields were 10% to 18% higher after corn than after soybeans. However, soybean yields in the corn-soybean-wheat rotation were an additional 7% to 10% higher than in the corn-soybean rotation.

There is also evidence from a 20 year experiment in Ontario, Canada that soybean yield gains with wheat in the rotation (versus just corn and soybeans) seem to become more evident as the number of years of soybean history accumulate in a particular field. Rotation studies in Minnesota confirmed that the actual percent of soybean yield response to rotation was higher in low yielding years than in high yielding years. Thus, farmers with soybean yields consistently above 60 bu/acre may benefit less from wheat than those with 40 bu/acre yield averages.

The relative yield benefits of growing soybeans every third or fourth year (instead of every second year) vary depending on disease incidence (e.g. root rots) the year soybeans are grown, the relative susceptibility of soybean varieties to those diseases, and other multiple stresses encountered by soybeans during the growing season. Nevertheless, two conclusions are apparent from Northern Corn Belt rotation experiments. First, soybeans apparently benefit more from longer rotations than corn does and, second, winter wheat benefits persist beyond just a single year following its production.

4. Soil structural stability has been consistently better after winter wheat than after soybeans in rotations in average yield situations. Fewer problems are likely to be encountered with soil crusting or soil erosion after winter wheat than after soybeans simply because the root mass, root distribution and stover decomposition characteristics are all superior with winter wheat. Gains in structural stability associated with winter wheat will be most evident after disturbance by tillage with field situations where inherent soil stability is low, and in environments where soil erodibility is a serious threat.

Conclusions:

The short-term economics of winter wheat plus double crop soybeans have always compared favorably with corn and soybeans alone in Southern Indiana (Purdue

Crop Guide, ID-166). Wheat alone has tended to be less profitable relative to other alternatives in recent years, and this has been a contributing factor in acreage reduction. However, the long-term benefits of winter wheat need to be considered in any budgeting exercise, since the additional profitability in the corn and soybean years following winter wheat may more than compensate for the short-term income disadvantage commonly associated with wheat. Cash crop producers with long-term farming commitments and concerns for their soybean yields should seriously reconsider winter wheat.

Table 1. Soybean yields in three rotation systems near West Lafayette, Indiana (1983-95).

Rotation	Tillage	
	Chisel Plow	No-till
	——Yield (bu/ac)——	
Cont. Soybean	39	40
Corn-Soybean	46	44
Corn-Soybean-Wheat	49	48

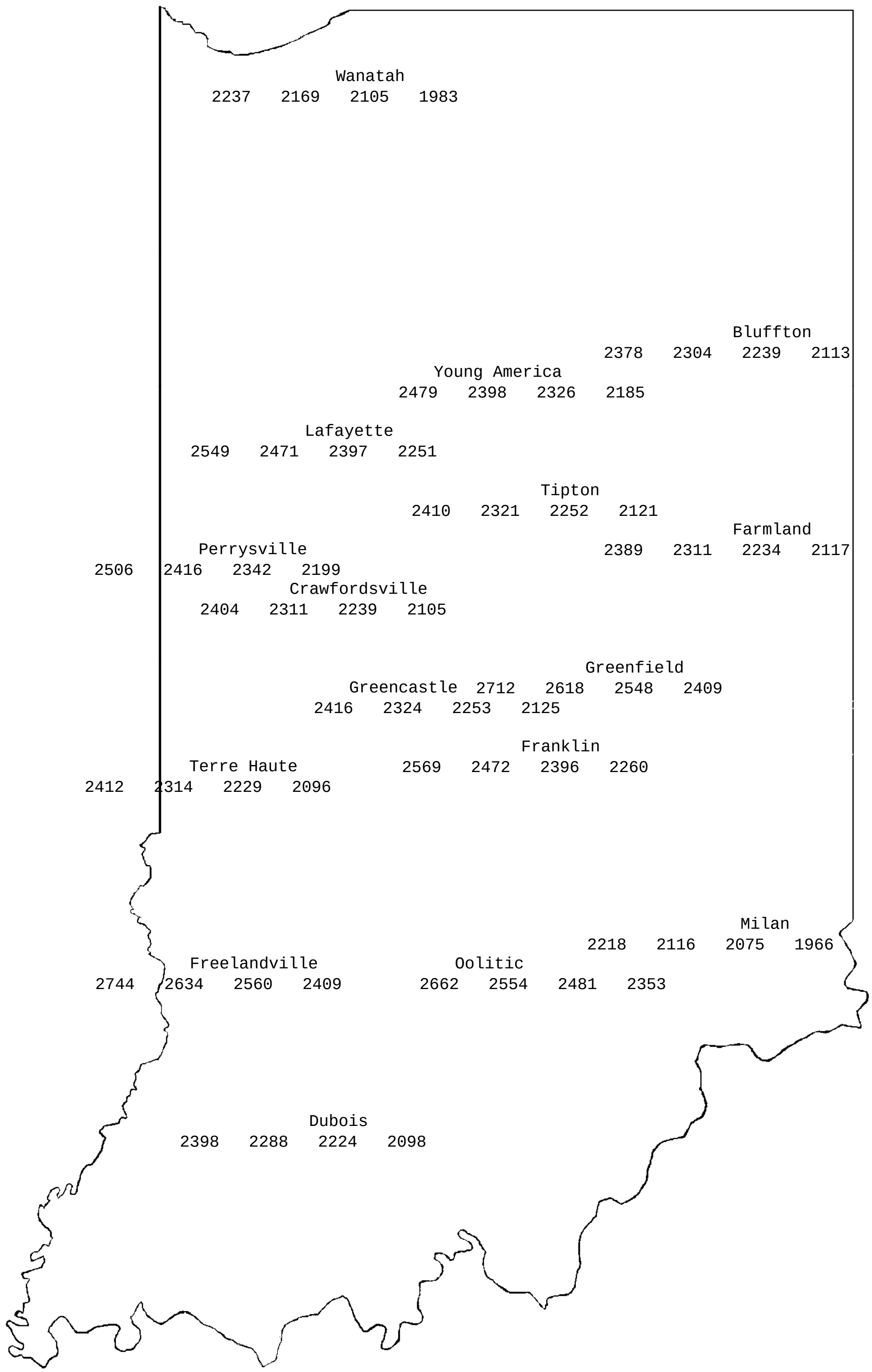
Source: Dr. M.V. Hickman, USDA-ARS, Purdue University. Data averaged for three levels of herbicide treatments.

Weather Update

Temperature Accumulations from Jan. 1 to August 29, 2001

MAP KEY
Location
GDD(3) GDD(11) GDD(40) GDD(90)

GDD(3) = Growing Degree Days from April 14 (3% of Indiana's corn planted), for corn growth and development
GDD(11) = Growing Degree Days from April 22 (11% of Indiana's corn planted), for corn growth and development
GDD(40) = Growing Degree Days from April 28 (40% of Indiana's corn planted), for corn growth and development
GDD(90) = Growing Degree Days from May 6 (90% of Indiana's corn planted), for corn growth and development



4" Bare Soil Temperatures 8/29/01

Location	Max.	Min.
Wanatah	84	78
W Laf Agro	88	71
Tipton	71	69
Farmland	77	65
Crawfordsville	77	72
Liberty	81	69
Terre Haute	80	75
Vincennes	80	69
Oolitic	78	75
Dubois	91	71

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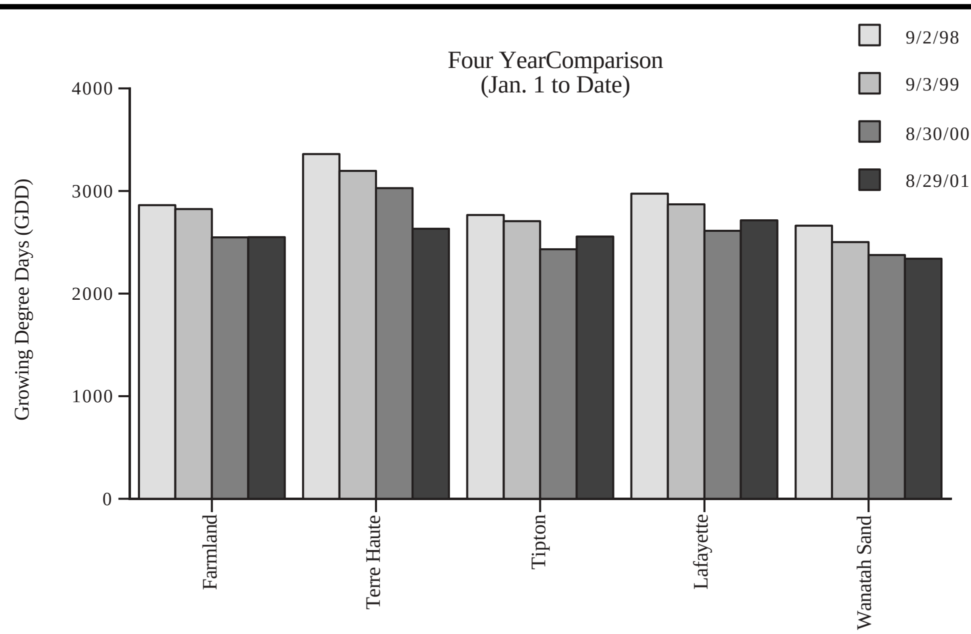

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