

Soybean studies continue in Delaware

NEWARK, Del. — A team of 16 scientists from the University of Delaware will again study Delaware soybeans this summer in a search for ways to help farmers improve yields. The special task force includes Agricultural Experiment Station researchers as well as Cooperative Extension Service specialists and county agents. Their work is being supported in part by a grant from the Delaware Soybean Board.

The soybean, now the state's leading field crop in terms of acreage, has a disappointing track record in Delaware from the standpoint of productivity. Yields over the past 10 to 15 years have averaged only around 24 to 26 bushels per acre. And wide fluctuations occur from farm to farm, as well as on the same farm from year to year.

According to task force coordinator, extension farm management specialist Don Tilmon, the four-year project is designed to monitor some 70 different factors on plots located throughout the state. These factors include everything from soil type, seed weight and tillage practice to row width and the amount of plant biomass present at the start of bloom. Both conventional and full-season no-till soybeans are involved.

25 growers
"We're looking for yield-related

factors over which farmers have some control," explains Tilmon. "Twenty-five growers are cooperating with us. We have four one-acre plots on each farm, with four replications in each plot. When we laid them out, we took great pains to make sure the soil within each plot was uniform. The best auld on a farm wasn't always chosen because we were after a wide range of soil types."

Participating farmers follow their usual cultural practices, treating soybeans in these plots as a regular part of their fields.

The study was initiated last year and task force members collected information all summer. In the fall, they hand-harvested plots, thrashed and weighed the seed, and adjusted yields for moisture. By the end of the season, over 7,000 pieces of information had been gathered and stored in a computer.

Tilmon spent last winter analyzing this mountain of data and has now identified five preliminary factors which seemed to relate most directly to 1983 commercial soybean yields in plots around the state:

- * Amount of rainfall in weeks 11, 12 and 13 of the growing season (the period between bloom and pod set).

- * Final plant population.

- * Amount of biomass of vegetation in the field beginning of bloom.

- * Seed weight in grams per 100 seed.

- * Distance between the ground and the first pod on the bean stalk.

"The rain, of course, was uncontrollable," Tilmon says, "but growers did have some control over the other factors. Our analysis showed that pod set was a function of row spacing and final plant population. Biomass was affected by rain as well as row width, early stand counts, variety and soil nutrients. Seed weight seemed to be determined by rain, row spacing, final stand count, variety, soil nutrients and tissue nutrients. Final plant populations depended on early stand count, rain, variety and tillage method. (About a fourth of the plots were no-till, and stands were likely to be higher under this system, he said.)"

Row spacing

Distance from the ground to the first pod was probably the result of row spacing and final plant population. "Computer analysis showed that the higher the pod set, the greater the yield," Tilmon says. "This makes sense when you figure that soybean plants grow taller when they're crowded. Higher plant counts and narrower row spacing resulted in higher pod set and higher yield. So that fact has implications for narrow row spacing."

It's impossible to generalize based on one year's observations,

however, the specialist stresses. "We had row spacing all the way down to 7 inches, and one farmer with 36-inch rows had a very high yield."

The trick now will be to observe the same plots again this summer and the next two years, to see if the same factors remain significant. For example, tillage methods and plant populations were correlated with yields in 1983. Was this a direct effect of the cultural practice used, or because the soybeans got more moisture in the presence of a no-till mulch? "We can't tell from one season's results," Tilmon says. "After several more years, we may know the yield-determining factor."

In subsequent years other factors may prove significant, while some that seem important now may not really affect soybean yields critically. "It's just too soon to know," Tilmon explains. "We'll need at least three years' worth of data before we can draw conclusions from our results."

Different varieties

"We do have different varieties in our study, and some of the factors we've pinpointed, like biomass, may reflect varietal differences," he adds. "Certainly an indeterminate variety will have

a different biomass than a determinate one. And the seed weight will be different."

Task force members are looking closely at all aspects of crop management, including pest control and fertility. In general, says Tilmon, weeds and other pests were not a factor in plots last year — probably because they were controlled. Also, soil nutrient levels were generally not a limiting factor.

He says there was a broad range of yields last year. To some extent, this was the result of test site selection.

The task force team includes the following: weed scientist William H. Ahrens, soil scientist Leo J. Cotnoir, agricultural economist Gerald L. Cole, extension entomologist Mark Graustein, entomologist Charles N. Mason, soil fertility researcher Tom Sims, extension plant pathologist Bob Mulrooney, agronomist Merle Teel, county extension agents Dean Belt, Derby Walker and Dave Woodward, extension agricultural engineer Tom Williams, associate scientist Ed Wisk, extension crops specialist Frank Webb, and extension farm management specialist Tilmon.

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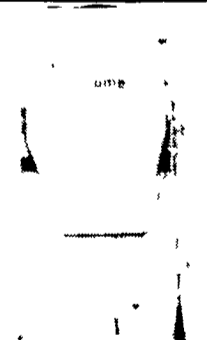
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