

Plant scientist explores solar energy to increase corn yields

UNIVERSITY PARK — Plant scientists at Penn State are working to build into corn plants the ability to convert maximum solar energy into expanded yields of grain or forage.

The complex process of converting solar energy into grain in cornplants is two-fold, stated Daniel P. Knievel of Penn State's College of Agriculture during national meetings of crop and soil scientists December 2 in Atlanta, Ga.

Knievel and associates are seeking ways to enable corn plants to improve their efficiency in using the sun's energy, through the natural process of photosynthesis, to produce high levels of car-

bohydrates — the vital "building blocks" of plant growth.

The second factor, he said, is that plants must have the capacity to accumulate and store high levels of carbohydrates as grain.

Improved carbohydrates storage is essential, he pointed out, since high photosynthetic rates do not necessarily lead to high grain production. That's the crux of the problem, he affirmed.

"Our experiments with corn show that, after pollination, carbohydrates can accumulate in plants during periods of high photosynthesis without increasing the growth rate of the developing grain."

"To complicate the situation, we also found that corn plants accumulating high carbohydrate levels in their tissues during grain filling had lower than normal rates of photosynthesis," Knievel commented.

This means, he explained, that a scientific "breakthrough" to increase plant photosynthesis would not, by itself, improve crop yields. Corn plants would need the genetic ability to accept and convert additional carbohydrates into grain.

Attending the Atlanta meeting were members of the American Society of Agronomy, Crop Science Society of America, and the Soil Society of America. Programs and events from November 29 to December 4 made up the 73rd annual meeting of the combined organizations.

The Penn Staters grew corn in a way to simulate high photosynthesis capacity, as yet not developed in commercial hybrids. Plants were grown at high and low populations to vary the degree of shading between plants to control the level of photosynthetic energy per plant. Pollination was done by hand to control the number of grains per plant.

Rate of grain growth per kernel was the same for all treatments, regardless of the number of kernels per ear. Where kernel numbers were low, plants stored higher amounts of carbohydrates in stalk tissues than where kernel numbers were high.

"The high accumulation of carbohydrates occurred because

the existing kernels were unable to accept all of the available energy

from photosynthesis," Knievel said.

Retired supervisor

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spent on the farm. And now, of course, computerization has taken over, and the samples are shipped to Penn State to be run in a central laboratory.

The hours for a DHIA supervisor are nothing to brag about. Brinton remembers leaving home as early as 3:30 a.m. to be on a farm for the morning milking. Other times there were late evenings when Mrs. Brinton would patiently wait for supper.

There was only one occasion when Brinton was forced by the weather to stay overnight. He says, "I stayed overnight because I wouldn't have been able to get back the next morning. I never had a really full circuit, so in bad weather I could make a change."

In his 21 years, Brinton has experienced watching the younger generation grow up and take over the management of the farms in some cases.

There have been other changes too. By the time he retired in October, all the herds he tested had pipeline milkers and herds have grown tremendously in size. Nevertheless, Brinton doesn't see larger herds as an absolute necessity to make ends meet. "They need to do a better job with the cows they have," he says. He points out the records dairymen use through the DHI testing program are helpful in the overall management of the farm, adding, "I wouldn't milk cows without records."

He also expressed his belief that over production is not the problem causing the surplus in the dairy industry, rather it is under consumption.

Asked how many cars he wore out throughout the 21 years, Brinton says, "One car probably would have lasted the whole time if I had used it just for that."

About farming's future, Brinton said, "I think farming has a bright future. I think if they are interested they can make it, but you can't just start farming like you once did. I think the only way is to work in gradually."

Brinton and his wife enjoy traveling, and will probably do more of that in retirement. But he also keeps busy with community activities. Being groundskeeper at the Southern Lancaster County Sportsmen's Club is a job which keeps him interested and involved. He is also a trustee at the Faith Reformed Presbyterian Church in Quarryville, which has recently built a new building.

Hunting and fishing have always been a big interest for Brinton, so perhaps he will find more time for that. He and his wife enjoy the solitude of a camp in Perry County.

He is a member of the Slumbering Groundhog Lodge of Quarryville.

Just as he enjoyed his work, Brinton now says he is enjoying retirement.

Export grain firms must register by Dec. 31

WASHINGTON, D.C. — All grain firms which export 15,000 or more metric tons of grain annually must register with the U.S. Department of Agriculture's Federal Grain Inspection Service by Dec. 31.

Kenneth A. Giles, administrator of USDA's Federal Grain Inspection Service, said registration is required by the U.S. Grain Standards Act.

"All firms currently registered must re-apply if they exported 15,000 or more metric tons of grain in 1981, or plan to do so in 1982," Giles said.

The registration fee is \$135 for firms which sell or ship grain overseas, and \$270 for export firms which own a controlling interest in other companies engaged in interstate commerce.

USDA has mailed application forms to all 119 firms now registered. Others who need application forms or more information should call or write James Conrad, Regulatory Branch, Compliance Division, Rm. 2405 - Auditors Bldg., FGIS-USDA, Washington, D.C. 20250, telephone 202/447-4759.

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