

Sometimes it's easier to fit plants to the soil

BELTSVILLE, MD. — Although scientists have for the past 50 years sought ways to change the soil to meet the needs of crops, scientists of USDA's Science and Education Administration here say that it is now often cheaper and more beneficial to tailor the crop to fit the soil.

Studies have shown that different genetic strains of the same type of plant — be it soybeans, wheat, corn, cotton, tomatoes, or chili peppers — have widely different abilities to tolerate stress conditions. For problem soils, even good soils in some cases, SEA soil scientists Charles D. Foy and John C. Brown say that selecting and breeding plants with genes for tolerance is a sensible alternative or supplement to sometimes massive and recurring chemical treatments, such as spreading lime or phosphorus.

By using more specific plant germplasm for specific soils, farmers could use much less energy for growing crops, say the USDA scientists, because fertilizer, lime, water and fuel for machinery would be used more efficiently.

"We may be entering a new era in agriculture," Brown wrote in a recent research paper, "an era in which we finally recognize the plant for what it is. Considering the restrictions imposed (on native plants during their evolution) by extremely diverse soils and climates, it seems remarkable that so many different kinds of native plants survive and reproduce. They do so because they are genetically diverse themselves and are able to adapt to stress conditions."

Foy and Brown over the past 20 years have tested and proven their theories on many economically important species. It is now up to commercial and government plant breeders, they said, to become more aware of the idea, to incorporate stress-tolerant genes into their breeding programs, and to make information available to farmers and extension agents.

"Farmers generally know their soil, but not their plants," says Brown. "We think that soon farmers will be saying to their suppliers, 'I want manganese tolerant seed, or I want seed for my alkaline soil, or seed for iron efficiency, or for tolerance to salinity, high aluminum or high boron.'"

Fitting plants to soils instead of the reverse also has a human nutrition angle,

say Foy and Brown. "One reason different strains of the same species vary in their abilities to tolerate certain soils is that the plants vary in their nutritional requirements, they take up different amounts of mineral elements from the soil. Thus, our genetic approach to soil fertility will not only boost crop production, but will allow us to control levels of

mineral elements in crops. We could raise the nutritional values of some foods or lower certain mineral contents that could cause nutritional problems in high doses."

The USDA scientists are with SEA's Plant Stress Laboratory, part of the Beltsville Agricultural Research Center in Maryland.

Alfalfa pests 'team up' to cause stress

UNIVERSITY PARK — Control of insects in alfalfa can yield greater benefits than meet the eye, says Dr. Kenneth T. Leath of the U.S. Pasture Research Laboratory at the Pennsylvania State University. He claims the interaction of insects and diseases are not apparent immediately.

Dr. Leath and associates have found that Winter kill of alfalfa, for example, can be traced to stress on plant roots from too frequent harvesting or from insect injury. Both lead to root rot among weakened plants and can result in Winter kill. Pasture Laboratory scientists conduct research for the U.S. Department of Agriculture.

"Our experiments show that stand appearance after final harvest in the fall may lead to the conclusion that all is well when this is not the case. Poor growth of alfalfa in the spring may result from hidden problems the previous year," he affirmed.

Crown and root rot of alfalfa, for example, produce the most disease when the plants are under stress of some kind. When alfalfa is harvested too frequently, root rot can become more severe than otherwise.

"Perennial forages such as alfalfa are subjected throughout their lives to a series of stresses that occur sometimes simultaneously, sometimes sequentially, but

always cumulatively," Dr. Leath declared.

He said a very serious stress on alfalfa is caused by the feeding of leafhoppers, aphids, and other insects on the leaves and stems. The effects are obvious on the tops of the plants but are not obvious on the roots.

The amount of root rot development was compared with that growing in

inoculated roots of plants not subjected to the stress of aphid feeding. The most severe root rot developed when plants were inoculated and under stress from aphid feeding. Later experiments featured a field insectary used to test the impact of leafhopper injury on root rot development. Plants subjected to both root rotting fungi and insect injury developed the most root rot.

Grain association sets meeting date

CENTREVILLE, Md. — The Maryland Grain Producers Association has set its second annual meeting for July 30th at the Queen Anne's County 4-H Park near Centreville, according to Brad Powers of the Maryland Department of Agriculture.

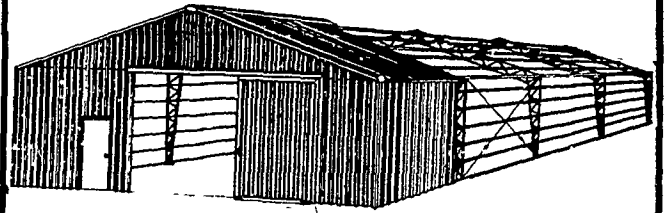
Meeting chairman Drew Stabler of Brookeville, says a group of informative speakers is being assembled to make the session a worthwhile affair for all who attend.

Commercial space will be available and groups or businesses interested in exhibiting should contact Stabler in care of the Maryland Grain Producers Association, Box 249, Annapolis, Maryland, 21401.

MGPA, founded just two years ago, is a forward looking new commodity organization in Maryland drawing as members grain farmers, handlers, marketers and users. Its aim is to cooperatively advance the state's grain industry which in the past several years has set new production records in the state.

The Queen Anne's County 4-H Park is located southwest of Centreville on Route 18. The association meeting will run from 1:30 to 4 p.m.

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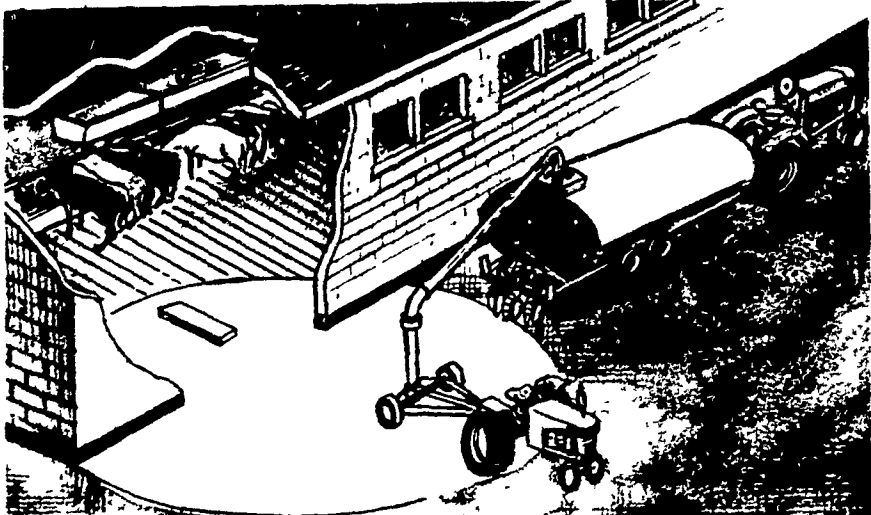
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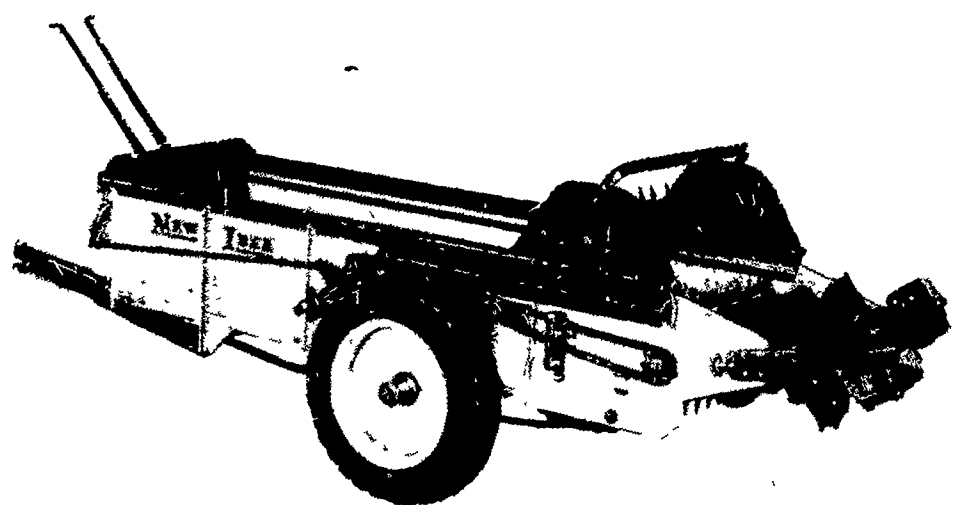
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