is $2.00 per acre. At a rate of $22.82 for one combine and operator plus a bankout wagon, tractor and man, the benefit for reduced harvest time is $4.79 per acre. A benefit-less-cost figure is given below for the two comparisons:

1. Plastic Levees vs. Three-year-old Soil Levees

Total cost of plastic levees	$11.11 per acre
Total annual cost of 3-year-old soil levees	1.88
Added increment of cost due to plastic levees	$9.23 per acre
Benefits resulting from use of plastic levees:	
.28 hr. per acre saving in tillage operations	$2.00
.21 hr. per acre saving in harvest operations	4.79
2.20 sack per acre increase in rice yield	9.90
Total savings per acre	$16.69
Net additional earnings per acre = $16.69 – 9.23 =	$7.46

2. Plastic Levees vs. New Soil Levees

Total cost of plastic levees	$11.11 per acre
Total cost of new soil levees	3.80
Added increment of cost due to plastic levees	$7.31 per acre
Benefits resulting from use of plastic levees:	
.21 hr. per acre saving in harvest operations	$4.79
1.30 sack per acre increase in rice yield	5.85
Total savings per acre	$10.64
Net additional earnings per acre = $10.64 – 7.31 =	$3.33

If growers receive extra income from rice lands used for game hunting, the weed growth is a benefit in favor of old soil levees and should be deducted from the benefits of plastic levees in figuring additional earnings.

Since there are substantial net additional earnings per acre for the example given, it is economically feasible to replace soil levees with plastic levees. It must be kept in mind that the costs compared depend on the length of levee per acre, and the benefits of increased yield are dependent on both length of levee per acre and the average yield. A new calculation of costs and benefits must be made from the tables and graphs for every field where a change in levee construction practice is being considered. The only foreseeable change in plastic levee economics is that the costs may decrease as further mechanization is accomplished—improving the economic feasibility of plastic levees.

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IMPROVING YIELDS IN SELF-POLLINATED CROPS

SOME MIXTURES of pure-line varieties of self-pollinated crops show promise of improving yields and stabilizing productivity, as compared to the pure lines.

In the past half-century much of the improvement in yielding ability of crops such as barley, wheat and beans has resulted from selecting pure-line varieties—consisting of a single genetic type.

These pure-line varieties are highly uniform for such features as size, maturity, disease resistance, and quality factors that improve their marketability. Valuable as these pure-line varieties have been, there are theoretical reasons for believing that certain types of mixed populations may be still more useful in agriculture.

Investigations have been conducted to test the theory that mixtures which provide a controlled measure of genetic diversity may not only yield more than a single pure line but also perform more steadily year after year. Under test is the idea that individual plants may encounter different environments not only within fields but also in different locations and years, and that different plant types may be able to exploit particular sites to their own particular advantage and to the advantage of the entire population.

One experiment with lima beans conducted at four locations over four years indicated that mixtures of pure lines were less likely to produce as high yields—or as low yields—in any one year as the best pure line included in the mixtures. The important point is that certain of the mixtures yielded more, when averaged over several years, than the best constituent pure line included in the mixture.—*R. W. Allard, Professor of Agronomy and Agronomist, Department of Agronomy, University of California, Davis.*

UREA FORM

T. G. BYRNE · O. R. LUNT

Urea formaldehyde was the first major synthetic nitrogen source developed for controlled availability. It has been commercially available for about a decade and primary uses have been with turfgrass and ornamentals. To obtain satisfactory responses, several aspects of its properties must be understood.

In the manufacture of urea formaldehyde these two components react to form polymers of various complexity. The ratio of urea to formaldehyde, and other factors affecting the reactions, influence the susceptibility of the product to mineralization—namely, conversion of the nitrogen to ammonium or nitrate forms. Commercial materials vary, particularly in the fraction of the total material that is readily available.

In commercial materials a substantial portion of the total nitrogen (25 per cent or more) is cold-water soluble. This fraction is of low molecular weight and is nitrified readily. The bulk of this fraction nitrifies, when conditions are favorable, within a four-week period. The remaining fraction which is relatively resistant to nitrification is mineralized at a much slower rate.

Under typical greenhouse soil conditions, about 6 to 7 per cent of the fraction relatively resistant to mineralization is converted to nitrate or ammonium each month. There is also some evidence that this rate tends to increase as the resistant fraction ages. From a given initial supply of this type of nitrogen the yield of mineral nitrogen tends to remain more nearly uniform than would be expected.

The 6 to 7 per cent rate of mineralization per month is some 50 times as fast as natural soil humus is mineralized. Thus, nitrogen from "residual" urea-formaldehyde is much more available than nitrogen from soil humus.