bottoms. The planter placed the seed 1 to 1½ inches below the chemical. A looped chain was dragged behind each planter unit for mixing and mulching. Some of the advantages that appeared to result from this treatment were as follows:

(1) The harvest operation was more rapid due to reduction of weed interference. Harvester plugging and breakdowns were less frequent which resulted in lower cost per ton. In some years, the time saved would also mean less wind-lodged corn because the harvest could be completed earlier.

(2) The usual 2,4-D spray was not needed on some of the acreage because Randox-T also controlled many broad-leaved weeds. This reduced both cost and risk of brittle stalks which may result if 2,4-D is not properly applied.

(3) The first cultivation was delayed until all corn was large enough to escape being covered and this resulted in a more uniform stand.

(4) Weed competition was reduced.

(5) Weed seed production was reduced, which will lessen weed problems in future crops.

The profitable results reported here may have resulted from a fortunate combination of treatment and field conditions; however, the reliability of any one treatment will not be known until there is more commercial experience.

Solubility, adsorption characteristics and volatility of a compound, for example, would be expected to influence its effectiveness. This indicates that type of equipment, moisture conditions, type of soil and manner and depth of soil incorporation should be considered in choosing a chemical.

C. K. Foy is Assistant Botanist, University of California, Davis; T. Lyons is farm Advisor, Sacramento County, and S. P. Carlson is Farm Advisor, Kings County.

WILL THESE CHEMICALS ALWAYS PAY?

Chemical treatment of soil at planting time offers neither a cure-all for weed problems or an obvious saving in weed control costs. It will pay in some situations and not in others, because corn is relatively weed tolerant and many weed problems can be solved with skillful mechanical cultivation.

Growers should consider all of the numerous factors involved before deciding whether to use this type of pre-emergence weed control. It also may reduce the pressure of critical timing in cultivation and harvesting operations—thereby allowing more efficient use of management, labor and equipment for other crops as well as corn.

None of the treatments discussed is recommended by the University of California at this time either (a) because of possible injurious effects on succeeding crops due to chemical residues in the soil or (b) because of lack of clearance from the standpoint of chemical residues in food or feed products when used under these conditions.

New Aqueous Resinous Soil Stabilizers

offer erosion control and water conservation possibilities

ROY J. PENCE · J. LETEY · R. E. PELISHEK · J. OSBORN

Reseeding, or the establishment of any suitable cover crop, will often lessen and even prevent soil erosion. Such measures must be taken well in advance of any subsequent damage brought on by winds or rains, however. Costs and labor of replanting have often been lost due to inadequate root establishment prior to the first eroding effects of adverse weather. This problem has resulted in research aimed at development of an inexpensive, easy-to-apply substance that could be added to the soil surface to stabilize its aggregates against pelting rains, while at the same time allowing the beneficial waters to pass through.

A cooperative research program between the Departments of Entomology and Irrigation and Soil Science was recently set up to formulate and test a simple aqueous resinous system which could be sprayed on or otherwise easily applied to the soil.

System requirements involved the following goals: (1) firm soil stabilization that would remain undisturbed under severe winds, rains or artificial irrigation; (2) stabilized surface aggregates that would allow water to pass through but not tear and separate under strain; (3) a solution capable of maintaining its original polymerization after each wetting so as to form a "seal" against subsequent evaporation—thus serving to trap and retain valuable water beneath to permit moisture for germination of any wild or planted seed; (4) formulation of a free-flowing concentrate having long shelf life, yet capable of offering satisfactory performance under water dilutions; (5) phytotoxicity must not be tolerated, yet the system must be capable of accepting a suitable non-crop herbicide and/or insecticide additive wherever this might be desired.

An aqueous resinous system was developed using a modified copolymer of vinyl acetate integrated with a fixing agent to promote higher flowability and longer shelf life in its concentrate form. Results of preliminary field trials have been encouraging and tests are being continued.

Field tests

The first field test was established prior to the 1960 winter rains. Applications were made to a freshly graded 25 per cent slope on the Los Angeles campus. Plots measured 20 feet wide by 30 feet downslope. The resinous concentrate was diluted to different proportions and sprayed on the soil.

The photographs shown were taken after 2.3 inches of rainfall had fallen in approximately two hours. The untreated area on the left clearly illustrates the degree of rilling and loss of soil following the eroding rain. The darker area on the right of the separating string was treated with the second best of the anti-erosion treatments tested, and exhibits very little rilling. The untreated area directly beneath the sprayed plot is heavily eroded with deeper rills resulting from the sheeting effects of water runoff which suddenly

New resinous stabilizers for raw soil that will also allow water penetration for plant growth are now available. Some of these materials show promise for control of wind or rain erosion previously possible only by a well established cover crop. New experimental formulas, found effective in the laboratory, along with others already on the market, are being field tested to determine their value in erosion control and water conservation.

encountered the unstabilized soil surface. A difference in color can also be seen between the treated and untreated areas.

In the close-up photograph, the treated area to the right of the dividing string shows twigs, aggregates, and general debris remaining undisturbed, as a result of adequate soil stabilization. The aggregates of the untreated area have been broken down. The lighter color is the effect of fine silt and clay being suspended in water and layered on the surface.

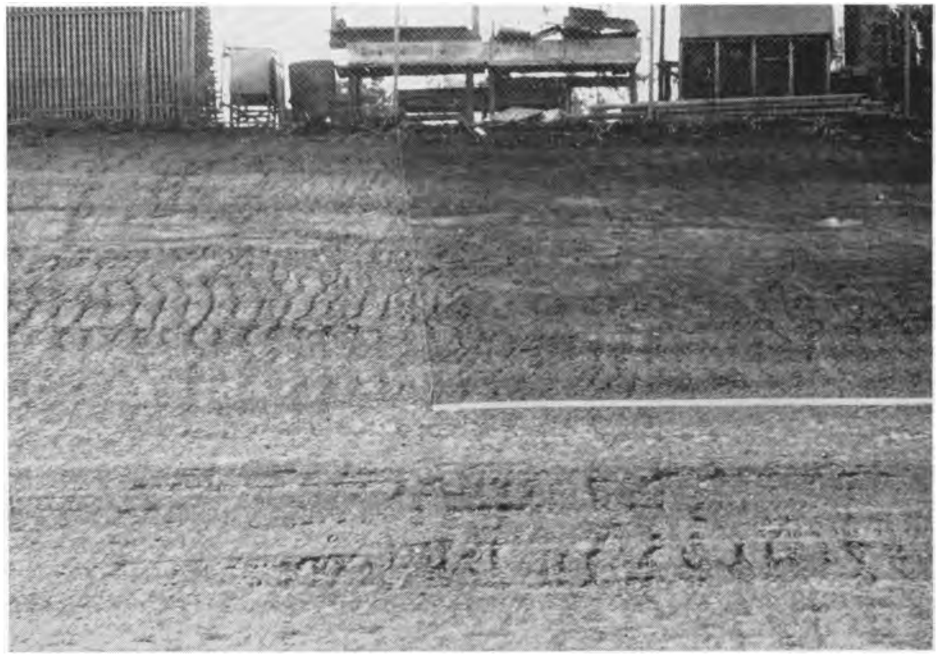
The darker color on the treated area indicates that silt and clay did not go into suspension. Observations made during the heavy rain clearly illustrated the effectiveness of stabilization on the treated plot. The sheeting runoff waters were clear and uncontaminated as compared to the dark, muddy waters from untreated areas which were soon deposited as mud and gravel accumulations at the base of the slope. Two succeeding rainfalls of approximately one inch each later fell on the test plots. These rains further eroded the untreated areas, but left the treated plots undisturbed.

Better stabilizing effects are achieved with increased quantities of applied resin solids as indicated in the table. Results were also improved for a given amount of solids by increasing dilutions and applying more of the dissolved liquid per unit surface area. Of a total of six separate treatments, all presented some significant degree of erosion control as compared to no treatment. Of the six, only the two offering the best performance were considered acceptable under the existing circumstances.

PERFORMANCE, COMPOSITION AND APPLICATION RATES OF AQUEOUS RESINOUS TEST MATERIALS

Performance order	Per cent solids	Rate of application*	Quantity of solids**
1	2	5	.83
2	½	10	.42
3	1	5	.42
4	2	2.5	.42
5	1	2.5	.21
6	½	5	.21
7	0	2.5	0

*Gallons per 100 square feet.
** Pounds per 100 square feet.



Anti-erosion test plot on 25 per cent slope following a steady two-hour rainfall of 2.3 inches.

Some of the many products tested in the laboratory show evidence of satisfactory performance. Among the best materials is one that resists water movement into the soil. This quality may prove useful if high runoff is desired and particularly where clean runoff may be directed to reservoirs for water conservation. However, the impervious systems cannot generally be used in areas where vegetation is planned because the stabilized surface minimizes water intake. Some question may also arise as to the desirability of impervious resinous systems for erosion control due to the large quantity of runoff flooding the bottom areas, with resulting damage.

Roy J. Pence is Associate Specialist, Department of Entomology, University of California, Los Angeles; J. Letey, Assistant Professor, Soil Physics, Department of Irrigation and Soil Science, U. C., Riverside; R. E. Pelishek, Technician, Department of Irrigation and Soil Science, U. C., Los Angeles; J. Osborn, Technician, Department of Irrigation and Soil Science, U. C., Los Angeles.

Close-up photograph showing the dividing string between the untreated area at left and the anti-erosion treated area at right. Note the presence of twigs, aggregates and organic content still intact over the stabilized soil.