

In all this we have departed somewhat from what some consider to be the conventional advertising technique. We have avoided exaggeration. We have tried to limit our claims not only to what can be scientifically demonstrated, but further, to what we think will be acceptable to the thinking agricultural leaders of the area in which we are working.

Has this sold more fertilizers? We think so—a lot more. We think it has sold fertilizers on the soundest possible basis—through benefiting our customers. It is the settled policy of NFA that this program will be continued and intensified.

### Fertilizer-Insecticide Mixtures Reduce Application Costs

M. D. Farrar

Dean of Agriculture  
Clemson Agricultural  
College  
Clemson, S. C.



IT IS PHYSIOLOGICALLY necessary for the plant to develop an extensive feeding area for its roots in order to find food and water for the above-ground parts. Insects can destroy the roots of plants either mechanically or by using the roots as food. In either case the damage that they cause will limit the plant development. Insects that have adopted certain crops as their preferred host may so seriously injure the plants as to make the growth of the crop unprofitable.

Use of fertilizers has become a standard practice in most farm operations. Machines are available to apply fertilizer in almost every desirable manner. It is then almost a logical assumption that if something is to be applied to the soil, why not follow the procedures used for fertilizers. The bulk of fertilizers applied per acre is rather large. Relatively simple fertilizer machines are in common use. The amount of pesticide required per acre is relatively small, and essentially no satisfactory machines are available for distributing pesticides. Where insecticides and fertilizers can be applied together, a single operation may do the job. Where fertilizer-pesticide mixtures are broadcast and worked into the soil by machines, they are extremely satisfactory.

Already vast areas of farmlands have been rid of certain pests by the treatment of their soils with pesticides. In some states the bulk of materials has been applied as fertilizer-pesticide mixtures.

Granular insecticides now available provide a medium of purchase whereby a

farmer can buy a pesticide under a label. Purchasing the pesticide in this manner assures a full value, as compared to an item of uncertainty where the pesticide is mixed with the fertilizers. The problem of labeling and testing fertilizer-pesticide mixtures is confusing. There are many ways of handling the problem. None is completely satisfactory.

The procedure for uniformly mixing a small volume of pesticide with a large volume of fertilizer has not been satisfactorily established. Routine sampling of mixtures would indicate that formulators will have to improve their processes for mixing. Data to date has shown a very variable analysis which would indicate a poor mixture of the fertilizer and the insecticide. Since the amount of insecticide is so small, a premix of the insecticide will probably be necessary in order to develop a uniform product.

The present methods appear to be satisfactory when based on results on the farm. Most producers have been well satisfied with results obtained following the use of fertilizer-pesticide mixtures. "Control wise," however, much work needs to be done in order to ensure a uniform product that will be satisfactory to both the manufacturer and the producer.

### Technical Problems Can Be Worked Out

E. P. Ordas

Head, Product  
Development Division  
Velsicol Corp.  
Chicago, Ill.



THE INVESTIGATION OF CROP RESIDUES and the persistence of the pesticide in the soil are chemical and biological problems requiring the development of analytical techniques of extreme sensitivity and accuracy. Even with one given insecticide, the development of an analytical procedure for soil residues requires almost as many different procedures as there are soil types. Similarly, different analytical techniques must be developed for the analysis of pesticide residues in different crops.

Residues in the soil have been of considerable concern from two particular points of view: The question of whether repeated applications will result in a gradual build-up to harmful levels and the economic question of how long the pesticide will persist in the soil to give control before retreatment is necessary. Controlled experiments show that insecticides applied for soil infestations gradually but definitely decrease in content

in the soil even though insect control is still obtained. The inference from these experiments is that once infestation is under control, there is less probability of reinfestation.

In almost all cases, pesticides are used at a low concentration when combined with fertilizer. A typical formulation which is to contain 0.5% pesticide is preferably prepared by blending in a premix 10% pesticide concentrate amounting to 5% of the total. In this case, sufficient time must be allowed for practical and uniform distribution of all ingredients. Depending upon efficiency of the equipment and assuming a ribbon-type of blender is used the blending cycle has been stated to require from 10 to 20 minutes. Because of the possibility of small particles of dry powder segregating themselves from the bulk of the fertilizer during storage, care must be exercised in the choice of form of insecticides to be used. Rigid control of the mixing and blending operation must be maintained and it is desirable that each lot be chemically analyzed to assure uniform distribution.

Since most of the insecticides used with fertilizers for the control of soil insects are of the chlorinated hydrocarbon types, it must not be assumed that merel analyzing for organically bound chlorine is adequate. Because of the rather high percentage of inorganic chlorides in fertilizer, it is advisable to extract the insecticide from the mixture with techniques suitable to the insecticide in question.

Fertilizer-pesticide mixtures have been demonstrated to be entirely practical and economical. Yet, there still is reluctance on the part of some authorities to recognize or sanction their use. This is certainly understandable since there are specific questions which do arise. We should, however, recognize the advantages and consider possible disadvantages, if any, with regard to their order of significance so that a most effective yet economical product can be made available to the grower.

### Mixtures Effective And Economical

C. C. Compton

Julius Hyman & Co.  
Division  
Shell Chemical Corp.  
Denver, Colo.



FERTILIZERS have been applied to soils for many years. We know that many insects exert their destructive action at the roots of plants. Then it seems