Ag and Food Interprets . . .

- **Pesticide-fertilizer mixtures—demand growing**
- **Low cost pump means small farmers can apply nitrogen solutions**
- **Growers confused about Miller Amendment regulations**
- **Wanted: a chemical to control bud development**

Mix Pesticides with Fertilizer?

Fertilizer industry prefers not, but farmers seem insistent. Tonnage increased 70% in one year

THE FERTILIZER INDUSTRY may not be happy about mixing its product with pesticides, but farmers evidently want it that way. In 1954, farmers in the U. S. bought an estimated 149,100 tons of such mixtures, some 70% more than the 87,000 tons they bought in the year ending June 30, 1953. Almost 80% of the total tonnage went into the West North Central region (42,600 tons), and the South Atlantic (73,200 tons). South Carolina, the biggest consumer of mixtures and the first state in which they were used, took over 30,000 tons. Next were North Carolina, Iowa, Florida, Nebraska, and Puerto Rico, all of which used 10,000 tons or more.

The biggest use of such mixtures is in the control of soil insects, particularly those that infest corn. Iowa farmers, for instance, applied mixtures to more than 60% of the corn acreage treated for soil insects. In South Carolina, farmers used mixtures on corn, Irish potatoes, pastures, sweet potatoes, snap beans, and even on cotton, truck crops, and lawns.

Aldrin is the principal insecticide used, chlordan is second, DDT is probably third, and the following are also used in smaller quantities: arsenicals, BHC, dieldrin, heptachlor, and toxaphene. In 1954, however, heptachlor probably moved up to share top honors with aldrin. Herbicides are also used, 2,4-D being the most popular. Some use was also made of fungicides. Addition of pesticides is chiefly to fertilizers containing two or more of the three primary plant nutrients, but there have been additions to straight fertilizer materials. Attention has been given to the possibility of adding pesticides to fertilizer solutions, but solid materials make up by far the largest part of fertilizer-pesticide mixtures.

Most members of the fertilizer industry are unenthusiastic about these combinations. Objections to fertilizer-pesticide mixtures generally fall into three categories: manufacturing and safety hazards, product liability, and state laws and regulations.

Mixing and Sampling

Discussing manufacturing and safety hazards at the recent National Plant Food Institute meeting, Charles T. Harding of Virginia Carolina Chemical warned that getting a good mix and a representative sample of a fertilizer-pesticide mixture is still a problem. Commonly used insecticides can best be incorporated by spraying the proper amount of the liquid toxicant on a preweighed amount of fertilizer—in a batch or ribbon-type mixer. However, in one case, state control officials supervised mixing operations and sampling but the samples never did show up as having the full quantity of pesticide added. In a similar case, eight or 10 samples were taken of a well-supervised mixture and no two samples ran alike—some were considerably over and others were deficient to the point of penalty.

To these objections, pesticide manufacturers retort that mixing methods have improved greatly in the last two years and that improvements will continue to be made. They point out that fertilizer manufacturers experienced only temporary difficulties in mixing small amounts of minor elements in fertilizers when they were first shown to be essential for optimum yields of crops. Amounts of pesticides added to fertilizers are relatively large compared to those of the minor elements. Not only are mixing methods improving, but so are analytical methods—more and more laboratories, they contend, are successfully determining the insecticide content of mixtures.

Mr. Harding said that he is sure the fertilizer industry would rather not be called upon to furnish these mixtures. However, he continued, if the industry had any reasonable assurance that this practice were here to stay, for even several years, it could afford to install proper equipment, for mixing and for safety, to do the job on a uniform, economical basis and eliminate all of the problems that now give concern.

General use of mixtures will necessitate more laws and regulations than are now in force, predicted Rodney C. Berry, Virginia State chemist. It is Dr. Berry's opinion that pesticide manufacturers and fertilizer manufacturers should both consider the complications and responsibilities which must be assumed in the marketing of these mixtures. He reminds fertilizer manufacturers that in manufacturing mixtures they will have to comply with the various state pesticide laws, in addition to the Federal Insecticide, Fungicide, and Rodenticide Act and the Miller Pesticides Amendment to the Food, Drug, and Cosmetic Act. He says few fertilizer manufacturers are aware of the legal responsibilities they will assume in marketing mixtures. He also warns that the manufacturer will be held responsible if the pesticide, when used as directed or in accordance with common recognized safe practice, be injurious to man, animals, or vegetation.

To the safety and regulatory objections raised, pesticides manufacturers point out that mixtures offer a safer way for the farmer to handle insect toxicants. Most insecticide-fertilizer mixtures contain about 0.5 to 1% of the insecticidal chemical, whereas conventional insecticide preparations may incorporate from 10 to 75% of the same toxicant. Too few individuals realize the extent of detailed investigations with regard to the safety of mixtures. Studies over a period of four years have demonstrated that addition of insecticides to fertilizers does not injure beneficial soil organisms. With regard to regulations concerning crop residues. translocation, flavor changes, and the like, these must be complied with before an insecticide is ever used to control soil insects—thus it is immaterial whether the chemical is applied directly to the soil or with a fertilizer.

Dr. Berry feels that the only noncontroversial claim supporting use of fertilizer-pesticide mixtures, is that based on the economics of the practice, but even here agreement is not complete.

John D. Connor, Washington D. C. attorney, reminds fertilizer-pesticide mixture manufacturers that the pesticide industry has been "plagued" with a heavy volume of product liability claims. Liability claims arise, in his opinion, because of three basic deficiencies on the part of the manufacturer. First of these is failure to conduct adequate research prior to marketing to determine a product's capabilities and limitations and the manner in which it can be properly and safely used. Another is failure to use adequate production controls or methods to assure that the actual product accords with the company's standard product—production of mixtures may present production and control problems not encountered in normal fertilizer production. A third deficiency may come from failure to label or advertise the product in accordance with laws and regulations.

Chairman of the NPFI panel, M. V. Bailey of American Cyanamid, suggested that those who will render the most service to customers in this connection are those who can approach the problem not as something unpleasant, difficult, and expensive which should be avoided as long as possible, but as an opportunity to produce something the consumer wants or can use to his advantage.

Predicts Increased Use

K. D. Jacob, USDA, predicts that consumption of mixtures will increase, especially in the North Central region. He anticipates an increase for most of the states except those in the West South Central region. Even in that region it would not be surprising if further research leads to increased use.

Fertilizer Pump

Low cost pump means small farmers can apply liquid fertilizers

THE SAVINGS to be realized by putting fertilizers into liquid form are in many cases offset by the costs of application of liquids. This is especially true in the case of small acreage farmers. Liquid application equipment is considerably more expensive than that needed for dry fertilizers. Provisions for application of dry materials are often incorporated with the farmer's row cropping equipment.

There has been a logical point at which investment for application equipment would offset the savings to be obtained by application of liquid fertilizers. In many areas this problem has been met by the custom applicator who in some cases contracts to apply a certain amount of nutrient per acre, the farmer paying for the fertilizer when it is in the soil. The custom application trend has been especially strong in the West, where application equipment for anhydrous ammonia application can only be purchased by large landowners or professional applicators.

A new application device developed by USDA and North Carolina State College, is now being commercially produced in North Carolina. Big advantage of the new pump unit is low cost. A farmer can purchase a pump unit for about $150 and attach tank and spray booms himself resulting in a complete application unit for an initial cost of less than $200. Only comparable commercial pump sells for about $300 and that is cost of pump unit alone.

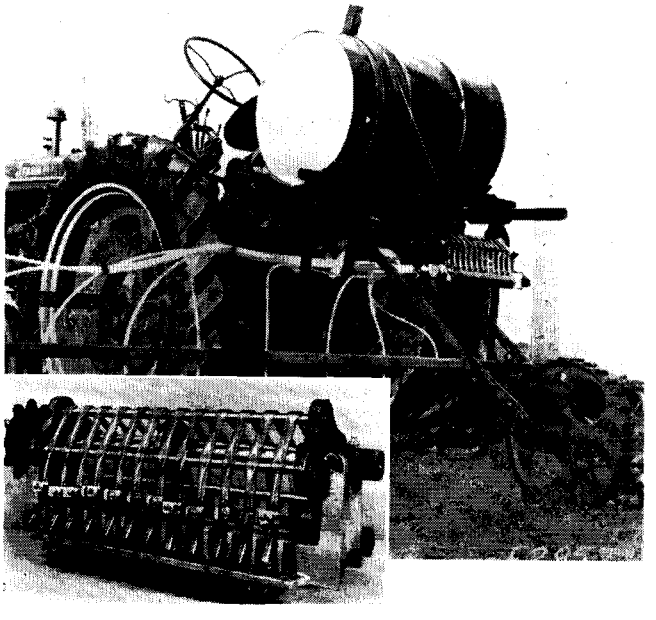
The pump unit consists of a number of lengths of plastic hose placed around a four-roller reel. The reel is connected to a ground wheel by a chain and sprocket drive or directly to a tractor axle. As the reel turns, the hoses are compressed exerting a pumping action on the liquid passing through them. Rate of pumping of application is governed by speed of the tractor; the pump thus delivers a constant rate of liquid per unit of length traversed and application rate is constant despite changes of tractor speed.

Commercial Unit Perfected

The commercial unit has been perfected from a design developed at the University of Tennessee Research Corp. The university still holds the patents but has assigned exclusive manufacturing rights to Liberty Mfg. Co. in Red Springs, N. C. Principal change in the old design was substituting plastic for the original rubber hoses.

Agricultural engineers, agronomists, and fertilizer manufacturers have come to realize the need for lower cost equipment for application of liquid fertilizers. Many small farmers, working less than 50 acres, could not afford expensive equipment for applying liquids themselves and were faced with the problem of either having it applied on a custom job basis or paying higher unit plant food prices for dry fertilizers.

The economic study was based on the relationship between relative costs of plant food units and application equipment for dry and liquid fertilizers. Labor rates were assumed to be the same for application of either dry or wet fertilizers.



Pump action is dependent upon tractor speed; roller is connected either to ground wheel or tractor axle. Rate of application is constant despite changes of tractor speed. Pumping action is due to alternate compression of the plastic tubes