PROCESSING AND LABELLING PESTICIDES

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Mr. Chairman, Gentlemen . . . it is an honor and a pleasure to appear before you today. It is an impressive audience that I face. An audience of technical specialists who have made a terrific contribution to Florida's agricultural wealth . . . *men who are basically responsible for the fact that the state of Florida today boasts nearly 62,000 successfully operated farms occupying 13 million acres of land with farm land and buildings valued at nearly five hundred millions of dollars.*

Every year—every month, in fact, more and more of Florida's wastelands are becoming veritable Gardens of Eden. Out of the desolate mucklands, the horticulturists have brought untold wealth in sugar cane and celery; out of the drifting sand hills they have created fortunes and improved national health with record breaking yields of superb citrus. *Florida is everlastingly indebted to her horticulturists.*

The dictionary, by the way, defines horticulture as "the science and art of cultivating garden plants."

I guess that's right. However, I don't see any dungarees or overalls in front of me. So perhaps we are "gentlemen farmers."—They tell me that a gentleman farmer is one who never raises anything but his hat.

I have been asked to speak to you today on the subject, "Processing and Labelling Pesticides."

It's a subject on which I could and sometimes do—spout all day but—I don't think I'd get away with it today. As a matter of fact, the last time I made a speech about pesticides I heard the chairman of the meeting say afterward—"That fellow Van Horn doesn't go by his watch when he talks about pesticides—he uses a calendar."

In the production of modern pesticides, the procurement of the highest quality raw materials is an important factor. But even the best raw materials do not necessarily insure or guarantee the production of a quality, effective and safe finished processed product. Even more important than materials are the knowledge and experience peculiar and specific to the profession—the art, if you please—to say nothing of the equipment and other plant facilities essential to the process.

For example—cooking is a science—but still there is an art to it. Give two housewives comparable ingredients with which to bake a cake. One will turn out a delectable, gustatory delight. The other will produce a product that even the chickens won't eat . . . Which proves, I guess, that some women can dish it out but they can't cook it. And there is nothing more exasperating than a wife who can cook and won't—unless it's a wife who can't cook and will.

Aside from that—this same "art" applies to the production of pesticides. There must be a "know how"—which is available neither in textbooks nor the Book of Knowledge. It is a "know how" acquired through years of research, experimentation and the reliable old system of trying, trying and trying again.

The physical and chemical properties of each ingredient which enters into the product must be carefully studied, with due consideration given to the final purpose, or objective, of this particular product, and the manner in which it will be applied.

Among the factors which research chemists, entomologists and plant pathologists must consider in compounding and processing a pesticide are these:

Dry Materials

A. Particle size.
B. Comparative density of components.
C. Ph of components and end product.
D. Shelf or storage life—chemical and physical.
E. Dustability of dusts.
F. Wettability of dry wettable powders.
G. Suspendibility of dry wettable powders.
H. Adherence and weathering qualities.
I. Foaming tendency.
J. Compatibility with other products.
K. Suitable package requirements.
L. Effects of material on equipment.
M. Effects of material on pest and host.
N. Hazards in handling.
O. Create synergistic action if possible.
P. Buffer against refractory waters and varying ph.

And I repeat—these are only *some* of the factors which must be considered.

Liquid Materials

When it comes to processing liquid formulations, most of the points I just listed must be considered, with the exception of such items as particle size, dustability, wettability and suspendibility.

However, in dealing with liquid materials, new factors arise . . . such as solubility, stability, and emulsifiability. In most cases, solvents, detergents emulsifiers, wetting agents and adjuvants are employed in processing.

These ingredients must not only perform their function in processing but they must also be non-inflammable, host-safe and effective against the pest. In all cases it is desirable for the toxicant to remain viable sufficiently long to be lethal to the pest. In some cases, long lasting residues are desirable and in other instances, this is a disadvantage.

Virtually the same basic requirements apply to those pesticides which are propelled by gas or liquid under pressure as those which apply to liquids.

In the preparation of baits, it is essential to obtain a food which is readily acceptable to the pest. The toxicant must not be repellant to the pest to the point where the pest will avoid the bait or fail to eat a lethal dose. Then there is the problem of keeping the bait in a palatable condition. Most baits contain material toxic to warm blooded animals and here again we have another problem—that of proper distribution and the establishment of safeguards against wanton poisoning of desirable species.

Certain solvents as may be used in liquids, diluents as may be used in dusts, wetting agents as used in dry wettable powders, may be in themselves toxic to either plant or animal life or both.

In general, processed products may be classed as solutions, mechanical mixtures, gasses, impregnations, solids, suspensions and emulsions.

Solutions are usually made by various methods employing heat, solvents, etc. Mechanical mixtures result from grinding and blending of previously fine ground materials. Impregnations are effected by atomizing liquids or solutions on to a dry absorbent base. Gasses are usually produced by prime producers. Baits may be either mechanical mixtures or impregnations. Emulsions and suspensions are usually produced by such mechanical devices as pumps, agitators, colloid mills or homogenizers.

In modern processing adequate equipment to do the job is paramount. This is especially true insofar as dry materials are concerned and specifically with dusts. Not only is the degree of fineness a critical factor but an intimate, complete and thorough dispersion of the actives must be obtained especially in the mechanical mixture.

This can only be accomplished by the most careful control of adding raw materials to be compounded through equipment which is adequate to accomplish the desired results. Simple mixing by means of a ribbon mixer, which is the process used by some blenders, all too frequently results in inferior dust blends.

To insure quality products, it is vitally important that chemical and physical control be in effect at all stages of production—this control to cover both the raw materials and the finished processed product.

The improper physical or chemical processing of a pesticide can be responsible for a reduction in the efficacy of the product below that which would normally be expected of it. By the same token, special processing not only can, but has been proved by demonstration to enhance the control value of the product beyond the expected normal.

We will now assume that the processed product has run the grim gauntlet that I have outlined, has met the prescribed tests and is now ready for labelling.

You know what they say about books —that some books sell by their label— others by their libel.

That doesn't apply to pesticides. The labelling of pesticides is a vitally important part of the intelligent use of the product.

Incidentally, the practice of branding commercial goods dates back to the Middle Ages, specifically in Turkey. At that time, the proud producers of goods distinguished one from another by the term "Hallmark." The modern version of the "Hallmark" is Trade-Mark, or Brand Name of the product. This is usually a part of every label.

There are at least twelve important points to consider in the preparation of product labels. The label should clearly and plainly give the following information:

1. Name of product.
2. Analysis statement as to ingredients.
3. Manufacturer and address.
4. Brief description of product.
5. Pests controlled and dilution.
6. Hosts on which to be used and rate.
7. Precautions as to handling and use.
8. Warnings as to hazards to applicator and/or host.
9. If poison—the word poison with skull and crossbones, both in red, should appear on label.
10. Antidote and/or treatment should be given for all toxic materials.
11. If materials are inflammable this should be so stated.
12. Net contents of each package.

All this information should be printed in a non-technical language, easily read and understood by the layman. All labels should be of such size that they can be readily seen. They also should be placed on an accessible smooth portion of the container. Such labels should remain on the package until it reaches the consumer. It is highly undesirable to break a labelled package and deliver unlabelled pesticides to a customer.

With the great number of new pesticides now in the field it is not only imperative that they be properly and completely labelled but it is also highly desirable that those who recommend and use the products should read and understand them, as some of these products are highly toxic to warm blooded animals; whereas, others can result in other forms of host toxicity if improperly used.

Well, gentlemen—that is a base canard they have spread about me. Here it is—still November the first—and I am through talking.

As a matter of fact, I am intentionally cutting this talk short. Just before I came up here on the platform, the chairman asked me if I knew the definition of an audience and before I could reply he said, "An audience is something that you should leave before it leaves you."

THE ROLE OF THE REGIONAL VEGETABLE BREEDING LABORATORY IN BREEDING AND TESTING NEW VEGETABLE VARIETIES

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For those who may not be familiar with the purpose and organization of the Regional Vegetable Breeding Laboratory, let me say that it was established in 1936 to aid in the development of improved varieties of vegetables for the South in collaboration with the 13 Southeastern States. Emphasis should be placed on cooperation with the state agricultural experiment stations, each of which, from Virginia to Oklahoma and Texas and all States south and east, has an official collaborator, appointed at the recommendation of each Station Director.

As a matter of fact, cooperation among the vegetable breeders of these States and of the U. S. Department of Agriculture has developed far beyond the point of formal collaboration, to the mutual advantage of all groups. The breeding of vegetables and other plants is a rather complex process, being made up of several distinct operations. These steps include the selection of breeding materials as parents, the adoption of a system of breeding, making the crosses (which involves a wide variety of techniques according to the crop), the selection of individuals and later of breeding lines, the regional comparison of the new lines with established varieties, and finally the increase of seed and introduction of the new variety. Some of these operations can be accomplished only by the active cooperation of a number of individuals. Other steps are often more effective if several workers can get together to pool their resources.

A good example of the necessity for cooperation is the regional testing of promising breeding lines. Here in the South the Southern Section of the American Society for Horticultural Science has set up an organization to handle such trials. While the horticulturists initiated the organization, it is open to all station workers in the region who are actively interested in vegetable breeding and in new varieties. It includes quite a number of plant pathologists, a few agronomists, and many horticulturists not actively engaged in the earlier phases of breeding. The work is done by a crop chairman and a variable number of cooperators, depending on the interest in and importance of the crop. The cooperators are usually widely scattered over the entire region. The chairman collects the several lots of seed, distributing identical sets to all cooperators. With the help of the group at annual meetings and by correspondence, he develops a set of forms for taking notes. At the