

MODERATOR MAIRE: Any questions for Pat?

UNIDENTIFIED SPEAKER: Has Temik been released?

PAT MORISHITA: I hope that it will come out about the first of the year. I have no experience with it on commercial crops. I gave Wes Humphrey some of this material and he tried it on Cuban laurel thrips. He had control for somewhere around six months. Timing is going to be very important.

I have a few words to say about control of scales and mealy bug, both of which are pests on woody ornamentals. Four different systemics, Temik, Lannate, Azodrin and Furdan gave very good control of several kinds of scale and mealy bug in greenhouse tests on Cycads. These materials have possibilities in the nursery if they're handled right.

MODERATOR MAIRE: Thank you Pat. At this time we once again have the pleasure of hearing Dr. Robert Raabe. He will tell us "What's New In Systemic Fungicides". Bob.

SYSTEMIC FUNGICIDES

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The development of systemic pesticides has opened a new era in agriculture. Some systemic insecticides are now available and more are in the process of being tested. Systemic fungicides are in the testing stages and only one has been released to date. The development of systemic fungicides has been slower than that of the systemic insecticides, partly because with the insecticides, the chemical must be effective against an animal system while moving through a plant system. Since fungi are plants, systemic fungicides must be effective against a plant system while moving through a plant system. Though this presents difficulties in finding materials which will be toxic to some plants and not toxic to others, such materials when found have the advantage that they are less likely to be toxic to animals (including man) than the systemic insecticides.

The first group of systemic fungicides to be developed belong to a group of chemicals known as oxathiins. These were first obtained by the Uniroyal Corporation as by-products of sulfur mustards in 1960. In 1963 Vitavax (also known as DCMO or D735) was synthesized and was found to be systemically active against loose smut of barley. Soon a dioxide analog, called Plantvax (also called DCMOD or F461), followed and it was found to be effective in controlling leaf rust and stripe rust.

Both of these compounds have been found to be specific against certain fungi in the Basidiomycetes, namely the rusts

and smuts, though they have some activity against *Rhizoctonia*. Vitavax has proven generally to be more effective against the smuts and *Rhizoctonia* whereas Plantvax has been most effective against the rusts generally. Variations do occur, however, and only experimentation will prove which material will be most effective against any specific disease.

In general, both materials may be applied as seed or soil treatments. Plantvax has also been successfully used as a foliage spray. The best type of application has been found to vary with the plant and disease involved. In controlling some of the smut diseases, seed treatment has been very effective. Control of snapdragon rust and carnation rust has been most successful when the materials are drenched into the soil around growing plants.

Two other closely related compounds by Uniroyal are being tested against these fungi. F849 has been shown to be effective against *Rhizoctonia* and G696 has been found to be effective against both rusts and smuts but is more toxic to plants than Vitavax or Plantvax.

Another group of systemic fungicides are the benzimidazole derivatives. Several of these are being tested in Europe and have been shown to be effective against leaf-spotting fungi and powdery mildews.

In the United States, TBZ, a material used many years as an anthelmintic in animals, has been found to be systemically effective against some rusts, smuts, powdery mildews, leaf-spotting fungi and *Botrytis*. It is generally used as a seed or soil treatment though drenches and sprays have been effective on some plants. The material is effective at low concentrations but care must be used since the margin of safety is not large.

Another compound in this group is Benlate (DuPont 1991). This systemic has been found to be effective against some fungi which attack leaves and fruits, including apple scab and brown rot of stone fruits. It also is effective against some rust fungi, powdery mildews and many leaf spotting fungi. In addition, it also controls certain soil-borne organisms such as *Rhizoctonia* and *Thielaviopsis*. In container-grown plants, it has given control of the verticillium wilt fungus but under field conditions, control has not been successful.

Although perhaps not acting systemically, it should be mentioned that mixtures of Benlate and Dexon (which is specific against the water mold fungi) have given excellent control of the rot complex in poinsettia and the root and bulb rot complex in Easter lily.

One other material not related to these groups of compounds but which shows some systemic activity is Demosan (DuPont 1823). It is used as a seed or soil treatment and is primarily effective in controlling seedling diseases caused by *Rhizoctonia*. The fungicide moves systemically as far as the cotyledons but apparently does not move beyond this.

Of all these materials, only Demosan is available. It is reported that Plantvax and Benlate will be released early in 1969 and perhaps others will not be too long in following.

MODERATOR MAIRE: Thank you Bob. Any questions from the audience?

RALPH SHUGERT: Dr. Raabe, have you tried systemic fungicides for the control of phomopsis blight?

DR. RAABE: No we haven't done anything along this line. One of the problems here is that phomopsis kills the tissues, so you have to get the systemic in before the fungus kills the tissue. These systemic materials do not move into dead tissues. They are only going to move in the living tissues, so there will be a protective rather than a killing action.

RALPH SHUGERT: Can you suggest a fungicide that will control phomopsis blight.

DR. RAABE: Have you tried this new material that Rohm and Haas just put out called Fore. It is an excellent all around fungicide.

RALPH MOORE: Does Benlate do anything for rose black spot?

DR. RAABE: According to the literature that comes to us from the DuPont Company it does an excellent job on rose black spot. In my own garden it does nothing.

UNIDENTIFIED SPEAKER: This is a question for Dr. Raabe. Do you have any chemicals other than Dexon that you would recommend for phytophthora root rot.

BOB RAABE: I have done a lot of work with a material called Terrazole that is put out by the same people that put out Terrachlor. It is an excellent material, but unfortunately they are a little bit slow about releasing it. They did bring some out in a mixture of Terrachlor-Terrazole but unfortunately the ratio was wrong in this mixture. They had 2 parts of Terrachlor and 1 part Terrazole. In order to use it at a rate where Terrazole was effective, the Terrachlor was too high and was toxic to plants. We have tried to get them to change the formulation. Terrazole stays in the soil a long time and once you have added it you don't have to worry about phytophthora for between 4 and 6 months on some plants. We did some experiments last year on some of the California natives in containers. We controlled root rot and produced beautiful plants using Terrazole.

DICK MAIRE: Roy Sachs, the next scheduled speaker is unable to be with us today. Wes Hackett will fill in for Roy and tell us "What's New in Growth Regulators". Wes.