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SUGGESTIONS TO GROWERS FOR TREATMENT OF TOBACCO BLUE-MOLD DISEASE IN THE GEORGIA- FLORIDA DISTRICT

ERWIN F. SMITH

Pathologist in Charge

and

R. E. B. McKENNEY

Pathologist, Laboratory of Plant Pathology

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SUGGESTIONS TO GROWERS FOR TREATMENT OF TOBACCO BLUE-MOLD DISEASE IN THE GEORGIA-FLORIDA DISTRICT.

THIS CIRCULAR has been issued with two ends in view (1) the saving of as much as possible of this year's crop and (2) the protection of future crops. The sudden appearance of a tobacco *Peronospora* in five widely separated seed beds at approximately the same time and its rapid spread to almost or quite all the other beds, together with its discovery on a weed in one seed bed and its subsequent appearance on tobacco in the field, both under shade and in the open, even when set with supposedly healthy plants, along with the well-known destructive character of all parasites of this group (downy mildew of the grape, downy mildew of the cucumber, late-blight of the potato, tobacco *Phytophthora*, etc.) makes it plain that a very dangerous enemy has been introduced and that it can be controlled only by a concerted effort on the part of all the tobacco growers of the Gadsden-Decatur district along intelligent and well-directed lines of disinfection, protective spraying, and field sanitation, as outlined below.

THE SEED BEDS.

The tobacco seed beds should be cleaned up at once. All trash (weeds, dead tobacco plants, etc.) should be burned. The beds should then be *soaked* in a solution of formaldehyde, using 1 part of the commercial 40 per cent formaldehyde (formalin) to 100 parts of water; or, in place of this the bed may be sterilized by the inverted steam-pan method for 30 minutes. However, when steam is used it will be necessary to treat the ground around the posts and around the edges of the field with the above-mentioned 1-to-100 formaldehyde solution. The posts, and the walls when they are of wood, should also be thoroughly sprayed with the formaldehyde solution. The cheesecloth used to cover the seed-bed should be burned or thoroughly boiled or steamed. Formaldehyde solution is not recommended as a disinfectant of cheesecloth, because of its tendency to make the cloth hard and brittle and therefore useless.

These beds should be resteamed or burned, as is usual preceding the seeding. Care must be used in handling the formaldehyde solution. This does no injury to the land, as it is readily decomposed in the soil and what is not decomposed rapidly evaporates, leaving the land sweet. However, it will harden the skin and make it crack and will cause smarting of the eyes and nose if carelessly used. Those

handling the formaldehyde solution should grease their hands with vaseline or use leather gloves that have been greased.

Seed beds that have been sterilized should not be visited by anyone not directly concerned in their care. Pigs, chickens, and other animals should be rigidly excluded.

In selecting seed for the coming season the greatest pains should be taken to obtain it from plants not attacked by this disease, and it should be stored so that it can not be contaminated by dust from diseased plants.

TOBACCO FIELDS.

Diseased (spotted) leaves should be removed at once as far as practicable and burned. It is probably dangerous to allow these leaves to remain on the land. No resting spores have yet been found in the diseased spots, but in fungi of this group thick-walled resting spores are a common way of passing the winter, and they occur almost certainly in some of the spots on these tobacco leaves. It is the safe thing to assume that the resting spores are present and to gather and destroy the spotted leaves.

The sound leaves on the plants should be sprayed with fungicides. At present a dilute Bordeaux mixture is probably the safest fungicide likely to give results. Experiments are being carried on with various other fungicides.

If Bordeaux mixture is used it is best made fresh, rather than bought dry, and should not be used stronger than the 2:2:50 formula, on account of danger of burning the foliage. Great care should be taken to wet the under as well as the upper surface of the leaves, since the fungus penetrates mostly and fruits on the under surface. This treatment should be repeated after rains and generally, rain or shine, as often as every second or third day during the rapidly growing period. Nothing can be promised, but we know that such treatment has proved successful against the downy mildew of the grape, and it offers the best hope for success of any of the common germicidal treatments.

BORDEAUX MIXTURE.

To make 2:2:50 Bordeaux mixture from stock solutions it is only necessary for 2 gallons of the stock solution of copper sulphate (bluestone) to be poured into a suitable container and 2 gallons of the stock solution of the milk of lime into a separate container, diluting each to 25 gallons. The two dilutions are then poured together into the spray tank or into a barrel, from which the tanks are filled. The mixture should be used as soon as made, not allowed to settle.

To make stock solutions of Bordeaux mixture, proceed as follows: Procure two water-tight barrels and protect from the sun. To prevent loss from evaporation each should have also a tight-fitting

wooden cover. The lime barrel should have a flat paddle for stirring.

The bluestone barrel.—For this, use 1 pound of copper sulphate to each gallon of clean water, suspending the crystals in a clean gunny sack in the top of the water until all are dissolved. Forty or fifty gallons is a good quantity to make at one time. The crystals will not dissolve completely if thrown on the bottom of the barrel, because the solute is heavier than water and settles around them.

The lime barrel.—Use stone lime in the same proportions (1 pound to each gallon of water). Slake in a minimum quantity of the water usually in the barrel, keeping track of the amount of water used, then add the remainder of the water and stir thoroughly each time before dipping; otherwise you will be using *lime water* at first and not *milk of lime*, and in this case the top part of the barrel will give an acid Bordeaux, injurious to the foliage, and the bottom a thick pasty Bordeaux that can not be sprayed.

In making Bordeaux it is of the utmost importance to use good well-burned lime, to slake carefully, and to stir the lime each time before using. The water also must be free from straws, chaff, small sticks, or shreds of any sort which will clog the sprayer and cause vexatious delays. Wooden pails must be used, not galvanized-iron pails or tin ones, since the metal will precipitate the copper. A Vermorel or equivalent nozzle must be used, so as not to waste the spray.

WEEDS AND ORNAMENTAL PLANTS.

We have found the fungus causing this tobacco disease on a weed in one of the seed beds and on a white-flowered tobacco grown for ornament in a garden. It should be looked for everywhere in the fields and around houses on solanaceous weeds (the black nightshade, the horse nettle, the bittersweet, the jimson weed, the husk tomato or ground cherry, etc.). Any spots at all suspicious on any such plant should be collected and turned over to the Government agents, who will help all that is possible. Weeds liable to harbor this fungus should be removed from the vicinity of seed beds, and later from the whole region, if necessary. Inasmuch as peppers, tomatoes, egg-plants, pepinos, and potatoes belong to the same family as tobacco and are near relatives of it, they also should be watched. Ornamental plants of this family should be discarded.

The amount of damage done by the disease this year will depend in large measure on the character of the season. If the weather is moderately dry the bulk of the crop will probably escape. Days with frequent rains are favorable to the disease, while dry weather tends to check it.