The Journal of Agriculture of the University of Puerto Rico

In continuation of The Journal of the Department of Agriculture of Puerto Rico

Published Quarterly: January, April, July and October of each year.

MELVILLE T. COOK, EDITOR

VOL. XVIII JULY 1934 No 3.

# PARING AND HEAT STERILIZATION OF THE CORMS TO ELIMINATE THE BANANA ROOT WEEVIL *COSMOPOLITES SORDIDUS* GERMAR

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## METHODS ADVOCATED

Various methods for rendering the corms of bananas and plantains free from the "root" or corm weevil, *Cosmopolites sordidus* Germar, before planting have been advocated.

Total immersion in water or in water with arsenicals, and fumigation with carbon bisulphide may kill the insect if prolonged, but will also kill the plant tissues.

Simmonds (1) has reported satisfactory results when the suckers are immersed in water for 21 days up to four inches above the union of the stem with the corm, allowing the rest of the stem to protrude above the surface. If immersed totally for that length of time, the suckers die. We have made one test only of this method and in that, some larvae survived by having worked their way up to the parts above water. The length of time and the special conditions required render this method cumbersome. The tendency of the larvae to work upwards may result in the destruction of the bud in some of the suckers.

The immersion in boiling water for one minute may be sufficient to kill the eggs or the very small larvae located near the surface of the corm. To reach the large larvae located deeply inside the corms, the immersion would have to be very long. A long immersion would be cumbersome and may result in the destruction of many of the corms.

The only method which has proved practical because it can be carried out quickly and inexpensively, is the paring or cutting off of the external parts of the suckers. The older corms are more irregular in shape than the suckers and are therefore more difficult to pare.

Froggat (2) in 1926, recommended cutting a thin slice off the

whole sucker as far up as possible without damaging the eye or otherwise imparing its growing qualities.

We have found that cutting off a thin slice may remove the eggs but is likely to leave behind the small larvae which have started to tunnel into the corm. Such small larvae or their tunnels are difficult to detect.

In the future, heat sterilization may prove to be a practical way to free the corms of the weevil. We have done enough experimental work sterilizing infested corms at 43°C for eight hours in a circulating atmosphere saturated with moisture to show that it will free the corms from the weevil without injury. A field experiment is being conducted at the Station grounds to compare the results of paring with sterilization to determine which is more desirable.

## THE NEED OF AN EFFECTIVE METHOD

Most of the banana varieties grown in Puerto Rico continue to produce satisfactory crops in most localities in spite of the weevil. Plantains, however, are so greatly injured in all localities that a second crop is usually unobtainable and even the first one is frequently a complete failure.

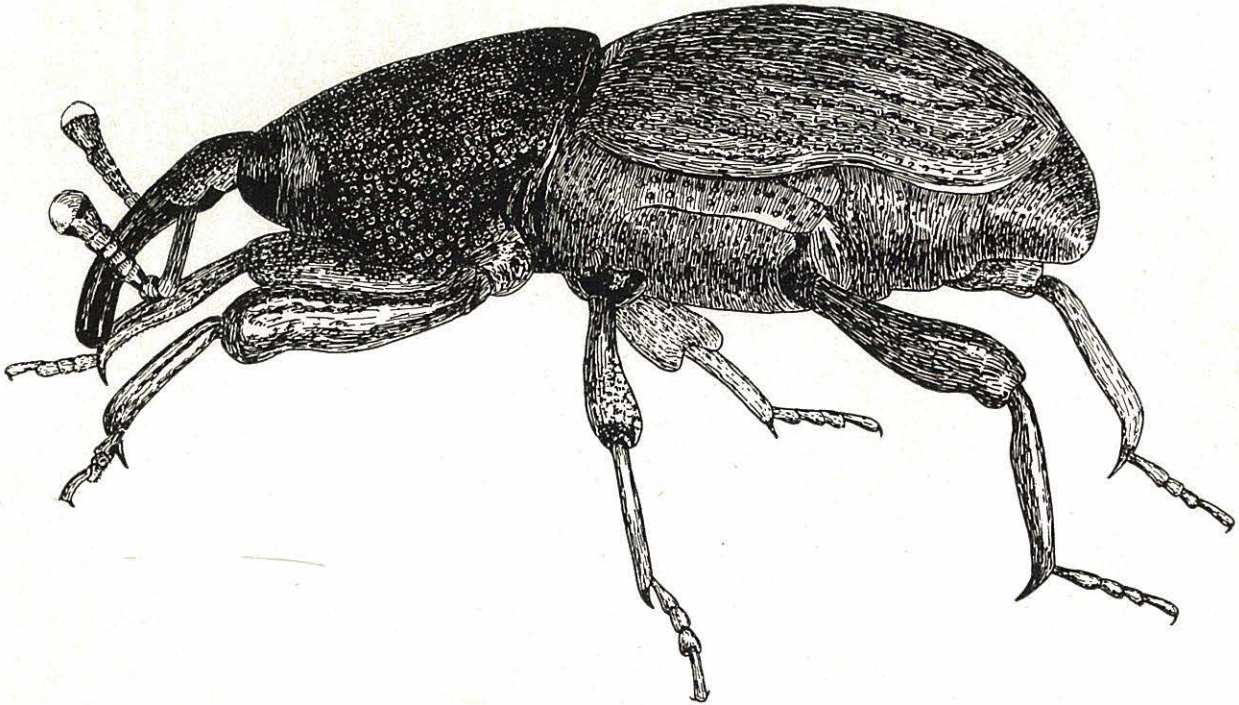
Plantains are greatly relished for cooking purposes and sell for about two cents each. Due to the difficulty of growing them because of the weevil, importations have to be made from Santo Domingo where the pest has not yet become prevalent. During the calendar year 1933, plantains valued at $84,690 were brought in from that island.

Bananas on fertile soil continue to produce for many years, plantains must be set into fresh soil after the second crop. Paring the suckers will serve equally well for bananas as for plantains, but the cultural practices followed render it more feasible with plantains.

## PROCEDURE

The first step is to secure the best corms that can be obtained. (Fig. 1.) These should come from the least infested plantations and from stools showing few or no tunnels in the mother corms. Digging out the suckers as soon as they are large enough will also tend to reduce infestation. *All* suckers or corms are to be considered infested and conscientiously pared.

The weevils (Plate I) come out to feed and lay eggs at night. Once dug out of the soil, the suckers must be pared and removed from



Adult of *Cosmopolites sordidus* Germar. Twelve times natural size. (Original.)

PLATE I

the plantation before nightfall, because their cut surfaces are extremely attractive to the weevils, which will congregate and lay large numbers of eggs in them.

Paring will remove the eggs and the small larvae before they tunnel deeply. If the suckers are pared immediately after they are dug out, there will be less danger of the eggs hatching or of the larvae tunneling deeply.

After being pared, the suckers must be examined by the person interested in the success of the plantation. At that moment, all the outer dark tissues having been removed, any large tunnels present will become visible. Corms showing tunnels should be discarded. Ordinary laborers cannot be relied upon entirely, because they will not pare the suckers thoroughly and will pass some with tunnels as sound.

To pare, the suckers should be held by the stem. A layer one inch thick, or more, if the size of the sucker will permit, should be cut off from all over it. The outer leaf-sheaths should then be removed and the region at the union of the leaf-sheaths and the corm carefully pared (Fig. 2). Suckers reduced to three inches in diameter by paring have germinated well and produced strong plants. There should be no fear of easily injuring the corms and no need of cutting off only a thin slice. The paring should be as severe as possible.

After paring, the suckers may be planted immediately. Storing in a cool dry place for a week before planting is preferred by some growers. In that case the suckers may be stored after having been pared. To store them before paring would give the eggs the opportunity to hatch and permit the larvae to tunnel beyond reach.

The pared corms must be kept away from plantain or banana plants. Paring renders them exceedingly attractive to the weevils and they will become heavily re-infested if left within reach of the adults. Some growers have great faith in the immersion in boiling water. If it is to be practised, it should be carried out immediately after paring.

The parings should be scattered to dry out rapidly so that the eggs or small larvae in them will be killed.

### OTHER PRECAUTIONS

It is useless to pare the suckers if they are to be planted in infested soil. For the soil to be free from the weevil it must have had no plantains or bananas for at least one year. It must be kept

Fig. 1.—An apparently sound plantain corm. Such corms should be selected for treatment by paring, to obtain plants free from infestation by *Cosmopolites sordidus*. **(Original.)**

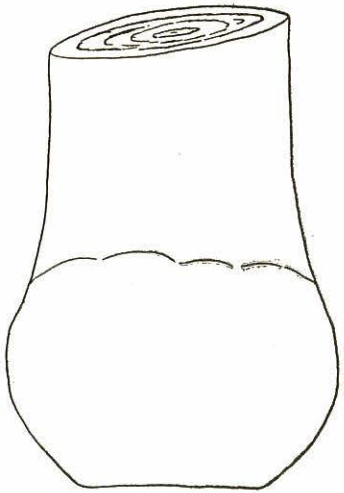


Fig. 2.—The same corm after having been pared. Note the comparative size. It is now ready to be planted. **(Original.)**

in mind that in plantations that are abandoned and allowed to die out by themselves, the corms persist for a long time and harbor the weevil.

The site for the new plantation must be removed from other plantations to prevent the beetles from crawling over or being washed down with trash by the heavy rains.

Paring may produce absolutely sound plants, but ordinarily a low percentage of infested plants is to be expected. Watch must be kept, therefore, over the plantation and any stunted plants with yellowish leaves that fail to unfurl normally should be inspected by cutting slices off the corm. If tunnels are detected, the plant must be dug out and the corm cut up to find and destroy any larvae, pupae or adults it may contain. From the more sound parts of the corm, slices are to be cut for traps. The slices are placed on the smoothed over soil where the plant was dug out. These traps attract the weevils that have migrated into the soil when they come out at night to feed. The weevils remain attached to the underside of the traps or hidden in the soil directly underneath them where they can be collected by hand and killed by dropping into cans with a little kerosene. After the surface of the traps dries out, a fresh surface can be exposed by cutting off a thin slice. After two weeks the traps should be finely chopped to destroy any larvae in them. Fresh traps should be kept on the ground until no more weevils come to them.

## SUMMARY

1. Other methods of control except the paring of the corms or suckers as carried out by the writer, have been investigated and found either unreliable or unpractical. Sterilization at 43°C for eight hours in an adequate sterilizer, kills the insect without injury to the plant tissues. This method may prove to be practical.

2. Paring the suckers heavily, that is, cutting away one inch or more of all the external surface and removing also the external leaf-sheaths of its stem, will eliminate all or practically all of the eggs and the newly hatched larvae which have not yet tunneled deeply. Upon paring, the presence of larger larvae is shown by their tunnels. It is better to pare off as much as the size of the corm will allow for greater safety. Corms even when very severely pared germinate well.

3. The method can be used equally well with bananas or with plantains, but the cultural practices followed make it more desirable for plantains.

4. Suckers showing no tunnels—presumably uninfested—should

be selected, and even so, must be pared thoroughly. Corms showing tunnels are to be discarded.

5. Suckers for planting should be dug out as soon as they attain sufficient size. They should be taken from stools showing few or no tunnels in the mother corms and from the less infested plantations. If left on the ground overnight near plantain and banana plants, they may quickly become re-infested, especially after having been pared.

6. The paring must be supervised to make sure none of the old surface tissues are left on, or corms with tunnels passed as sound.

7. The pared corms are to be set in land free from the weevil and any plants that show infestation should be rogued and traps set to catch the weevils.

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