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GRANULAR INSECTICIDE APPLICATORS

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Granular Insecticide Applicators

Granular insecticides are being used more and more to control field pests. In the past, insecticides were mixed with fertilizer and applied with the fertilizer applicator. However, new fertilizer equipment places fertilizer in a band below and to the side of the seed, where the insecticide would not be very effective. To apply insecticides as recommended, use an insecticide attachment to get the correct placement.

TYPES OF APPLICATORS

Two general types of granular insecticide applicators are available—gravity-flow and positive-flow.

The **gravity-flow** type is basically a hopper for holding the granules with a metering hole in the bottom for discharge by gravity. Generally an agitator is provided in the bottom of the hopper to insure flow. The agitator does not directly control or meter flow but does induce flow indirectly due to the agitator's position directly above the hopper discharge. This type is quite simple and relatively inexpensive. The gravity applicator is satisfactory if the granules are uniform and the rate of speed during application is kept uniform. Rate of application is controlled to a large degree by the rate of speed during application.

Positive flow is generally either a fluted-feed type or auger-type. The auger or fluted-feed is located so the granules fall onto it from the hopper, and it in turn meters and pushes the granules down the discharge hose. These applicators are more complicated and also more expensive than the gravity flow applicator. They are more accurate in the rate of placement than the gravity flow, as delivery rate is controlled by the ground speed of the applicator. Rate is changed by using different sized drive sprockets or by adjusting the outlet opening.

APPLICATOR PARTS

The three major parts of a granular applicator are the metering device, the spreading mechanism, and the hopper and hoses.

Usually there is a 10 to 20% fluctuation in ground speed, and a positive flow **metering device** that would give a proportional discharge rate to ground speed would be the most accurate. However, this type of metering device has not been successful due to the nature of the materials, rates desired, and the economics involved. Agitator-gravity-feed is the type that is most often found on today's applicators. This type has been quite successful even with normal ground speed fluctuations.

The **spreading mechanism** is at the lower end of the discharge hose and distributes the granules in a band. For corn rootworm control this band should be worked into the upper one-half inch of soil. Therefore, the band should be behind the planter and in front of the press wheels or covering disks or dragging chains. The bands should be 4 to 7 inches wide for corn rootworms and placed directly over the corn row. For corn borer control, spreading devices that will apply granules in 14 to 20 inch bands directly over corn plants are recommended. For some types of soil insect control, granules are dropped directly out of the discharge tubes for both band and overall applications.

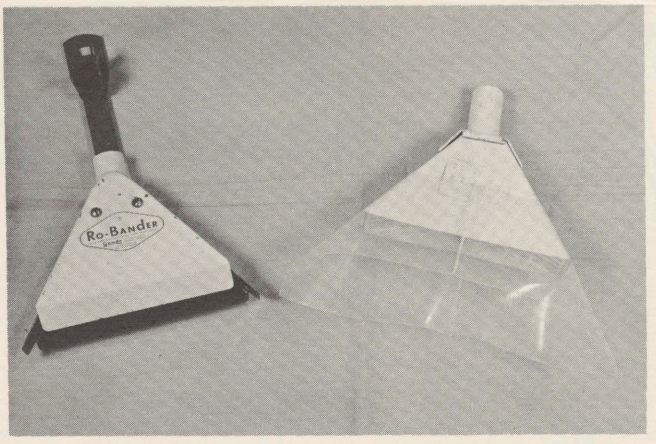
Hoppers and discharge hoses should be so constructed and mounted that they will not hinder the flow of granules. Data on the angle of repose, indicate that the best results occur when the bottom and sides of the hoppers have at least a 40°, and preferably a 60°, angle from the horizontal to prevent bridging. The hoses should be as straight as possible to prevent a hinderance of flow. Hoppers should be big enough so they can be filled at the same time as the planter boxes, but they should not hold more than a half day's supply, as moisture may be absorbed from air by chemicals and increase the bridging problem. The hoppers should be located so they can be easily loaded, unloaded, and cleaned.

Inspect other features of applicators also before deciding which applicator to purchase. These include construction materials, chains, gears, bearings, and durability of the whole applicator.

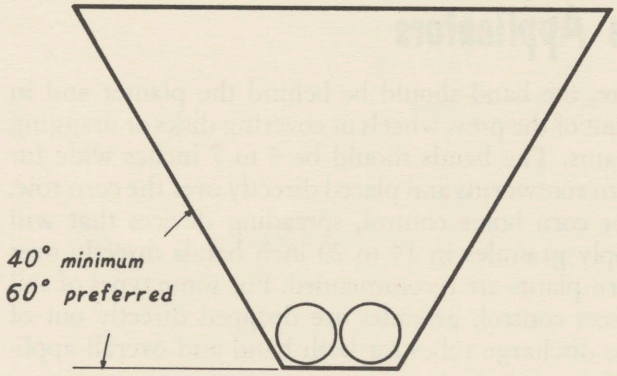
CALIBRATING THE MACHINE

Proper application rates of insecticides are important. Too little dosage could prevent a proper kill of insects, too much could injure plants as well as increase the expense.

Calibrate an applicator not only prior to its initial use but also periodically during operation. Many factors will cause a variation in the application rate.



Spreading mechanisms for distributing granules in a band.



Bottom and sides of hopper should have at least a 40° angle from the horizontal to prevent bridging—60° would be even better.

Area of metering orifice, speed of agitator, ground speed of applicator, nature and size of granules, roughness of field, humidity, and temperatures can affect the rate. Some of these factors are directly related to each other and some will change periodically during the day. Check the operator's manual for the manufacturer's recommendations on how to calibrate the applicator.

One way to calibrate an applicator is to follow these steps.

1. Fill the hopper with granules.
2. Set the tractor speed at the field rate and operate the unit 300 feet in the field, catching the granules from the hoppers in buckets.
3. Accurately weigh the granules discharged by each unit; then adjust units so each will meter the same amount.
4. Calculate the square feet of the test area—take the row width in feet times the number of rows times the distance covered (300 feet).
5. Get the rate per acre—multiply the pounds of granules collected (step 3) by 43,560 and divide the answer by the square feet from step 4.

$$\text{Lbs. per acre} = \frac{\text{43,560 x lbs. granules applied over test area}}{\text{Area of measured course in square feet}}$$

EXAMPLE

granules applied on 300 ft. = 1 lb.

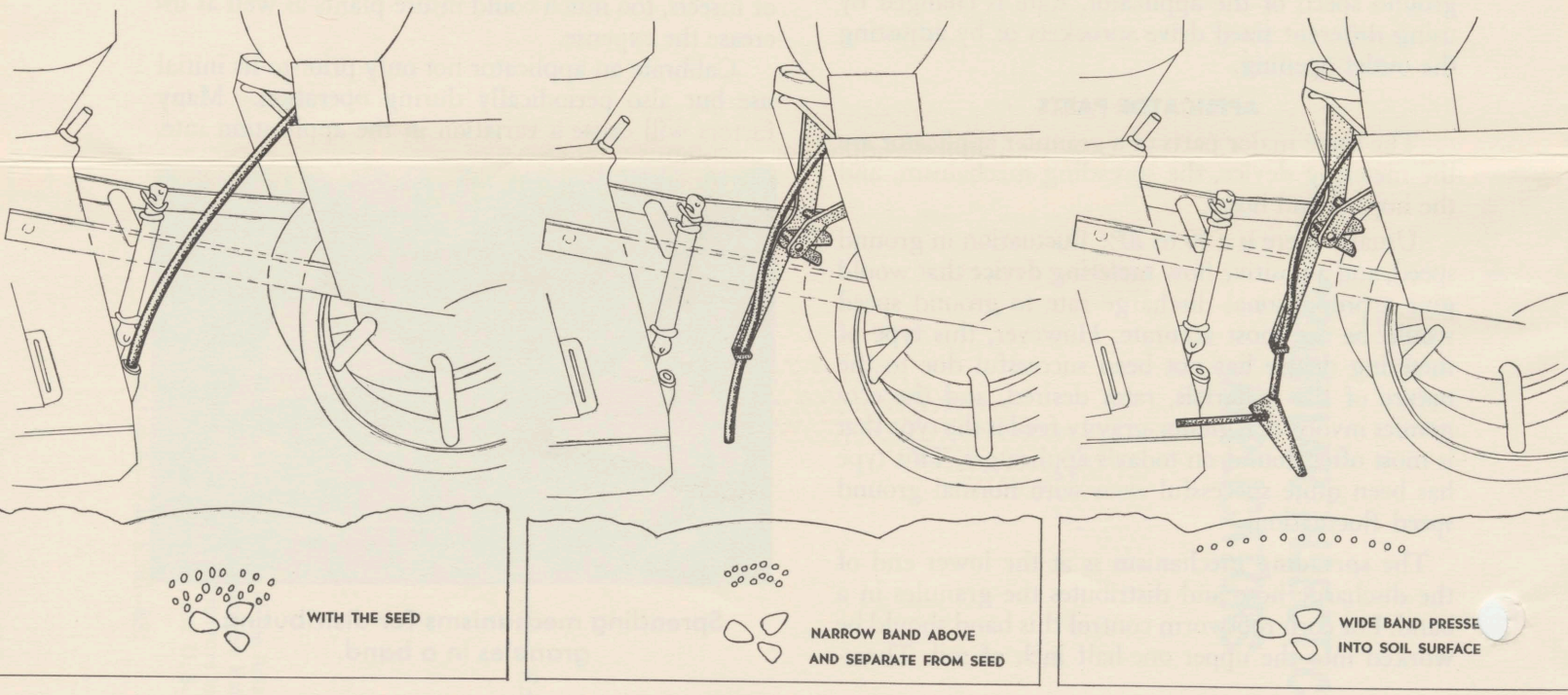
rows = 40 in.

No. rows = 4

(40 in. ÷ 12 in./ft. × 4 rows × 300 ft. = 3990 sq. ft.)

$$\text{Lbs./A.} = \frac{43{,}560 \times 1}{3990} = 10.9$$

Granular insecticide placement.



This gives the application rate of the bulk insecticide. You find the amount of active ingredient applied per acre by multiplying the pounds per acre (step 5) by the percent of active ingredient in the granules. Then divide by 100. (The label on the insecticide container will tell the percent of active ingredient.)

$$\text{Lbs. per acre active ingredient} = \frac{\text{Lbs. per acre (from step 5)} \times \% \text{ active ingredient}}{100}$$

EXAMPLE

Lbs./A. = 10.9

% active ingredient = 10

$$\text{Lbs./A. active ingredient} = \frac{10.9 \times 10}{100}$$

active ingredient = 1.09 lbs./A.

Adjust and test the applicator repeatedly until you get the desired rate from each hopper. Recheck the applicator once in a while, especially when operating conditions change, to be sure application rate remains proper. Comparing the time it takes to empty a hopper with the area covered will give an idea of application rate and indicate if readjustment is necessary. After the machine is calibrated it is very important that uniform speed of operation is maintained, as a change in the speed of operation will give a change in the rate of application with most machines.

CLEAN THE APPLICATOR

Clean out the applicator thoroughly after each day of use to prevent unnecessary corrosion. Before storing at the end of the application season, thoroughly clean the applicator. Give all parts subject to rust and corrosion, such as chains, gears, hopper, and agitator, a protective coating of oil, grease, or rust preventive solution.