

HEIN, GARY L.* , RICK PATRICK, CHARLES K. FLINT and JOHN A. SMITH, Panhandle Research and Extension Center, University of Nebraska-Lincoln, 4502 Ave. I, Scottsbluff, NE 69361. **Effectiveness of a precision applicator in applying pesticide granules synchronously with sugar beet seed.**

ABSTRACT

A precision granule applicator has been developed by Monosem for their Mecca planter units called the Microsem spot applicator. This applicator meters out granules and places them in synchrony with the seed. The advantage of this applicator is to apply an adequate amount of material directly with the seed and avoid application of material between the seeds. The intent of this applicator is to apply the material more precisely where it will be most effective, thus improving effectiveness and reducing costs. **The objective of this study was to evaluate the effectiveness of this applicator on a grease belt at various speeds to determine the spatial distribution of granules released by the applicator.**

Procedures:

A Meca 2000 planter unit was equipped with a Microsem spot applicator (Figures 1-3) and mounted on planter test stand. The test stand was equipped with a grease belt to collect seed from the planter and also granules dropping from the granular application tube directed over the seed furrow. The planter test stand was capable of running at various speeds. After setting the planter seed spacing at 5.3 inches, the Microsem applicator was adjusted to synchronize its application with the seed placement. This adjustment was relatively easy and could be made once we were familiar with the adjustment mechanism.

Once the planter unit and applicator unit were synchronized, the grease belt was run at 2, 3, and 4 miles per hour. We stopped the grease belt at several points to observe the seed and granule distribution. A series of photographs were taken of the seed and granule placement on the belt. Image analysis software (*Scion Image*) was used to evaluate the photos and to quantify the granule distribution. The number of granules were counted in 1-cm segments between the seeds. Analysis of each photograph began at a seed and continued the full distance between seeds one and two and seeds two and three. Twenty photographs at each speed were analyzed, and averages of the number of granules deposited in each 1-cm segment were determined.

Results:

A graphical summary of the granule distribution at the various speeds are shown in Figures 4a, 5a, and 6a. Representative photos of the granule distribution for the three speeds are shown in Figures 4b, 5b, and 6b. Synchronization of granules with the sugar beet seed could be obtained at all speeds, but the distribution around the seed also increased with increasing speed. As the seed approached the granules began to flow at a more rapid pace but tailed off a bit more slowly after the seed had passed. This left a more gradual decline in granule density after the seed. The granules were deposited in a much more concentrated distribution at the 2 mph speed, and this distribution evened out as the speed increased. About 75% of the granules were deposited within 2 cm of the seed at 2 mph, but only about 50% if the granules were deposited within 2 cm of the seed at 4 mph. The tailing off of the granule distribution after the seed can be observed at all speeds.

The applicator did work reasonably well at concentrating granules around the seed, and synchronization of the granules and seed was relatively easy to obtain. However, speed did have a significant effect on granule synchronization and would change pesticide application rates immediately around the seed. It is likely that rates would need to be adjusted based on planter speed as application of granules right around the seed would vary.

The reduced popularity and usage of granule insecticides may reduce the need of this type of applicator; however, the applicator does have potential for more precise application of higher value pesticides or biocontrol products. Some of these products may need to be targeted directly with the seed but may not be appropriate for use as a seed treatment. The Microsem spot applicator may have applicability in these situations.

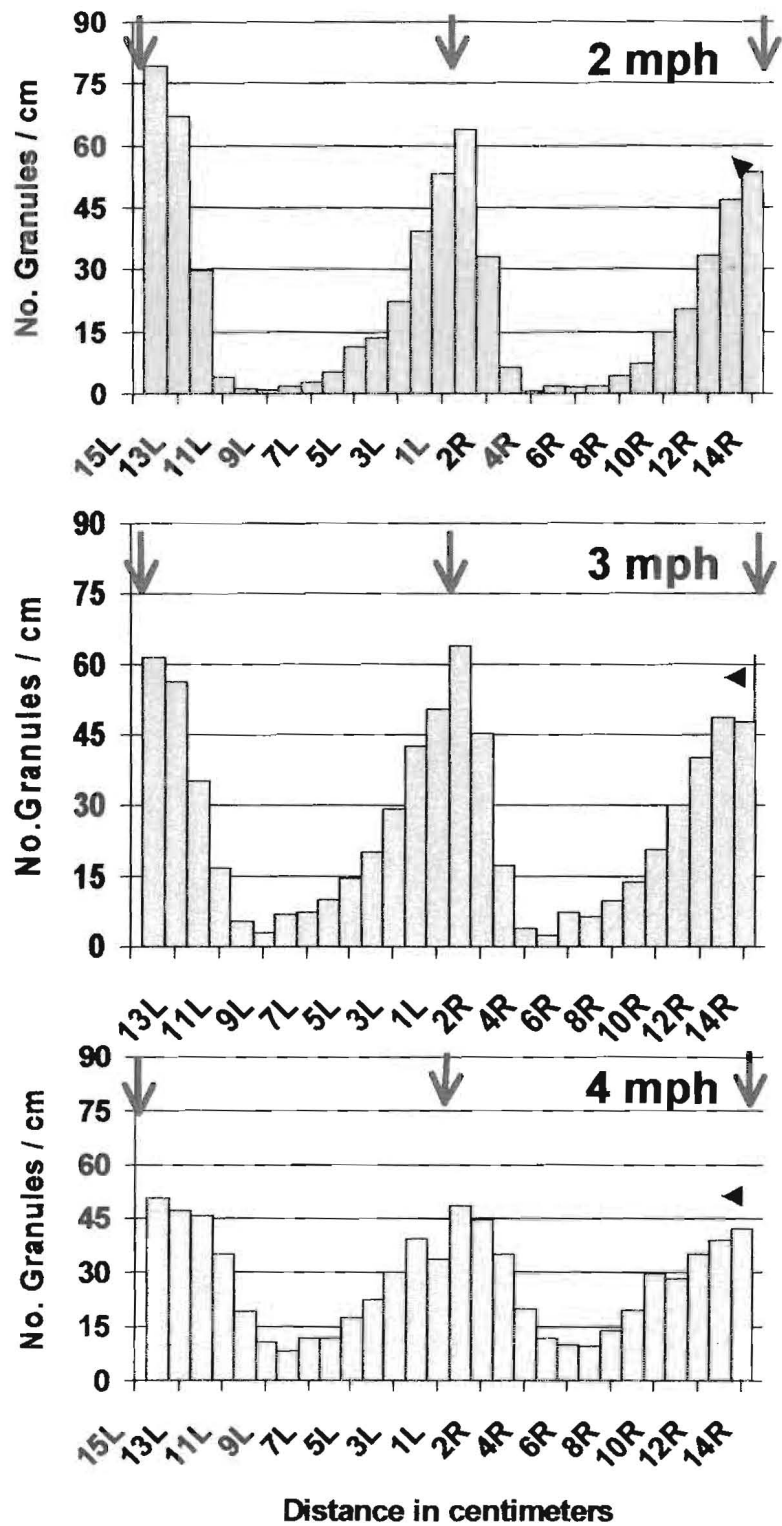


Figure 1. Average (n=20) distribution of granules produced by Microsem spot applicator at 2, 3, or 4 mph (planter direction right to left; arrow indicates seed placement).