



Extension FactSheet

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Skip-Row Soybean Production

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Highly profitable soybean production systems consist of early planting; narrow rows; good fertilization; selection of the most suitable varieties; good weed, disease, and insect control; crop rotation; well-drained land capable of supplying lots of water to the crop; and the reduction or elimination of any stress to the crop. Good management is a system of compromises. Sometimes the optimization of one cultural practice makes optimization of other practices difficult. An example is the use of postemergence pest control without damaging a narrow-row crop with wheel traffic. Changes in some management practices have positive effects on other inputs. Reducing the row width usually makes weed control easier through increased competition between the crop and weeds.

One of the major problems with early planted soybeans is that pre-emergence herbicides often do not provide season-long weed control. The high-yielding cultural systems being used today (narrow row, no-till) make mid- and late-season herbicide or insecticide application difficult without damaging some of the crop with tire traffic. When plants are less than six inches tall and the field is not muddy, ground application equipment causes little crop damage or loss of plants. As plants get larger, more plant damage and yield loss is caused. We need to maintain the ability to get through our fields at any time without damaging the crop. If equipment is to avoid running down emerged plants, wide row middles are needed, and wide rows reduce yields.

Getting through our fields without damaging the crop can be accomplished with the use of skip-row production systems. This practice has been used throughout Europe for 30 years where intense management of small grains necessitates several applications of pesticides and fertilizers during the growing season. Skip-row systems for soybeans consist of planting the field in narrow rows with repeating patterns of missing rows to allow space for the tires of application equipment. The skip-row system needed depends on the size of pesticide application equipment to be used. Systems can vary in width of the skips, distance between the individuals of a pair of skips, and the distance from one pair of skips to the next. Yield reductions due to skipped rows vary from as little as a few pounds of grain per acre, up to about a half bushel per acre depending on the skip-row system used. Small equipment for planting and spraying necessitates more frequent pairs of skips and results in

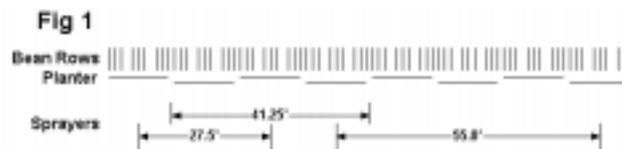
larger yield losses than larger planters and sprayers. As the number of skips per acre decreases, so does the associated yield loss.

The yield loss associated with two 30-inch-wide skips every 30 feet has been about half a bushel per acre but only 15 pounds per acre when they were 60 feet apart. When the width of the skip is no more than 15 inches wide, then this loss is reduced even more. Therefore, depending on the frequency of skipped rows and the width of the skips, the yield loss may be only a couple pounds per acre.

Let's assume beans are drilled in 7-inch rows, skip rows are not used, and an insecticide application is needed in late August. A high clearance sprayer with a 60-foot boom and 10-inch tires would run down from two to four of the 103 rows sprayed in one pass across the field. Little or no yield would be harvested from those rows, and a yield loss of about three percent would be realized. At the 50-bushel yield level, the lost income would be \$9 per acre. A comparative loss for using a skip-row system would be less than \$1 per acre, not counting a small savings in seed cost.

Planter Adaptation

The row width used for skip-row soybeans and the width of the skip can be any size. A planter designed to plant six 30-inch rows can be adapted to plant a wide variety of skip-row patterns. The addition of three planter units, one between the two center units and one on each end between the two outside units, would result in a pattern of three 15-inch rows between a pair of 30-inch skips and six rows between pairs of skips (Figure 1). Both row markers are moved in 15 inches for this system.



The addition of four units to the planter would result in a more efficient pattern (Figure 2). The four added units are placed between the five units on either end of the planter, with the original second unit from the end being moved out 15 inches to create a 30-inch space with two units on one side and eight on the other.



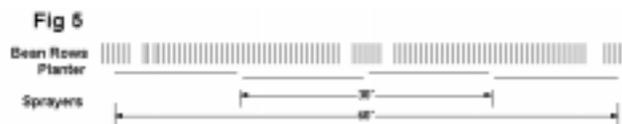
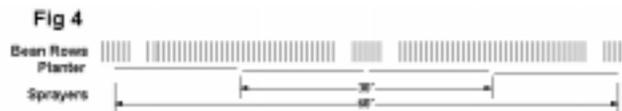
Where air planters are used, two units can be prevented from seeding by turning off the fan that services the units. With the addition of five units to a six-row, 30-inch air planter, and with two units turned off every fourth pass across the field, a highly efficient system is produced (Figure 3). These skip row systems (Figures 1, 2, 3) would produce yields of 51.6, 52.5, and 52.7 bushel per acre, respectively, compared to a yield of 53.0 bushels per acre for a field of 15-inch rows. These same patterns can also be produced by 8- and 12-row planters. With any skip-row system, the sprayer must be either the same size or 2, 3, or 4 times larger than the drill.



DrillAdaption

Research studies indicate that seven eight-inch wide rows, planted with a drill, yield about one bushel per acre more than 15-inch rows. Grain drills are easily adapted to producing a wide range of skip row patterns since disk openers are easily moved and seed metering units under the seed box can be easily closed off. When the fourth, fifth, and sixth row from either end of a 24-row drill with a 7.5-inch drill spacing is prevented from planting, a skip-row pattern is produced (Figure 4). The skips would be 30 inches wide and spaced 6.5 feet apart on center. When only the fourth and fifth seeding units from the end are closed, the skips are 21 inches wide and 60 inches apart (Figure 5). Similar patterns can be formed with most drills, and the tires of most tractors will easily fit these patterns without being moved. Wider spacing between the two skips can be made by closing either two or three seeding units

furthest from the end of the drill. The width of sprayer to match the systems in Figures 4 and 5 must be either 30 or 60 feet wide and would use every set of skips if 30 feet wide and every other set of skips if 60 feet wide.



With any skip-row system, the sprayer must be either the same size, or 2, 3, or 4 times larger than the drill. When making skip rows with a grain drill, it is advisable to use markers on the drill so the width of guess middles is kept constant and the skips always remain parallel and equidistant.

Summary

Skip rows help prevent sprayer overlap and skips when applying postemergence pesticides. They eliminate the need to count rows to determine where the next sprayer pass should be. This is especially convenient where large sprayers and/or narrow rows are used. Skip rows encourage the application of postemergence pesticides, when needed, that result in additional yield. Skip rows permit easier harvest of the crop if lodging occurs. When the end of the header is in a skipped row, there is less rubbing and bumping of adjacent rows, which reduces grain shatter.

Finally, skip-row systems are easy to develop and use. They allow the use of narrow rows to increase yield without losing access to fields. They give great flexibility with respect to row width, distance between the two skipped rows, and distance between the pairs of skipped rows. Skip rows are a useful management practice available to help Ohio soybean farmers increase production efficiency.

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