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Solid Seeded Soybeans in Missouri

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Solid seeding (drilling) of soybeans is experiencing a revival in Missouri. Some 300,000 acres were grown in this way in the state in 1979, as compared to 135,000 acres only two years earlier. When soybeans first became popular in this state, the use was primarily for hay, and solid seeding predominated. Some weed growth in the hay crop was tolerable, but as emphasis shifted to production for beans, there was almost a complete shift to row culture to permit cultivation to control weeds.

Now, developments in soybean chemical weed control materials allow adequate control of most weeds in solid seeded stands. So now, soybean farmers can often benefit from the many advantages of solid seeding without undue risk.

Advantages

• ***Yield potential increases*** from 5 to 15 percent as compared to yield from 30 inch rows. The yield advantage does decrease from north to south in the state with the lower figure applying to the southeast Missouri Delta area. Late plantings may sometimes exceed a 15 percent advantage. Plantings that encounter stress such as drought may not show a yield increase, but when weed control is adequate, decreases in yield are not expected.

• ***Erosion is reduced*** due to reduced cultivation and quick establishment of a complete ground cover. This becomes a major advantage on sloping fields.

• ***Harvest loss is reduced.*** The combine can be operated closer to the ground and pod height is higher—possibly 2 to 3 inches above those of row soybeans.

• ***Harvest efficiency increases*** because the combine can be operated in all directions.

• ***More acreage is actually growing soybeans*** in each field because of more complete use of turn rows. This may mean from 5 to 10 percent more of the land growing soybeans on small or uneven fields and also will help on terraced fields.

• ***Lodging is reduced*** if excessive planting rates are not used.

• ***Fuel, labor, and possibly machinery costs will decrease.*** Short term cost of machinery may sometimes be increased with the initial purchase of a drill and possibly a rotary hoe. But longer term costs should be reduced, and especially so when the drill is used for other crops grown, such as milo and small grain.

• ***Productive use of water will increase*** through decreased runoff and less evaporation from the soil surface.

• ***Late-season weed control will improve*** since the narrow rows create a canopy faster, thus inhibiting late germination of weeds. Giant ragweeds (horse weeds) and established perennial weeds reportedly can "break" the soybean canopy. Given below are the approximate times required to achieve full ground cover:

Row width	*Approximate days to full canopy*
7 inch	30 days
10 inch	34 days
30 inch	57+ days
38 inch	70+ days

Disadvantages

• ***Good early season weed control is essential*** until the canopy develops.

• ***Perennial weeds will be difficult*** and likely impossible to control without some cultivation. Solid stands eliminate shovel cultivation and reduce opportunities for use of "over-the-top" applications with recirculating sprayers or rope-wick applicators. By the time the perennials overtop the soybeans sufficiently to be treated, tractor wheels can be expected to damage soybean plants. So fields with many perennial weeds may not be usable for solid seeding.

• ***Drilled soybeans normally mature 5 or 7 days later*** than row beans. So a shift to a slightly earlier maturing variety may be needed in some cases.

• ***Seed cost will increase.*** A higher seeding rate will result in more rapid full-canopy formation but may also contribute to increased lodging. Emergence may be poorer in drilled seeding because of less uniformity of planting depth and because each seedling must emerge on its own. Rotary hoeing will also reduce stand. Thus, use of a seeding rate slightly higher than that recommended for 30-inch rows will be necessary.

Requirements for Success

A uniform stand. A canopy with no "holes" to permit late season weed growth is a first essential. This is related to:

• ***Depth control.*** The new soybean drills with packer wheels do provide for better depth control than the older type drills. But many farmers continue to use the older type drills successfully. Avoid excessive speeds that give "drill bounce." Four to five miles per hour should be the top speed with any drill, even on a very smooth seedbed. Use some device, such as a small sweep or tines behind tractor wheels, to prevent a compacted seedbed in wheel tracks and a different depth of seeding. An alternative to get adequate seed depth and soil coverage may be to adjust the pressure on

the drill's disk openers that run in the tractor tracks.

• ***Seeding rates.*** Generally, 65 to 80 pounds of seed per acre will give a good canopy and maximum yields and avoid the extra lodging that accompanies higher rates. If you consider using a rotary hoe, increase the seeding rate by 10 percent to compensate for plants destroyed by hoeing. Some farmers have been successful with as little as 50 pounds per acre, but slightly higher rates do give more assurance of a full even canopy if conditions prove unfavorable for establishment. Rates as high as 80 pounds per acre are probably justified only on low fertility fields with low moisture holding capacity where lodging will not be a problem and where the plants will tend to be less vigorous and slower in developing a canopy. Double cropped soybeans and stands planted late can also use this higher rate.

• ***Smooth seedbed.*** Drilled beans do require a good, relatively smooth seedbed for depth control when planting and because a good seedbed is a prerequisite for good early-season weed control.

Weed control. Early season weed control must be primarily through the use of chemicals, although rotary hoeing is feasible to control emerging weeds and to break soil crusts. A good job of selecting and properly applying chemicals is vital. Decisions on which chemicals to use to fit particular situations are even more critical than where cultivation is possible. UMC Guides 4436 and 4437, *Recommendations for Chemical Weed Control in Soybeans, Part I and II,* and UMC Guide 4904, *Herbicide Response of Common Weeds,* available in county University of Missouri Extension offices, provide information that will help you make these decisions.

No post-emergence grass weed control chemicals are currently available. While good pre-emergence grass control materials are available and are widely used, the soil incorporated dinitroanilines (Basalin®, Tolban®, or Treflan®) are more dependable when solid seeding, because their activation is influenced less by weather conditions.

The availability of post-emergence materials that can give control of many broadleaf weeds (Bentazon, [Basagran®] and Naptalam + Dinoseb [Dyanap®]) gives an extra safety factor. Some growers use Basagran® as their only broadleaf control material. Best results have been obtained when it was applied from 18 to 23 days after planting (first to third trifoliate stage of soybean development). Weeds will be small and may appear insignificant at this time, but early control is more effective and usually suffices until the canopy develops.

The rotary hoe is often a useful tool with solid seeded stands. When pre-emergence chemicals are applied followed by dry conditions, a rotary hoeing may help move some of the chemical down to sufficient moisture to start activation and may destroy many of the weed seedlings that are just germinating. It is also a useful tool to break soil crusts that form after a heavy rain. Experience indicates that soybeans no more than 8 to 10 inches high can be run over by tractor wheels one time with no lasting damage. Two times over in the same wheel tracks will cause some harm, and three or more times over can be expected to badly hurt both stand and productivity. Judicious use of the tractor is feasible either for rotary hoeing or applying "over-the-top" herbicides.

Harvesting. Solid seeding tends to make harvesting more efficient. Bean pods tend to be higher; the even distribution of plants makes cutting easier; feeding into the machine is more uniform; and the full width of the header is used.

Bean plants tend to wrap around the reel ends; so harvesting solid seeded beans requires one combine adaptation—separation snouts on the outside ends of the header or end enclosed reels, or both, to reduce harvesting loss from the reel ends catching and throwing plants.

Additional Management Considerations

Desirable drill features. A drill for planting solid seeded soybeans should have accurate seed metering without damaging the seed, uniform depth control, and good soil to seed contact. Uniform seed spacing in the row is desirable, but slight variation in the spacing distances has less effect on soybean yield than on corn yield.

A conventional grain drill can be a satisfactory soybean planter for solid seeded soybeans if it has a slow speed drive on the metering mechanism. Some old drills can be set satisfactorily, but others may need a gear change to enable the throat on the metering device to be opened wide enough to avoid seed damage without overseeding. Seed depth control usually is less uniform than with a conventional planter; however, with a level, well prepared seedbed, depth and seed to soil contact will be acceptable.

Grain drills designed to be used as soybean planters have slow speed metering devices, uniform depth control, and they provide good soil to seed contact. Tests on metering devices indicate no significant difference in seed germination, seed spacing, or yield between the fluted roller meter, the single-run cup meter, the air drum meter, or the conventional plate planter. These drills use slow speed metering mechanisms that do not damage the seed and press wheels that control planting depth as well as provide good seed to soil contact.

Fertility. High yielding soybeans require adequate nutrition. While specific requirements for solid seeded soybeans have not been defined, the higher yield potential of the system will require more nutrition. Obtain a fertilizer recommendation based on a soil test. Allow for the increase in yield potential. The concept of applying fertilizer in line with expected crop yield is built into the University of Missouri's soil test recommendations. (For more information on UMC soil tests, see Guides 9109, 9110, and 9111.) Fertilizer should be uniformly broadcast and incorporated before planting.

Planting Date. As with row planted soybeans, highest yields can be generally expected from drilled plantings made early in the season. But extremely early planting will sometimes result in slow early growth, delayed canopy development and reduced weed control. As planting is delayed, soybeans have less time to develop before flowering and, therefore, make less total growth. Yield increases with narrower row spacing (drilling) when planting is delayed, although total yield may be less than from plantings made earlier in the season.

Varieties. Most varieties can be expected to yield more in drilled plantings than in conventional rows. Generally, the shorter, less branched, and slightly earlier maturing varieties adapted to an area have responded best to drilled seeding. Occasionally, late maturing varieties will yield less in drilled planting as compared to normal rows. This occurs when planting rate and environmental factors favor excessive growth and lodging. A possible advantage of several semi-dwarf varieties now available is their reduced susceptibility to lodging. Until more specific information is available on varieties for drilled seeding, we suggest that you try several varieties differing in growth type and maturity.

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