



PLANTING METHODS FOR SMALL GRAINS IN ARIZONA

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Small grains are planted for a variety of reasons, but their rotational benefit makes them a popular crop all over the world and influences the way they are planted. One of the major benefits of small grains as rotational crops is that they cover the soil and suppress weeds. Thus, small grains are most commonly solid seeded with a grain drill.

Beds vs. flat

Similar yields can be achieved whether planting on beds or on flat ground. While several studies have shown higher yields on beds vs. flat ground, the results are probably related more to irrigation water control. Beds have an advantage where a field has significant side fall, where a sufficient head of water is not available to irrigate borders, or where water infiltration may be a problem. Small grains can be solid seeded on beds and in the furrows, or only two or three rows may be planted on the bed itself. We do not have data to indicate whether or not to plant in furrows, but doing so is usually preferred unless the slowing of the irrigation water caused by plants in the furrow is not desired.

Planting into moisture vs. irrigating up

Planting through a dry soil mulch into moist soil is preferable to planting dry and irrigating up. An advantage of planting into moisture is that weed seeds germinate with the pre-irrigation. Irrigating up cools the soil and can form a crust in some soils. Thus, stand establishment is usually better when planting into moisture and seeding rate can be less. The ground must be prepared earlier when planting into moisture to allow for the soil to dry sufficiently before planting and the window when soil moisture is optimum may be narrow. Thus, small grains are usually planted into dry soil and irrigated up due to these management considerations.

Planting direction

Planting direction is not usually a consideration for small grains, unlike for certain vegetables, where east-west beds are avoided due to size difference between rows on the north vs. south side of a bed running east-west. Nevertheless, in a study conducted with wheat in Arizona, east-west beds resulted in somewhat higher yields than north-south beds. Also, the rows on the south side of an east-west bed yielded more than the north-side rows.

Row spacing

Small grains are usually planted in drill rows spaced about 6 inches apart. Optimum yields have been obtained at this row spacing in a study conducted at the Maricopa Agricultural Center. Some varieties do slightly better in row spacings as narrow as 3 inches, while others do slightly better in row spacings closer to 12 inches. It has been reported in Mexico that yields of some varieties planted two to three rows on a 30-inch bed, where the spacing between rows on adjoining beds is about 18 inches, is similar to solid seeding. The advantage of row spacings as wide as 18 inches is that it allows cultivation, but the disadvantage is that cultivations will probably be required. Wider row spacings are thought to be an advantage for small grains grown under water stress, and dryland wheat is often grown in 14-inch spacings in the Great Plains. Narrower row spacings are more effective at suppressing weeds but more prone to lodging than wider row spacings. Wider row spacings can be achieved with a grain drill by covering openings in the hopper and adjusting seeding rate appropriately. Narrower row spacing can be achieved with specially built drills that have 4-inch spacings between openers or by planting twice either parallel or perpendicular to the first

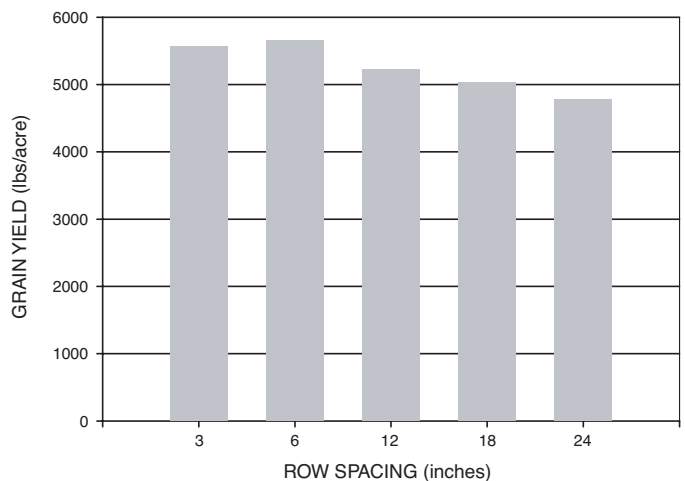


Figure 1. Grain yield of durum as affected by row spacing in a study conducted at the Maricopa Agricultural Center.

pass. Planting twice does not always achieve the result intended since the seedbed from the first pass receives compaction from the tractor wheels of the second pass and a ridge is created on the second pass that covers seed with more soil than optimum on the second pass. Narrow row spacings can also be simulated by removing the drop tubes from a grain drill from the disk opener, allowing the seed to be broadcast on the ground by the drop tubes, and incorporating with a harrow or cultipacker. This planting method was tried in a study conducted in Eloy, but grain yields were not improved compared to drilling normally.

Reduced tillage

Small grains can be planted into the stubble of a previous crop such as cotton, but a no-till drill may be required for best results in a true no-till system. In a reduced tillage system such as a single disking after stalk chopping, a conventional drill is usually adequate. A major advantage of reduced tillage systems is that the time between crops is reduced and there is a better chance of planting small grains at the optimum time. A method of seeding that saves time between crops and is a form of reduced tillage is to broadcast seed into the stubble of the previous crop, and incorporate the seed with a disking or by forming beds. This method works better with barley than wheat, since barley can emerge from deeper in the soil.



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This information has been reviewed by University faculty.
extension.arizona.edu/pubs/az1333-2015.pdf

Originally published: 2004

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Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Jeffrey C. Silvertooth, Associate Dean & Director, Extension & Economic Development, College of Agriculture Life Sciences, The University of Arizona.

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