Fall Crop Potato Trials in Arizona

By Paul M. Bessey

Growing fall crop potatoes is different than growing spring crop potatoes in Arizona. Occasionally a grower will plant in late summer in an attempt to capture a portion of the early winter "new potato" market.

More recently another goal has been to supply Arizona chippers with a local source of freshly dug potatoes. Both outlets provide strong incentives to "experiment" with a 40-, 80-, or 160-acre block, or as he would put it, "Enough to make it worthwhile."

Later, when this grower finds a plant population of 20 percent or less, and harvests only 25 hundredweight per acre instead of 250 hundredweight, he is likely to ask the perplexing question, "What did I do wrong?"

To show what the fall crop grower is up against, trials started in 1962 are a good illustration. A variety trial was planted August 6 and 25 at the Mesa Branch Experiment Station. Seed potatoes saved from spring crop trials harvested in June and stored at 48° F. were planted 7″ apart in rows spaced at 34″. Pre-irrigation, bedding, and fertilizer practice was the same as for the spring crop. Fertilizer (16-48-0) was applied at 1,000 pounds per acre in two bands 4″ to the side and 2″ below the base of the seed piece. Ten percent phorate (Thimet) granular was applied in one band at the rate of 20 pounds per acre for systemic control of insects.

Variety and Planting Date

Soil temperatures from planting to September 1 commonly reached 95° F. at seed piece depth during late afternoon. In dry soil, prior to irrigation, 105° F. at 5″ depth was reached several times. Since growth suppression and physiological collapse of seed pieces is anticipated at temperatures exceeding 90° F., the poor stands and yields obtained, as shown in the accompanying table, were not surprising.

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Based upon delayed emergence, poor stands and apparent nutritional deficiencies encountered, experiments in 1963 and 1964 were set up to influence the breaking of dormancy and to devise a satisfactory fertilizer program.

Use of Cut Seed

By cutting potato tubers used for seed, terminal bud dominance can be broken. A cut vs. whole seed comparison was made in 1963 and 1964 to determine whether cutting would improve uniformity of emergence. Shoots from cut seed in both years emerged from one to two weeks earlier than from whole seed. In 1963, stand from cut seed averaged close to 100 percent while the stand from whole seed only reached 70 percent. In both years the planting date was delayed until the first week in September to reduce high temperature growth inhibition. Yields in 1963 were: cut — 54 cwt. per acre, and whole — 41; In 1964, cut — 26, and whole — 22.

The latter comparison was part of an experiment which included study of the effects of previous seed storage temperatures and subsequent fertilizer applications. Temperature of stored seed during the summer had a marked effect on early emergence. For the temperature range from 38° to 75° F., emergence was advanced by 14 days. There was, however, very little difference in final stand or total yield as influenced by storage temperature.

Nitrogen Fertilization

Application at planting of nitrogen fertilizer in the form of ammonium nitrate at the recommended rate for the spring crop had a depressing effect upon emergence and total stand. In addition, if all the nitrogen was applied at planting time, acute deficiency developed in the latter third of the growing season. In 1963, plots receiving all nitrogen at planting and plots with half at planting, and half side-dressed at midseason, each yielded 50 cwt. per acre. Plots receiving all nitrogen in two side-dressings during the growing period, produced 67 cwt.

A zero nitrogen check was added in the next season. Emergence, in 1964, was again delayed 7 to 10 days by ammonium nitrate applied at planting. Yields were: no nitrogen (check) — 7 cwt. per acre; all nitrogen at planting — 22; half nitrogen at planting and half side-dressed at midseason — 39; and all nitrogen side-dressed at midseason — 54.

While yields have not reached 200 cwt. per acre, improvements in culture adapted to commercial practice have raised production. The best plots have produced over 100 cwt. per acre. The major achievement has been to improve stands to near 100 percent. Further research will be needed to learn how to boost plant vigor, control viruses and mature more tubers before frost. *Under present methods and conditions, commercial fall potato production is not economically feasible.*

Effect of Variety and Planting Date on Stand and Yield of Fall Grown Potatoes. 1962

		Planting Date			
		August 6		*August 25*	
Variety	*Maturity and Color*	*Stand Percent*	*Yield cwt./Acre U.S. No. 1A*	*Stand Percent*	*Yield cwt./Acre U.S. No. 1A*
Pungo	early, white	29	10.4	34	30.0
Kennebec	mid, white	6	2.5	18	20.2
Merrimack	late, white	15	3.5	31	21.9
Viking	early, red	22	20.9	34	39.4
Red Pontiac	mid, red	15	8.6	29	39.9