

WILD OATS MAKE A GOOD PARENT

By R. K. THOMPSON

Wild oats have flourished in the Southwest from the time they were brought in by the early Spanish missionaries. Their spread and persistence, both in the wild state and later under cultivation, demonstrate their remarkable adaptability to growing conditions in Arizona.

Although they have been utilized to some extent for forage, to the Arizona farmer they have been a weed of dubious value. Wild oats can be successfully crossed with cultivated species of oats. Most undesirable characters are simply inherited and easily discarded in the early generations of a cross.

Extreme variability in plant type and seed conformation has been found in the progeny of a Kanota x wild oat cross. Selections from this cross show promise for improving both the grain and forage production of oats in Arizona.

Genetic and cytological studies of crosses between the wild oat (*Avena fatua*) and the cultivated oat (*Avena byzantina*) have shown no isolation barriers between these species; therefore in a plant breeding program they may be considered as varieties of the same species. In fact there is evidence of considerable introgression of *A. byzantina* germ plasm into *A. fatua*.

For five years (1960-64) experiments have been conducted at the Mesa Branch Experiment Station to evaluate the performance of a Kanota (*A. byzantina* × Wild Oat (*A. fatua*)) cross. The original cross was made by C. A. Suneson at Davis, California. The bulk F₇ seed of this cross was brought to Arizona by R. T. Ramage in 1959.

Variability Is Extensive

Many of the undesirable characters contributed by the wild parent, such as hairy lemmas, seed dormancy, shattering, and maturity extremes were eliminated by growing the early generation of the bulk under field conditions of planting and harvesting. The bulk F₇ was quite variable and thousands of potentially valuable combinations from the cross remained.

Plants in the bulk F₇ ranged in height from 30 to 90 inches, with a maturity variation of up to three weeks. Mature stem diameter differences were very marked in thin seedlings, with some of tooth-pick size and others as large as pipestems. Variations in leaf fineness, width and number per stem were numerous. Con-

siderable diversity in early growth habit was observed, with many prostrate winter types, intermediate, and erect early growing plants present. Panicle types ranged from short and compact to long and open.

Many differences in seed conformation and appearance were evident. Seeds were black, red, grey, yellow, white and various combinations or blends. Seeds were both small and large, varying from long and slender to short and plump. An occasional hairy lemma and long, hard twisted awn typical of the wild oat parent was observed.

First Planting Here in 1959

The bulk F₇ seed of Kanota × Wild Oats was first planted at the

Mesa Experiment Station in December, 1959 and has been advanced one generation each year. One thousand random head selections were made from the bulk F₇ and planted in head rows the following season. From this planting 78 entries with promising forage and grain qualities were selected for increase and evaluation.

Yield tests were conducted on a replicated small plot basis. The Arizona recommended oat varieties, Palestine for grain and Markton for forage, were compared with the Kanota × Wild Oat bulk for grain, hay and simulated pasture forage. Grain yield data were obtained at the Mesa and Yuma Experiment Stations for five years (1960-64). One of the best appearing selections was included in tests at both locations in 1963 and 1964. Yield comparisons for hay were made for four years (1961-64) at the Mesa Station.

The hay was harvested in early head or flowering stage of plant development. Simulated pasture data was obtained at the Mesa Station for a five-year period (1960-64). Pasture conditions were simulated by clipping with a sickle mower three inches above ground level. The clippings were made at the onset of jointing, when the plants were 12 to 14 inches tall.

Grain Yield Is Competitive

The grain yields for Kanota × Wild Oat bulk and Markton, when compared with the Palestine check, were similar for 1960, 1961, and 1964 (Table 1). In 1962, 1963, and 1964

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Table 1. Grain Production of Cultivated x Wild Oat Cross Compared with Arizona Recommended Oat Varieties, Palestine and Markton.

Year harvested	Identity	Yield in Percent of Palestine		
		Mesa	Yuma	Average
1960	Palestine	100	100	100
	Markton	72	42	57
	Kanota × Wild Oat Bulk F ₇	67	56	62
1961	Palestine	100	100	100
	Markton	77	38	62
	Kanota × Wild Oat Bulk F ₈	79	42	61
1962	Palestine	100	100	100
	Markton	73	42	58
	Kanota × Wild Oat Bulk F ₉	83	97	90
1963	Palestine	100	100	100
	Markton	45	41	43
	Kanota × Wild Oat Bulk F ₁₀	78	101	90
1964	K × WO Selection 683	102	109	106
	Palestine	100	100	100
	Markton	92	91	92
	Kanota × Wild Oat Bulk F ₁₁	90	83	87
	K × WO Selection 683	105	106	106

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AT LEFT, Rex Thompson inspects a group of selections from Kanota x Wild Oats Bulk, noting variability in growth.

Table 2. Hay Production at Mesa of Kanota x Wild Oat Bulk Compared with Markton and Palestine Oats. Harvest was made in the Early Head or Bloom Stage of Plant Development.

Oat entry	Oven Dry Hay Yields in Percent of Markton				
	1961	1962	1963*	1964	Average
Markton	100	100	100	100	100
Kanota x Wild Oat Bulk F ₈₋₁₁	80	81	126	83	93
Palestine	80	53	131	58	81

* Vegetative growth froze back to ground level in mid-January. Consequently two harvests were made, one in late January and one when the entries were headed.

Table 3. Pasture Production at Mesa of Kanota x Wild Oat Bulk Compared with Markton and Palestine Oats. Grazing was Simulated by Clipping Seven Times Each Season at the Onset of Jointing.

Oat entry	Green Pasture Forage Yield in Percent of Markton				
	1960	1961	1962	1963*	1964
Kanota x Wild Oat Bulk F ₇₋₁₁	113	121	114	97	112
Markton	100	100	100	100	100
Palestine	98	98	100	103	91

* Oats were only clipped three times in the 1963 pasture season. A severe freeze following the third clipping on January 9 killed most of the plants.

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the yield of the Kanota x Wild Oat bulk was competitive with Palestine. Perhaps the improved performance can be attributed in part to the natural selection of adaptable germ plasm contributed by the wild oat parent. The grain yield of Kanota x Wild Oats Selection 683 exceeded that of Palestine in both 1963 and 1964. Average bushel weight at Mesa in 1963 and 1964 were Markton, 33.5; Wild Oat bulk, 34; Palestine, 35; and Selection 683, 36 pounds.

Hay production data (Table 2) indicate that the yield of the Kanota x Wild Oats bulk is intermediate between Markton and Palestine when harvested at the early head stage of

growth.

The Kanota x Wild Oat Bulk F₇ to F₁₁ has made an excellent showing when harvested as simulated pasture (Table 3). In the peak production year, the 1960-61 growing season, yields of green forage were 21 percent more than the Markton check. The average percent total protein for seven clippings of Kanota x Wild Oat Bulk F₈ was 21.01 compared to Markton with 18.44. This limited quality data is indicative that a wild oat cross is at least equal if not superior to other oats in forage nutrient value.

Has Two Advantages

The exceptional performance of the bulk wild oats cross as a pasture forage is attributed to (1) its natural adaptation to Southern Arizona growing conditions and (2) its variability,

which contributes to sustained vegetative growth over an extended period in the spring.

In a two-year study (1963-64) an attempt was made to improve on, or duplicate, the performance of the bulk by blending six selections of varying plant type characteristics, such as plant height, maturity, early growth habit and grain production qualities. The blend produced no more and perhaps slightly less green pasture forage than the bulk, and each year two or more of the selections included yielded as much or more than the blend.

Several selections from the Kanota x Wild Oat Bulk F₇ have exhibited superior qualities for grain production and an ability to produce large quantities of a good quality forage. These are being further evaluated in small plot studies, and increased in alternating and replicated combine harvest strips throughout the state preliminary to possible release of a new oat variety for Arizona.

Here Brand New Idea — Taking Corral to Cows

Taking the loading chute and corral to the livestock on the range is a new idea being tried on the Yerba Buena Ranch managed by Fred Voorhees in Santa Cruz County, Arizona.

Voorhees designed and built the portable loading chute for specialized use on the ranch.

The ranch, which is owned by movie star Stewart Granger, produces Charolais cattle for breeding purposes. It also produces a few animals for the fat cattle market.

Voorhees is using the portable chute to move cattle from one pasture to another, to pick up cattle for treatment, and for other specialized uses. The ranch includes 600 acres of irrigated pasture.

Just how well the portable chute will work on the various kind of range land in Arizona, particularly rough land, has not yet been determined.