



A. D. Day, University of Arizona Agronomist, left, shows Mrs. A. T. Bartel, wife of the late U. S. Department of Agriculture plant breeder, the first bag of the new grain barley named for her late husband. Dr. Day and the other authors of this article developed the new barley as described below.

A. D. Day, R. K. Thompson,

E. B. Jackson, and

F. M. Carasso*

New Grain Barley for Arizona

A new grain barley, called Bartel, has been released for commercial production in Arizona by the Arizona Agricultural Experiment Station and the Plant Science Research Division, Agricultural Research Service, U. S. Department of Agriculture. Bartel was named in honor of the late A. T. Bartel who was a U. S. Department of Agriculture small grains breeder stationed at the University of Arizona many years ago.

Adaptation

Bartel is primarily a grain barley adapted to the irrigated areas of Arizona and to other similar areas of the Southwest where Arivat is grown. To capitalize on its high tillering capacity, standing ability, and yield potential, Bartel should be planted early (November) at low seeding rates (25 to 35 pounds of seed per acre).

Grain Potential

In five replicated yield tests grown under the foregoing conditions, from 1968 through 1971, the grain yield of Bartel was 20% more than that of

Arivat (Table 1). In seven replicated yield tests grown at Mesa under more conventional methods (seeded in early December at 60 pounds per acre), Bartel produced 5% more grain than Arivat. Bartel yielded an average of 10% more grain than Blanco Mariout at Yuma in 1969 and 1970. It produced high quality grain with a higher bushel weight than grain from Arivat or Blanco Mariout.

More Resistant to Lodging

Bartel has been more resistant to lodging than Arivat when planted (Please turn to Page 16)

*Agronomist, Research Associate, Agronomist and Assistant in Research, Arizona Agricultural Experiment Station, University of Arizona, Tucson.

Timber Value

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Annual rates of value increase over a ten year period for various tree diameter classes are as follows:

Diameter (inches)	Rate of Value Increase (percent)
10	3.7
12	4.0
14	3.9
16	3.2
18	3.0
20	2.7
22	2.0
24	1.1
26	0.5
28	0.1

Interpretations of the Concept

It can be seen from the table that the rate of value increases and then declines. The timber manager decides upon or is given a guiding rate of return. Considering only timber values, a tree should be cut when its rate of value increase is decreasing and is less than the guiding rate of return. For example, if the guiding rate of return is 3.5 percent, then trees 16 inches in diameter and larger should be cut.

The financial maturity concept may be applied to entire forest stands as well as to individual trees. In uneven-aged stand management, when individual trees are selected for harvest, the approach described here will aid the manager in reaching that level of investment in growing stock that will provide a rate of return equal to the guiding rate of return.

In even-aged stand management where all trees are harvested at one time, the financial maturity concept may be used to determine the rotation age that will provide the desired rate of return.

When values of other products and services of forests must be given consideration, knowledge of rates of value increase provides the forest land manager with an estimate of the timber opportunity costs of providing these other goods and services. For example, if aesthetic considerations lead the manager to increase the diameter and age at which trees or stands are harvested, these rates tell him what this will cost in terms of a lower rate of return.

New Grain Barley

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early at low rates. It has averaged three inches shorter than Arivat and it stands better for combining than most other varieties of barley grown in Arizona.

Characteristics

Bartel has very uniform growth, superior shattering resistance, nodding heads, predominately white seeds, and very long, rough awns. It matures at about the same time as Arivat.

Breeding and Testing

Bartel is a six-row, spring barley developed by crossing the following

parents: Arivat, Atlas, California Mari-out, C.I. 1227, Harlan, Mars and Trebi. Selection for the variety was made at Mesa in 1963. The original plant was identified as Arizona 6210-5. Yield tests were conducted at Mesa, Phoenix, Tucson and Yuma, Arizona.

Seed

Breeder Seed will be maintained by the Arizona Agricultural Experiment Station. Foundation Seed may be obtained through the Arizona Crop Improvement Association, Department of Agronomy and Plant Genetics, University of Arizona, Tucson, Arizona 85721.

Table 1 Average yield of grain from Arivat and Bartel barley planted in November at rates of from 25 to 35 pounds of seed per acre at Mesa, Phoenix, Tucson, and Marana, Arizona from 1968 through 1971.

Variety	1968 Mesa	Yield in pounds per acre				Average five year tests
		1970		1971		
		Tucson	Phoenix	Mesa	Marana	
Arivat	5611	3669	5481	4765	4960	4897
Bartel	7308	4660	6358	6522	4590	5888
Yield of Bartel in % of Arivat	130	127	116	137	93	120

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