

ONE CLUE TO bird tolerance is revealed in photo at left. Note how the glumes ← of Georgia 615 are longer and cover more of the seed than is true with RS 610 or Regular Hegari.

A Bird-Tolerant Hybrid Grain Sorghum for Arizona

R. L. Voigt

We all enjoy watching the uninhibited antics of our feathered friends. Many of us enjoy feeding them, and even go to some trouble and expense to keep them fat, healthy and songful. However, some of our farmers who have planted grain sorghum in their fields, and have seen the birds destroy all or part of the crop before it could be harvested, are certainly not bird enthusiasts!

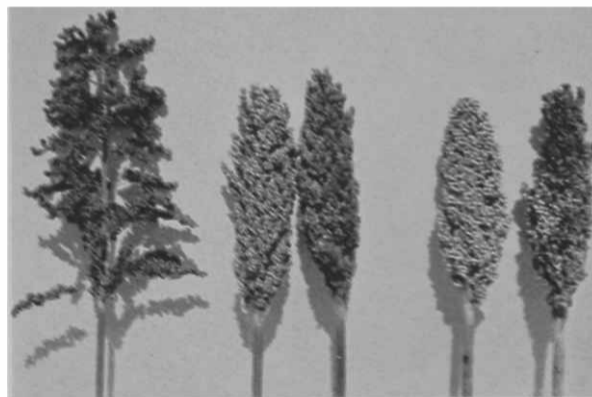
Arizona agriculture is peculiar in that it is concentrated or isolated to facilitate irrigation. Concentration of certain crops, such as grain sorghum, in these areas attracts high bird populations. The grain sorghum acreage in Arizona has been somewhat limited by this problem.

Many Sorghums Susceptible

Many of our improved sorghum varieties and hybrids are particularly susceptible to bird damage. Such



ABOVE, PARTIAL bird damage to crop of Regular Hegari at U. A. Marana experiment farm, October 1964.



COMPARISON OF HEAD types and bird damage of grain sorghum heads at Marana farm in October of 1964. Georgia 615, at left, is undamaged. But RS 610, center, and Regular Hegari, right, show considerable bird damage.

Dr. Voigt is an associate professor in the Department of Plant Breeding and Associate Plant Breeder in the Agricultural Experiment Station, and is project leader on the Forage and Grain Sorghum projects.

Dr. Voigt acknowledges appreciatively the collaboration of Experiment Station workers in many areas of Arizona who have directed sorghum trials in which the bird-tolerant Georgia 615 has been compared in field tests with commercial varieties and hybrids grown in this state.

These collaborators include Mr. Fred M. Carasso, assistant in research in agronomy, stationed at the Yuma Branch Experiment Station; Mr. Charles W. (Bill) Fitzgibbon, superintendent of the U of A's Cotton Research Center at Tempe; Mr. Laurel D. Leavitt, foreman at the Mesa Branch Experiment Station, and Dr. Fred Turner Jr., associate professor in the Department of Agricultural Chemistry and Soils and also Superintendent of the Safford Branch Experiment Station.

damage by English sparrows at Marana, Ariz., in October 1964 is illustrated above.

Various sorghum varieties or hybrids have been produced with characteristics of providing some "bird tolerance" for the grower. One of the more recent of such hybrids is Georgia 615. This hybrid was planted in March 1964 on the Yuma Branch Experiment Station as a uniform crop for a herbicide experiment.

All yield testing of grain sorghum had been discontinued on the Yuma

Experiment Station several years before, because of repeated bird losses approaching or even up to 100%. The station personnel observed that with Georgia 615 the birds, usually English sparrows, doves and blackbirds, would regularly roost in the field—some even building nests and laying eggs—but no damage or grain loss was apparent.

In another experiment in 1964, a crop rotation study at the Cotton Research Center at Tempe was made, using Georgia 615. Here again the station personnel were convinced that this hybrid is bird tolerant, since little or no damage was experienced. Nearby commercial fields of the usual hybrids suffered greatly from bird losses as the season progressed.

Better Than Guns

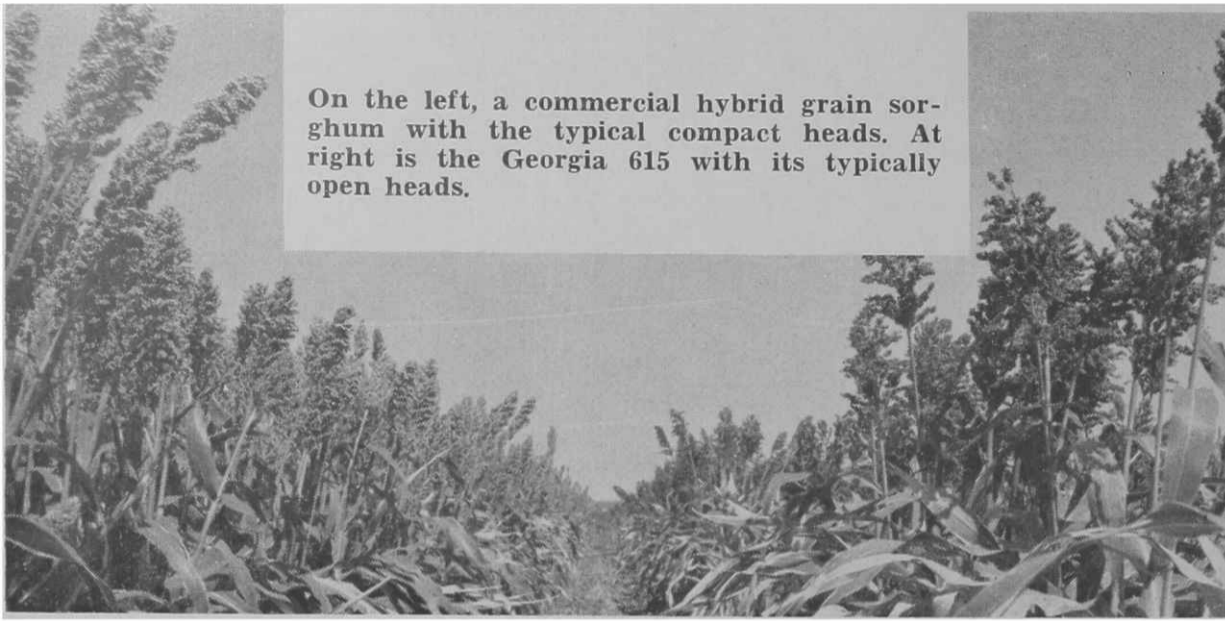
A fertility study at the Mesa Experiment Farm using Georgia 615 showed similar results regarding bird damage. At Mesa, carbide guns had been used regularly and actual shotguns had been used occasionally to ward off the sparrows and doves. Usually these efforts held grain losses to 30 to 50 per cent, but this is too high for experimental work, so it had to be discontinued. With Georgia 615 we gave the birds their freedom—but they wouldn't eat.

The Safford Experiment Station has had a similar history of bird damage. During the 1964 season an irrigation experiment on grain sorghum utilized Georgia 615 as the indicator crop. The birds here had no more desire or ability to eat the sorghum than did those at the other locations. Yet nearby plantings of other varieties lost 50 to 100 per cent of their grain to our feathered friends.

Without the bird tolerance of Georgia 615, most of these experiments conducted at Yuma, Tempe, Mesa and Safford may well have been lost or would not have been made at all.

Georgia 615 is an F₁ hybrid grain sorghum (Milo) developed at the Georgia Experiment Station in cooperation with the other Georgia Experiment Stations and the U. S. Department of Agriculture. Georgia 615 is the result of controlled pollination between male sterile Redlan and a double dwarfed Shalla. The plants

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On the left, a commercial hybrid grain sorghum with the typical compact heads. At right is the Georgia 615 with its typically open heads.

Honor Darwin Anderson With Scholarship Fund

A memorial fund has been established to honor the memory of Darwin Anderson, who was killed in a plane crash near Las Vegas, Nev., Nov. 15.

The memorial fund will provide scholarships to the annual Youth Conservation Camp in Arizona. Those wishing to contribute may send checks to Wayne Kessler, president, American Society of Range Management, 6710 N. Tenth Ave., Phoenix, Ariz., 85013, or to Murray Cox, vice president, Arizona chapter, Soil Conservation Society of America, 6029 Federal Bldg., 230 North First Ave., Phoenix, Ariz., 85025.

Funds also may be directed to Dr. Andrew McComb, head, Dept. of Watershed Management, University of Arizona, Tucson.

Darwin Anderson, a native Arizonan, received his degree from the College of Agriculture, University of Arizona, in 1934. He was known internationally for his knowledge and accomplishments in management and use of range and pasture lands, and of soil and water resources. His entire professional career was devoted to range ecology, and he was one of the Southwest's leading authorities on range revegetation.

He began working for the Soil Conservation Service in Safford in 1935, and excepting for seven months with the U.S. Forest Service, he spent his entire working life with the SCS, mostly in Arizona and New Mexico.

For the past 10 years he was plant materials technician, serving Arizona, southern Nevada and southern Utah.

Contributions to the memorial fund should be sent in soon, so that the memorial scholarship may be activated for next summer's conservation camp.

The University of Arizona Agricultural Experiment Station system has been able to make good use of Georgia 615 during the 1964 season to conduct research in many phases of agriculture. Perhaps some growers near cities or other areas of high potential bird damage might utilize this hybrid to increase their "take-home" production.

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are characterized by loose, sprangling heads with reddish-brown seeds. The hard, reddish-brown seeds help make the hybrid resistant to bird damage and seed molding. The loose heads aid in drying at maturity and further prevent molding.

The accompanying photos illustrate the open head characteristics. Note how the open mature Georgia 615 head differs from heads of RS 610 and Regular Hegari.

Don't Like the Taste

What is it that the birds don't like about Georgia 615? At least two factors may be operating to discourage the birds. First, according to the originators of the hybrid, its bird resistance is largely associated with the reddish-brown seed color, which in turn is associated with an astringent factor during the early development of the grain. The astringency is reduced as the grain matures, and at maturity it is scarcely detectable except by chemical tests.

This astringency is due to tannic acid. Its content is highest in the milk and dough stages, when bird damage usually is at a maximum. As the tannic acid content decreases with time and weathering, it is logical that eventual bird damage could occur — if harvest were delayed for a long time for some reason. This reduction in tannic acid is desirable from the standpoint of palatability of the feed grain.

Tannic acid percentages were determined on some mature grain standing in the field at Marana in October 1964 as follows:

Georgia 615	— .386% tannic acid
RS 610	— .270% tannic acid
Regular Hegari	— .162% tannic acid

These amounts probably would not affect the palatability for livestock to a great extent, and may be even lower

by the time the grain is actually utilized. Chang and Fuller, reporting in Poultry Science, observed detrimental effects of tannic acid on growth of chicks only when the percent of tannin in the diet was about .5% or higher.

Harder to Get At

Georgia 615 also possesses longer glumes than the RS 610 or Regular Hegari, as indicated in close-up photographs at the head of this article. Perhaps these longer glumes also tend to discourage the bird and send him to something else a little easier to eat.

What about the yield of Georgia 615? Have we sacrificed one factor to gain another, as is the case so many times?

Yield data from the 1964 tests are not yet available from all locations at the time of writing. At Yuma, the herbicide experiment was planted in March, making two grain crops possible in one season at this lower elevation of 200 feet above sea level. The plot yields from the first harvest made about the first part of August ranged from 5588 to 6602 pounds per acre, but unfortunately we had no comparison with any other variety. This first crop also had a vigorous vegetative growth which was chopped with a forage harvester and used in a dairy operation with good results. The regrowth then produced a second grain crop.

Comparable to Hybrids

Previous grain yield tests by Georgia indicate production generally equal to or greater than that of hybrids such as RS 610.

The irrigation experiment at Safford was planted about the first of July and made a good grain crop prior to frost, indicating the wide seasonal range under Arizona conditions. Georgia 615 blooms from three to five days later than RS 610.