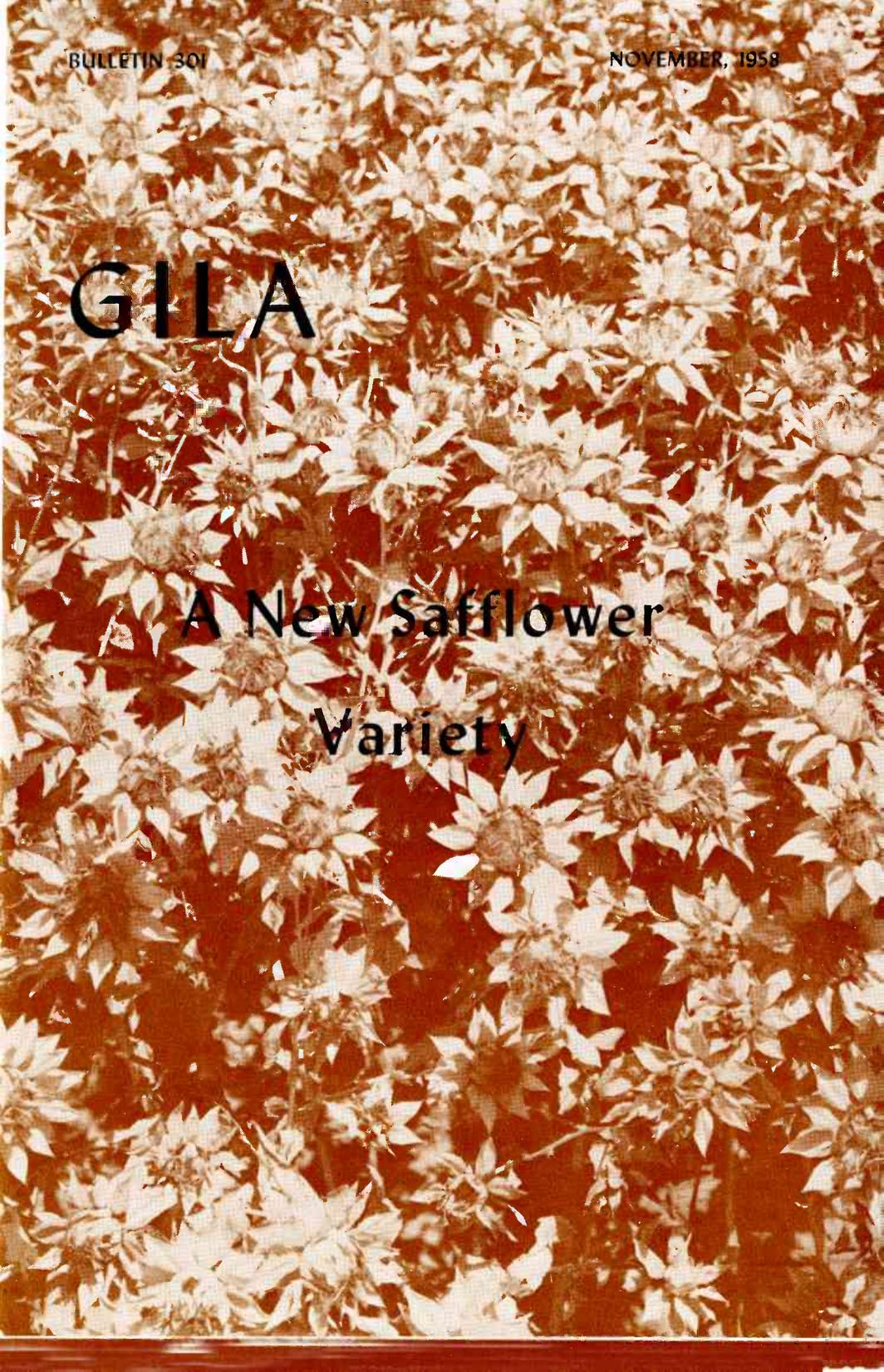
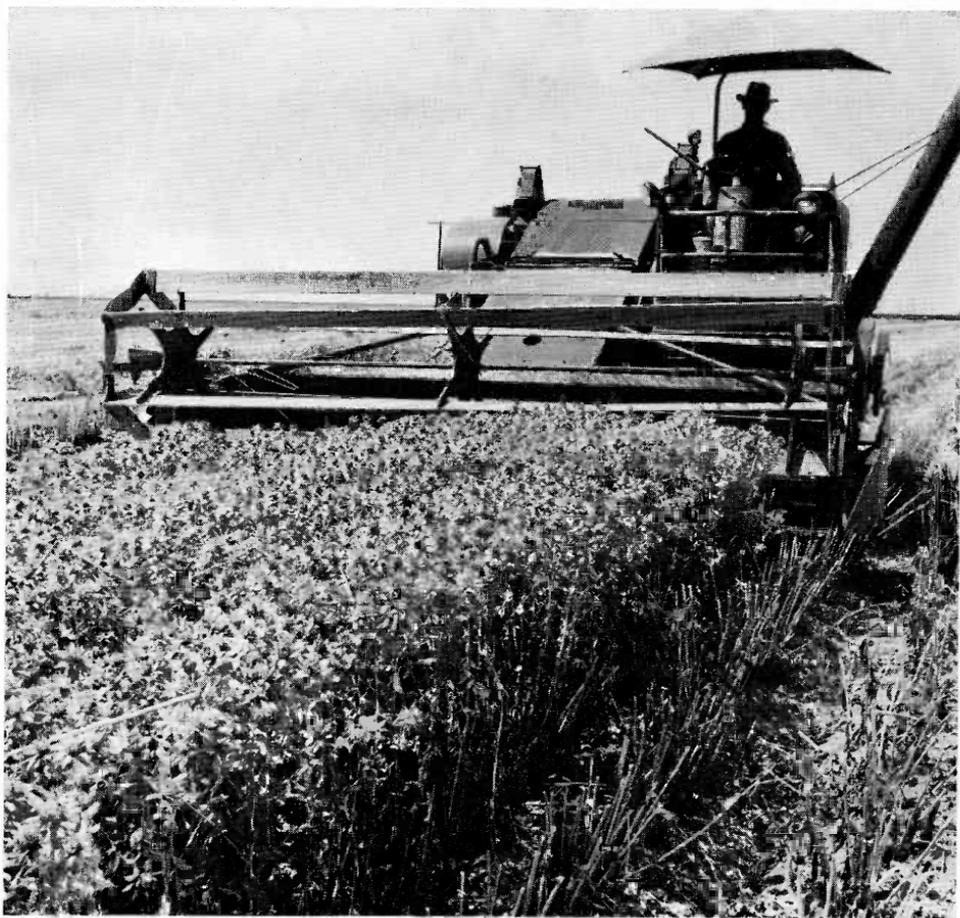


GILA

A New Safflower Variety





Combining the first increase field of Gila safflower in the summer of 1958.

Developmental History

Gila is a selection from a cross of N10 x W.O.14 backcrossed to N10 once and selfed four generations.⁴ Selected plants were bulked in the fourth selfed generation. The pedigree is as follows: (N10 x W.O.14) N10-S₄.

The cross was made in 1952 to combine the good agronomic characteristics of N10 with *Phytophthora* root rot resistance and rust resistance of W.O.14.⁵ The original cross, the backcross to N10, and the first two selfs were made by C. A. Thomas and L. M. Pultz in the U. S. Department of Agriculture greenhouses at Beltsville, Maryland. The early segregating generations in the greenhouse were inoculated with safflower rust and *Phytophthora* root rot and selections were made for resistance to both diseases.

Greenhouse selections were planted in the field in the season of 1954-55 at the University Experiment Farm, Mesa, Arizona, where the field selection and early testing were done. In 1955-56 progenies from individual plant selections were tested in the root rot nursery.

Selections were made on the basis of root rot resistance, yielding ability, bushel weight, oil content and earliness. One of the selections eventually

became the variety, Gila. This selection, together with several other promising selections, was grown in replicated yield tests at the University Experiment Farms at Yuma-Valley, Yuma-Mesa, Mesa and Safford in 1957 and 1958 (Table 1). It was also compared with N10 in drill-strip plantings at the Mesa Experiment Station Farm in 1958 (Table 2). Because of its excellent performance in comparison to other selections and commercial varieties in these tests, it was officially released as a named variety, Gila, in September, 1958.

Plant Characteristics

Gila is very uniform for agronomic characteristics but is not genetically pure for flower color, having a mixture of orange and yellow flowers. In growth habits Gila is very similar to N10; it has early seedling vigor and develops a very limited rosette in its early growth stages. It is a spiny variety similar to N10 and other commercial varieties. Gila branches considerably more than N10 and produces a denser population of heads.

Agronomic and Seed Characteristics

Most agronomic and seed characteristics of a safflower variety will vary to a small degree, depending upon the environmental conditions under which the crop is grown. The characteristics of Gila are discussed

⁴ Pedigree: N10 was a plant selection from N852, which was a mass selection from an introduction from Anglo-Egyptian Sudan. W.O.14 was a plant selection from a cross of N8 x N977-16-1 backcrossed to N8 four times and selected for rust resistance (Race 1). N8 is a plant selection from Special Russian. N977-16-1 is a plant selection from N977 which was an introduction from Romania. Western Oilseeds 14 was developed by personnel of Pacific Oilseeds, Inc. (formerly of Western Oilseeds Co.) and the other plant introductions and plant selections were made by Nebraska Agricultural Experiment Station.

⁵ Races of *Puccinia carthami* were not discovered until 1954. Under the present classification four races have been identified. The varieties W.O.14 and Gila are resistant to Race 1.

below, compared to other varieties grown in the same environment.

Yielding ability—Gila has been one of the highest yielding varieties in every test in which it has been entered during the past three years (Tables 1 and 2).

Oil percent—It has been among the top varieties in all yield tests averaging about one percentage point higher than N10 (Table 1).

Bushel weight—It is relatively high in bushel weight or about equal to N10 (Table 1).

Maturity—Gila is an early variety. However, it averages about two to three days later than N10 in flowering and maturing (Table 1).

Height—It is medium in height but because of its extra branching will average slightly taller than N10 (Table 1).

Phytophthora root rot—Gila is highly resistant to *Phytophthora* root rot,

although under very severe conditions a few plants may be susceptible (Tables 2 and 3).

Rust resistance—It is resistant to Race 1 of safflower rust, but is susceptible to Races 2, 3, and 4. All races have been found in Arizona.

Hull percent—Gila is an improvement over N10 in hull percentage and is slightly lower than other commercial varieties (Table 4).

Protein percent—It compares favorably in protein content with other varieties and averages slightly higher than N10 (Table 4).

Seed size—Gila seed is slightly smaller than N10 seed but proportionately more plump in relation to its length. The length of Gila seed averages 6 to 7 mm. and that of N10 seed 7 to 8 mm.

Iodine number—It is slightly higher than other commercial varieties (Table 4).



Various lines and varieties of safflower were tested severely in the *Phytophthora* root rot nursery, as pictured here. The two light-colored rows were susceptible and were killed by the root rot. Those which survived the root rot tests were evaluated for other characteristics of resistance, yield and quality in severe selection tests from which Gila was developed.

Table 1. Average Agronomic characteristics of Gila compared with other commercial varieties at Mesa, Yuma, and Safford, Arizona. No *Phytophthora* root rot was evident in any of these tests.

Location ¹	Variety	No. Years Tested	Yield lbs./A.	Oil %	Bushel Weight lbs.	Date of 1st Flower	Height Inches
Mesa Experiment Station	Gila	3	2636	38.0	43	May 12	43
	N10	3	2258	37.1	43	May 9	42
	N6	3	2231	33.9	44	May 17	47
	N8	3	1831	36.3	39	May 20	45
Yuma-Valley Station	Gila	2	2812	38.5	43		
	N10	2	2314	38.8	42		
	N6	2	1939	32.5	43		
Yuma-Mesa Station	Gila	2	2230	34.7	42		
	N10	2	1742	33.6	43		
	N6	2	2206	31.0	43		
	N8	2	1990	34.9	37		
Safford Experiment Station	Gila	2	2438	36.6	43		
	N10	2	1675	35.4	43		
	N6	2	1718	31.8	43		
	N8	2	1113	31.3	36		

¹ Approximate elevations: Mesa, 1250 ft.; Yuma, 150 ft.; and Safford, 2900 ft.

Table 2. Comparison of Gila with N10 in drill strips on land in which the *Phytophthora* root rot organism is sporadically present, Mesa Experiment Station, 1958.

Variety	Yield in Pounds per Acre Borders			Average
	I	II	III	
Gila	2287	2933	1865	2362
N10	622	2710	652	1318

CAUTION

Yields per acre given in this bulletin were obtained from small test plots and under varied environmental conditions. These tests were grown primarily to obtain *comparative data* among varieties.

Yields per acre obtained by safflower growers will depend upon a number of factors such as variety planted, date of planting, soil fertility, fertilizer used, irrigation practices, insect control, diseases present, etc. For best results follow the recommendations of your county agents. A University of Arizona Agricultural Experiment Station bulletin entitled *Growing Safflower in Arizona* will be available soon.

Table 3. *Susceptibility of Gila to Phytophthora root rot in comparison to other safflower varieties in the root rot nursery. All plots were uniformly inoculated with the Phytophthora organism.*

Variety	1956		1957	
	No. Plants	Percent Killed	No. Plants	Percent Killed
Gila	14	0	98	10
N10	190	95	24	100
N6	211	13	55	58
N8	225	0	94	6
WO14	40	0	17	6

Table 4. *Average seed characteristics of Gila compared with several commercial safflower varieties.*

Variety	Protein %	Hull %	Iodine Number
Gila	15.9	40.6	143.4
N10	11.9	48.3	137.4
N6	11.9	44.4	141.5
N8	18.5	41.2	134.5

ORGANIZATION

Board of Regents of the University and State Colleges of Arizona

ERNEST W. MCFARLAND (ex officio), A.B., M.A., J.D., LL.D.

Governor of Arizona

MARION L. BROOKS (ex officio), B.S., M.A.....State Superintendent
of Public Instruction

JOHN M. JACOBS.....Term expires Jan., 1959
EVELYN JONES KIRMSE, A.B., A.M., President.....Term expires Jan., 1959
ALEXANDER G. JACOME, B.S., Treasurer.....Term expires Jan., 1961
WILLIAM R. MATHEWS, A.B., LL.D., Secretary.....Term expires Jan., 1961
LYNN M. LANEY, B.S., J.D.....Term expires Jan., 1963
SAMUEL H. MORRIS, A.B., J.D., LL.D.....Term expires Jan., 1963
JOHN G. BABBITT, B.S.....Term expires Jan., 1965
ELWOOD W. BRADFORD, B.S.....Term expires Jan., 1965

EXPERIMENT STATION ADMINISTRATION

RICHARD A. HARVILL, Ph.D.....President of the University
ROBERT L. NUGENT, Ph.D.....Vice-President of the University
DAVID L. PATRICK, Ph.D.....Vice-President of the University
NORMAN S. HULL, LL.B.....Vice-President of the University

HAROLD E. MYERS, Ph.D.....Dean
RICHARD K. FREVERT, Ph.D.....Director
JOHN BURNHAM, B.A.....Editor