

CARGILL, INCORPORATED  
Grinnell, Iowa

1. Survey of attempts to hybridize maize with sorghum.

Attempts to hybridize maize with sorghum may receive more attention now that the germplasm of another member of the Andropogoneae, Manisuris, has been implemented in the improvement of maize itself. Maize and the Andropogoneae have also been hybridized through the highly polyploid genus Saccharum. These points alone cannot strongly endorse a maize x sorghum effort, yet they do offer a certain element of encouragement. Certainly most efforts to date have been quite modest and this is stressed repeatedly by those investigators willing to report their work. Even a weakly fertile hybrid would seem worthy of considerably more effort, especially if it can serve as a bridge to the exchange of germplasm between these two important crop species.

Forty of the larger American crop research groups were contacted in this survey. Eighteen of these indicated an effort of some kind, and 16 furnished descriptions of the scope, techniques and success of their work. What portion of the total USA and world effort this represents is not known.

Cargill, Incorporated                      Grinnell, Iowa                      E. E. Gerrish

1964 - female 4 plants 2n maize - silks shortened - one week after pollination 10 " blisters" on each ear inoculated with 14-day old normal 3n maize endosperm fluid - no development

1966 - female 150 plants 2n maize (single crosses) - silks treated with 100 ppm Gibrel, later shortened and shucks removed - pollination with 2n sorghum (Reliance, Norghum) pollen followed at intervals of 4 to 48 hours by application of maize pollen carrying dominant endosperm and embryo color markers - all seed sets greatly reduced by combined shuck removal and silk shortening - seed set apparently unaffected by presence of Gibrel - no seed development where pollination limited to sorghum - seed development comparable to check (shortened silks, shuck removed, and pollination with maize pollen) where maize pollen followed sorghum pollen - no positive identification of hybrid (colorless) embryos in normal marked maize endosperm.

Texas A and M University                      College Station, Texas                      K. F. Scherty

Female 2n ms sorghum - male 2n and 4n maize - a few seed developed which produced typical sorghum plants.

University of Florida                      Gainesville, Florida                      J. R. Edwardson

1956 - female 24 plants 2n maize (F6) and 24 plants 2n sorghum - maize silks shortened - greenhouse - no seed development.

Funk Bros. Seed Company      Bloomington, Ill.      C. Laible

1964 - female 20 plants 4n maize - male 4n sorghum - silks shortened - pericarp stimulation only.

University of Illinois      Urbana, Ill.      D. E. Alexander (reported 1963 MNL)

1961 - female 4n maize (synthetic B and inbred N6) - male 4n sorghum - silks shortened - sparse pollination with maize prior to hybridization - 100 putative hybrid embryos excised - strongly resembled maize seedlings - no survivors through nutrient cultures.

1962 - female both 4n maize and 4n ms sorghum - silks shortened - total 53 putative hybrid embryos excised - growth aberrant and abortive in nutrient culture - developmental pattern of many suggestive of hybrid nature - no root tips available - germination and sluggish growth of maize pollen in sorghum styles - reciprocal obs. inconclusive - further effort planned.

Iowa State University      Ames, Iowa      P. A. Peterson

1963 - female 50 plants 2n ms sorghum - wide spectrum maize races and types male - nick poor - 30 small seed developed - all sorghum, perhaps halapense x vulgare.

Iowa State University      Ames, Iowa      G. F. Sprague      (Beltsville)

1946 - female 30 plants 2n ms sorghum - isolated in maize nursery - several seeds developed - all sorghum - outcross source located.

Iowa State University      Ames, Iowa      M. L. Kinman

1943 - female 2n ms sorghum (Blackhawk Kofir) - isolated in maize nursery - massive amounts of maize pollen applied in addition - several seeds developed - all sorghum - outcross source located 2 miles downwind.

University of Kentucky      Lexington, Kentucky      J. F. Shane

1965 - female 6 plants 2n ms sorghum (A385) - male 2n maize (Wf9) - no seed development.

1966 - female 25 plants 2n ms sorghum (A385 and A Martin) and 96 plants 2n maize (T8 and CI21E) - maize silks shortened in some cases - males 16 different varieties of 2n sorghum and 5 inbreds of 2n maize - 5 seeds developed on maize females and 5 seeds on sorghum females - all suspected of outcross origin - further effort planned.

University of Massachusetts      Waltham, Mass.      W. C. Galinat

1958 - female 24 plants 2n ms combine Kafir - 14 embryonic-type developments excised at 17<sup>th</sup> day - no further growth or differentiation.

1959 - female 12 plants of 4n sugary maize - silks shortened - male a mixture 4n maize and 4n sorghum - 9 putative hybrid embryos excised - no hybrids developed.

Michigan State University East Lansing, Mich. E. C. Rossman

1951 - female 100 plants 2n maize - silks not shortened - 12 seed developed - all maize.

Missouri Farmers Association Marshall, Mo. C. O. Grogan

1948 - female 10 plants 2n maize - silks shortened - 3 seeds developed - failed to germinate.

University of Missouri Columbia, Mo. E. R. Sears

1938 - female 10 plants 2n antherless sorghum - no seed development.

Ohio Agricultural Research and Development Center, Wooster, Ohio, W.R. Findley

1963-64 - female 1000 plants 2n ms white sorghum - isolated in maize nursery - nick poor - 25 yellowish seed developed - all sorghum - further effort planned.

Paymaster Seed Farms Plainview, Texas N. W. Kramer

1950's - female 500 plants 2n ms sorghum - isolated in maize nursery - no seed developed.

Pioneer Hi-Bred Corn Company Johnston, Iowa W. L. Brown

1957-59 - female several hundred 2n ms sorghum - isolated in maize nursery - several poorly developed seed - most germinated and survived one month - died at approximately one inch height.

Purdue University Lafayette, Indiana R. Pickett

1959-60 - female several dozen 2n ms sorghum - hand pollinated - several seeds developed - no germination.

South Dakota State University Brookings, S. D. C. J. Franzke

1932-64 - reciprocal crossing involving total 20,000 plants, mostly 2n, wide divergence of types in both parents - maize as female mostly shortened silks - sorghum as female hand emasculated - all hybridizing greenhouse - no success maize as female - on sorghum shiveled seed yielding maize-like plants maturing without terminal or lateral inflorescences.

E. E. Gerrish