Manihot neusana NASSAR, A NEW SPECIES NATIVE TO PARANA, BRAZIL

Nagib M. A. Nassar

Department of Agronomy, University of Brasilia
Brasilia, DF, Brasil.

A new species of Manihot, Manihot neusana Nassar, was collected from the state of Parana, Brazil. It was grown and studied in the living collection at the Universidade de Brasilia. The new species is closely related to M. Pohlii Warwa, but differs from the latter in geographic distribution, growth habit, fruit shape and color and seed shape and size. This species possesses interesting characteristics from a plant breeders view point, such as tolerance to low temperature, resistance to stem borers and an evergreen habit.

Key words: Manihot neusana, M. Pohlii, tolerance, low temperature, stem bore

Brazil has long been recognized as an area of unusually high genetic diversity for Manihot species providing cassava breeders with a valuable pool of germplasm (Nassar 1978a). Nassar (1979) has described the formation of gene centers and microcenters of this group, and has reported in further studies that these species when tested within the limits of their environment show a wide range of adaptation to heat, cold, drought, floods or diseases (Nassar 1978a, 1979, 1982).

Wild Manihot species have been collected from all over Brazil through our program to conserve, evaluate and utilize genetic resources of cassava. A monograph by Rogers and Appan (1973) was consulted to localize and identify different species. The collected species were screened in their natural habitat for tuber formation, growth habit and infection by insects or diseases. Moreover, soil samples were analyzed chemically to detect adaptalin of these species to aluminum toxicity. Data on rainfall and temperature in the natural habitat were collected from the meteorological stations to indicate possible tolerance to extreme temperature and drought conditions.

The collected species were reproduced by seed and/or cuttings and maintained in a living collection at the experimental station of the Universidade de Brasilia. In the following season seed was collected from these plants and planted, morphological characters of the progeny were recorded to determine whether the parent plants were true breeding or produced seed through natural hybridization. Observations on screening these species have been reported previously (Nassar 1978a, 1979, 1982, 1984).

One of the most interesting germplasm lines was collected from Parana in Southern Brazil, Latitude 25° S. It is so distinctive that it is proposed as a new species. This line was collected initially by Dr. Neusa da Cruz and transferred to our living collection where it was reproduced and observed for four generations. It is a shrub of 2-3 m that grows vigorously and exhibits an evergreen habit, during the winter, in contrast to the majority of wild Manihot species and even cassava itself. For this reason it can serve well as animal feed, moreover, introducing the gene for evergreen habit to cassava may improve carbohydrate storage in the roots. This line was the only one that grew actively during the winter when all other Manihot species shed their leaves. This line is native to southern Brazil where the temperature is as low as 0°C in winter. It should therefore be a good source of resistance to cool temperature. This line is very resistant to stem borers (Silba pendula and Coelosternus spp) which are serious pests of cassava in Central Brazil. During the 4 years of observation we did not record any attack of these insects on this species, while adjacent plants of other species were severely attacked. Thus, this species should be a good source of resistance to these two insects.
Manihot neusana is a shrub with branches which tend to droop; pubescent leaves; glabrous mature stems; stipules less than 1 cm long, 0.5 cm wide; pubescent, cadulous, petioles ca. 15 cm long, 5 cm wide, palmately 3-5 lobed; median lobes obovate-lanceolate, margins entire, apex acuminate. The inflorescence is monoeocious, terminal, ca. 5-10 cm long, bracteoles foliaceous, 1-2 cm long, 2-3 cm wide, margin entire, pubescent; bractlets foliaceous; the pistillate flowers are restricted to the base of the inflorescence. The fruit capsule is 1.5-2 cm long, spherical to oblong, surface pubescent, variegated in color green-white; the seeds are 1-1.5 cm long; caruncle rudimentary.

Manihot pohlii Warwa is a similar species. However, fruit of M. pohlii is conical in shape and is three times larger than that of M. Neusana, which is spherical to oblong (see photo gallery). The fruit of M. Pohlii is green, that of M. Neusana is variegated green-white with an ornamental pattern. Seed of M. Pohlii is spherical and three times larger than that of M. neusana which is oblong (see photo gallery). Manihot pohlii is conged to the states of Espirito Santo, Rio de Janeiro and Eastern Bahia (Rogers and Appan 1973). The introcuction of this species, which are maintained in our living collection, were collected by me from Lençois, Bahia State. M. neusana is native to Parana, the southern-most state of Brazil, about 2000 km from Bahia. Obviously there is no overlap in the geographic distribution of the two species and they have distinct habitats with a mechanism ensuring geographic isolation. It is possible that this new species and M. pohlii are two isolates of a common gene pool; however, the distinction of their geographic distribution, morphological characteristics, and climatic adaptation suggest they are quite distinct species. The variegated decorative fruit of this new line is also distinctive. The species description by Cruz (1967), several new taxa described in the monograph by Rogers and Appan (1973), and the discovery of this new species suggest that further collection in Brazil may reveal more new species in this genus.

**Latin Description of the Species**

Manihot neusana Nassar sp. nov. Fruitibus ca.3 m persistentibus monocaubibus; caulibus junioribus teretibus; stipularum marginibus integris; petolis ca. 15 cm longis; foliarum labis medianis integris 15 X 15 cm bracteolis 2.5-3 X 0.9-1.2 cm; Florum discis rubis; capsulis variegatis apicibus truncatis; seminibus 1.2-1.5 cm longis carunculis rudimentalibus differit.

The material studied is being maintained in a living collection at the Experimental Station, Universidade de Brasilia, and is represented by the accessions 201, 202, 203, 204, 205, 206, 207, 208 and 209. the holotype is deposited at the herbarium of Universidade de Brasilia (UnB).

**ACKNOWLEDGEMENT**

This work was carried out with the help of a grant from the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), Brasília, Brazil. The living collection was initiated by the Canadian International Development Research Center (IDRC) between 1976 and 1980 to whom I am very grateful.

**REFERENCES**


Native to Parana, Brazil, a new species of Manihot, *Manihot neusana*, is described. This species is distinguished by its spherical fruit capsule that is three times larger than that of *Manihot pohlii*. Unlike *M. pohlii*, the leaf morphologies of *M. neusana* are also distinct, with smaller caulines and stipules, and longer petiolae. The adventitious roots of this species are well developed and can tolerate extreme temperatures and drought conditions.

The discovery of *M. neusana* suggests further exploration for species with similar characteristics. Such species could be used for breeding programs aimed at increasing tolerance to abiotic stress and for developing improved cassava varieties with enhanced nutritional value. Further research is needed to understand the genetic diversity and potential for genetic improvement within the Manihot genus.