

# Classification, Cultivation, and Selection of Aguaruna Cultivars of *Manihot esculenta* (Euphorbiaceae)

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This paper has three principal objectives. The first is to describe how Aguaruna manioc cultivars are lost, found, and maintained. This description provides data on indigenous practices of manioc selection comparable to that provided by Conklin (1957) for rice (*Oryza sativa*), by Yen (1968) for sweet potatoes (*Ipomoea batatas*), and by Brush et al. (1981) for Andean potatoes (*Solanum tuberosum*). The second objective is to address the problem of the loss of genetic diversity of important crops. I stress, as Brush and his collaborators (1981) do, that an understanding of the social context of crop selection is a key to dealing with this serious problem. The third objective of this paper is to provide background information to support the claim that Aguaruna manioc cultivars have been selected for their perceptual distinctiveness. I will develop this idea more thoroughly elsewhere (Boster, unpubl.).

This paper recognizes three types of cultivar selection: perceptual, cultural, and natural. By perceptual selection, I mean the addition to an inventory of those cultivars that can be distinguished from other similar appearing cultivars. Such selection for perceptual distinctiveness is a preliminary step in the overall process of selecting a manioc cultivar. If a cultivar can be perceptually distinguished, its fate depends on its utility and hardness. Cultural selection refers to the selection of cultivars for characters affecting the use of the plant while natural selection culls those plants that cannot survive the hazards of the environment. This paper will primarily consider these last two modes of selection: deliberate cultural selection for desirable properties related to the consumption of the cultivars and natural selection for resistance to pathogens, pests, and other environmental hazards. The selection of manioc cultivars is only one aspect of the dynamics of the

Aguaruna manioc cultivar inventory; this paper also describes the loss and introduction of cultivars in this system. Finally the paper describes the ways in which this dynamic system is reflected in Aguaruna manioc nomenclature.

The Aguaruna Jivaro live in humid tropical forest on the hilly rim of the Amazon basin in Peru. They subsist by gardening, fishing, hunting, and collecting forest products. Women are the principal gardeners (Fig. 1) while men are the principal hunters. Although many crops are grown by the Aguaruna, manioc is by far the most important. It contributes more than half of the calories in the diet (Berlin & Berlin, 1978: 26) and makes up more than three quarters of the individual plants in the gardens. In fact, the diversity of distinct cultivars of manioc maintained in the polycropped gardens is greater than the diversity of distinct crops (Boster, 1983). The starchy root is prepared for consumption by boiling or roasting or by fermenting for beer.

The field research was conducted between July 1977 and September 1978 as part of the Segunda Expedición Etnobiológica al Río Alto Marañón, led by Brent Berlin. My methods of data collection included asking informants to identify by native name manioc plants growing in experimental gardens, conducting standardized interviews to determine the culturally important properties of the manioc cultivars and the flow of cultivars through the community, taking transects of native gardens to determine the frequencies of the various manioc cultivars and other cultivated plants, recording of yields of garden production, engaging in in-depth, open-ended interviews on cultivation practices, and simply observing. The data were collected by myself and by trained, literate Aguaruna and Huambisa research assistants.

## Selection and maintenance of cultivars

Aguaruna horticultural practices are typical of a lowland South American swidden system (cf. Carneiro, 1964; Denevan, 1971; Kensinger, 1975; Leeds, 1961). Well drained, sandy, stream-side sites covered with mature secondary growth are preferred for gardens because they can support the largest inventory of crops with the least effort. Gardens are cleared with the use of axes and machetes. Often the felled trees and slash are burned, but sometimes the slash is merely dumped at the edge of the garden. The garden is prepared for planting by loosening the earth with a palm-wood digging stick and inserting the manioc planting stems into the resulting mounds. Most of the planting stems for a new garden are taken from the cultivator's other gardens. Many of these are acquired in the daily harvesting of roots; a single healthy plant when harvested can supply from five to twenty planting stems. Additional planting material is harvested from plants that have multiple trunks sprouting from the same original planted stem. One of these can be used for planting material without harm to the parent plant. At seven to ten months, the manioc reaches maturity and the cultivator begins a daily routine of weeding small sections of the garden, harvesting the plants in the weeded areas, and replanting almost the entire length of each stem in the mounds created by harvesting.

Planting of a new garden is the occasion of the most intense selection of cultivars. Some effort is made to keep a good mix of cultivars in the garden. If a cultivar is judged to be under-represented in the older garden, as many planting stems as possible are cut from the plants that do exist to reestablish a balance. If a desired cultivar cannot be found in the older garden, it is often requested from a kinswoman, usually a mother or sister. The judgment of whether a cultivar is under-represented depends on the ability of the cultivator to identify the cultivar in