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SOME OBSERVATIONS AND EXPERIMENTS ON SPECIES AND VARIETIES OF TROPICAL SPINACH

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Many plant species may be grown under tropical conditions to be used in the same way as the true spinach (Spinacia oleracea L.) We have compared in Guadeloupe some varieties of tropical leaf vegetables belonging to the genus Amaranthus, Celosia, Basella, Solanum and Xanthosoma. Table 1 summarizes the result of one of our experiments, realized in a short time (63 days from transplantation on November 19th to the 3rd harvest on January 21st.

TABLE 1

Species and Variety		Number of plants/m^2	% surviving at the end of experiment	Total yield kg/m^2 stems+ leaves (3 harvests)	Total yield/m^2 (leaves only) 3 harvests
	1	8	100	5,57	2.71
	2	8	94	5.29	2.78
Amarants	3	8	97	5.36	2,33
	4	8	48	2,07	1.13
	5	8	70	0,54	0.21
Celosia argentea		8	90	2.58	1.42
Basella alba		6	87	0.69	0.59
Basella rubra		6	98	2.29	1.17
Solanum nigrum var. guineense		8	87	2,13	1.26
Xanthosoma brasiliense		3,3	100	0,32	0,32

Let us consider now with more detail the performances and qualities of each species and variety.

Amaranthus spp.

It is difficult to give specific names to Amaranthus varieties grown as spinach in tropical countries. The determinations we give here are due to J. Fournet (INRA-Guadeloupe). Amaranthus spp. are known to have the C4 process of photosynthesis especially effective in tropical conditions. Very high yield of leaves/m^2 can be obtained in a short time. Our varieties 1, 2 and 3 have produced approximatively 75 kgs of dry matter by hectare/day and 13 kg of proteins. These potential yields can be reduced by diseases, or by a too early flowering, as in our varieties 3 and 4.

The variety 1 was obtained from "Hauteurs Lézarde" Guadeloupe. The plants are abundantly ramificated, and able to give four or five successive harvest. It belongs to Amaranthus gracilis, but is very different from the spontaneous A. gracilis, by its size, lateness, and resistance to Albugo bliti.

Variety 2 was obtained from Ste Anne, Guadeloupe. Less ramificated, with a stronger main stem, and terminal inflorescence, with broad savoyed leaves, it belongs to Amaranthus dubius.

Variety 3 was obtained from Dahomey (Africa). The plant habit is similar to No. 2, but with flat leaves, and larger inflorescences producing seeds more easily. This variety, called "Fotete" was given to us by Dr. Grubben (Porto-Novo-Dahomey) as Amaranthus hybridus, but, following J. Fournet it may be, too, an A. dubius.

Another African variety we have received later from Dr. Grubben, called "KLAROEN" is very similar to the variety 2 from Guadeloupe.

Variety 4 is an Amaranthus caudatus received from Dr. Lexander (Sweden). Very susceptible to stem rot caused by Pythium aphanidermatum, its yield is inferior to 1, 2 and 3 for this reason.

Variety 5 is the "Tampala spinach" from Burpee seed company (probably Amaranthus gangeticus). Adaptated to the long days of North American summers, it produces flowers very early in West Indian winter conditions, and the plants remain of a very small size.

When cooked these Amaranths give a spinach of a medium quality, with a slight bitterness perceived by some persons.

As diseases and pests we have observed Pythium aphanidermatum, especially on 4, Choanephora cucurbitacearum on some branches after they were cut for harvest, and Herpetogramma bipunctalis (Pyralidae). The roots are not attacked by gall nematodes.

Celosia argentea

This species is grown in Dahomey under the name of "Avounvo." Its productivity is about one half of this of the better Amarsnths. The roots are very susceptible to gall nematodes. It gives a spinach of poor quality.

The Basellas

We have grown Basella rubra (from University of West Indies, Trinidad) and Basella alba (Burpee seed company).

The red Basella is a very interesting plant, which gives a spinach of very good quality, without hitterness. In our trial it was not grown correctly. There are two possible methods for growing Basella: either staked, with a growing period of 4 to 6 months in the family garden, with yields of 2-3 kgs/m^2 every 15th day, or sown very closely (50-100 seeds/m^2) and harvested at the 4 leaves stage, in the same way as European spinach. However, the dry matter content of Basella leavas is only 6%, compared to 11.5% for Amaranths.

Basella roots are very susceptible to gall nematodes, the leaves may be attacked by a disease probably caused by Cercospora basella.

The green Basella from Burpee cannot be grown following the first method described above, since it produces flowers and seeds too early in short photoperiods.

Solanum nigrum variety guineense

This species is grown in West Africa under the name of "Ogomoh" (we have obtained the seeds from Prof. Tindall). It grows slower than Amaranths at the beginning, but covers the soil very well and should be able to give 4 or 5 harvests in 100 days from transplantation. The roots are only slightly susceptible to gall nematodes. The leaves are easily colonized by aphids and red epiders.

It gives a spinach of a very special taste, out which could be appreciated by people who consume the leaves of the West indian Solanum nigrum (or S. caribaeum, called in Guadeloupe "Agauman").

Xanthosoma brasiliense (Def) Engl.

This species, which must not be confused with X. sagittifolium gives a spinach of a very good quality. Unfortunately the yields are very low, even with a long-lasting plantation. The stock we have found in Guadeloupe and Trinidad are infected by a virus disease identified by Dr. Zettler (Gainasville University) as Dasheen mosaic virus. M.J.B. Quiot (INRA-Guedeloupe) has obtained virus free plants by meristem cultures, which will be triad in the field next year.