

AGRO, ETHNO AND ANTROPOLOGICAL ASPECTS OF THE MACA

HISTORY AND AGRONOMY OF THE MACA

Generalities

The maca (*Lepidium meyenii* Walp) is the first class food and medical resource; it has a high content of carbohydrates, proteins, minerals, vitamins and amino acids. Thanks to the Naturalfa's participation, after having been declared in process of extinction by the FAO in 1982, now it is a recovered crop since during the agricultural season 1997-1998 there has been 400 ha sown. In spite of this, the maca continues being little known and the technical-scientific studies carried out about this 'land-fruit' are limited.

The maca is grew almost exclusively in the Meseta de Bombón, in the surroundings of Lake Chinchaycocha or Junín's Lake, the border of the Junín and Pasco departments, in Perú. It grows between 3,700 and 4,500 m of altitud.

The people of the Meseta de Bombón are poor. Growing and industrializing the maca they try to improve their way of life and the family economy. If the crop is still not much grew is because it has not a market. Encouraging the culture of this vital product it is tried:

- To promote its consumption
- To recover the interest of the family group to increase the maca culture
- To improve the use of the scarce-agricultural land in the zone
- To train the peasant with modern-technological means of culture
- To prevent the peasant migration to the city

Perú, at the conquest time in 1532 has offered to the world the potato, the corn, the sweet potato and other crops. At the beginning of the XXI Century, Perú will be able to offer the maca to improve the food quality of humanity.

The maca has been a very appreciate crop at the pre-Inca and Inca time. Its domestication is estimate to occur around the year 3800 B.C. The maca in the Inca time was reserved for the consumption of the nobility, the clergy, the privileged class and it was given as a reward to the warriors when they came back from their expansion campaigns.

The Spaniards, during the conquest and the viceroyship, have to cover long distances in the Inca ways, which due to the wild topography of the Peruvian territory were extremely exhaustive. At high altitude there was not forage for their horses that died of hunger and efforts to which they were forced. During their trip from Cajamarca to Cuzco, when reaching Cerro de Pasco, the found the maca which herb and fresh fruit solve their problems; the herb serves as forage to the horses, and also the roots (hypocotic) to feed them.

After 500 years between conquest, viceroyship, independence and republican times, the maca has been almost oversight, to become only a family staple crop. The FAO, in 1982, declares to the maca a crop in process of extinction; we do not know the exact surface cultivated with maca in Peru. In June 1995 was estimate in 84 hectares (208 acre), and in 1997-1998 it was found that only in the Meseta de Bombón have been sown 400 hectares.

The maca, a high Andean root, with characteristics scientifically proved, is a powerful reconstituent for its high content of carbohydrates, proteins, vitamins, minerals and amino acids, particularly indicated to combat malnutrition, lack of physical and mental energy, the stress and lack of memory. In animals, it has been proved it powers the sexual activity.

Studious and surveyed people affirm that the maca is a food of high nutritive power, invigorating and medicinal . Dr. Javier Pulgar Vidal affirms that the maca is also a great fecundating product.

The maca is grown almost exclusively in the Meseta de Bombón, at the surroundings of Lake Chinchaycocha, also called Junín's Lake, located in the border of the Junín and Pasco departments at 4,125 m of altitude. It grows where other crops find difficult to develop and supports temperatures as low as -10°C .

Due to the importance of this resource several foreign universities have studied it. It is affirmed that was sew in Germany and Canada without having obtained the adequate growth, mainly that of its hypocotyl, that is where the plant concentrates the higher amount of its nutrients. In addition, it has to be say thatg the Universidad Nacional Agraria de La Molina and the International Potato Center in Lima, Peru have carried out important studies about the maca and are interested to recuperate and develop this crop for man's benefit.

Peru, place of birth of the Inca civilization, has given to the world three of at the present major-consumption food products the potato, the corn and the sweet potato. At the beginning of the XXI Century Peru offers the MACA as a natural food of great nutritive and medicinal value and others such as the mashua, oca, ulluco, kiwicha, quinoa, cañihua, tarwi, etc.of excellent nourishing quality.

Peru, has been afflicted by the terrorism since almost 20 years. This phenomenon has motivated that entire populations, particularly the young peasant, have migrate to cities in their surroundings. This also is happening with the Meseta de Bombón inhabitants, with those from Huanuco, Huancayo and Lima. With this, the peasant, depositary of vast ancestral knowledge on agriculture and particularly about the maca cultivation, has became in the cities in a parasitic peddler. The secret of the crops is lost in this way and the fertile land is abandoned in spite to be so scarce. For this reason Junín, Uco, Huayna, Carhuamayo, Ninacaca, Shelby, Vicco, Huallay, San Pedro de Pari and Ondores are populations that in case this tendency continues will be almost deserted, with very old people without effective capacity to cultivate their land.

After some years of observation we have been able to appreciate that the universities, institutes and researchers make apart efforts to study the maca. It is good to suggest here the establishment of a coordinating entity for its study, the same that should have to gather all the existing information about this crop and its uses, to which all those interested may go. With this the duplication of efforts will

be avoided by saving of overlapping costs. In the UNALM, Universidad Nacional Daniel Alcides Carrión of Cerro de Pasco and the Universidad Nacional del Centro, do not exist a germoplasm bank that had the best diversity of wild and cultivated species where the researchers interested in the genetic improving of the maca crop may go.

After innumerable visits to Pasco, Huancayo, Ayacucho, Arequipa, Cuzco, Tarapoto y Moyobamba, it is possible to assure that the man from the Andes and that from the jungle possesses an ancestral knowledge that allow us, in the middle of the XX Century, to make use of food crops such as the maca, kiwicha, quinoa, tarwi, kañihua, chicuro, ulluco, oca, mashua, llacón, chagos and medicinal plants like cat's claw, sasha inchi, camu camu, etc. Even more, at the beginning of the XXI Century continues offering to the world nutritious and medicinal products the best in quality.

The peasant-communities in all the Peruvian Andes are ancestral institutions with their own very disciplined organization, but without education. They are not enough trained for acquiring modern knowledge that allow them a better management of those crops inherent to them adding the necessary aggregate value to reach the supply markets in better conditions of competitiveness.

The government, the universities and the private enterprises should be worried for reviving the interest of the farmers of the Meseta de Bombón to revalue the maca and other Andean crops, which knowledge genuinely belong to them, assuring both a national and a foreign market. For this to be possible it will be necessary to invest in education on benefits and use-ways of these resources.

To create a germoplasm bank to guarantee the preservation, evaluation and genetic improvement and in this way to obtain improved varieties of high-yielding hypocotyl-root maca.

To train the family-group and interested farmers with modern knowledge and technology, to improve quality and productivity in the maca crop.

To encourage the young commoners , peasants and family-groups, that have abandoned their lands looking for better horizons in the neighboring cities, to come back to their habitat to cultivate the maca and other products for industrial purposes and domestic consumption. Peru is an agricultural country with increasing demand, so it is risky to abandon the land.

History of the Pre-Columbian Andean Crops

In Peru there are a series of Andean crops which morphology, nutritive and medicinal excellences, management, conservation and rational utilization are not completely known. They are only recognized as great food products that have a very important role in the Andean inhabitant feeding since thousand years ago.

La maca (*Lepidium meyenii* Walp) is one of these products being cultivated in the Andes since the pre-Inca times, at altitudes between 3,700 and 4,500 m. At the present the crop has been reduced to the Meseta de Bombón in the surroundings of Lake Chinchaycocha or Junín's Lake at the border of the Junín and Pasco departments.

This high-Andean alimentary plant is one of a few resources the inhabitants of the highs of the Peruvian Sierra have. It is resistant to hailstorms, frosts, continued droughts and pests. This plant goes quite ahead among all the food crops, due to its grand nutritive value what makes it to be worthy of a great diffusion by means of the scientific investigation for its genetic and agronomic improvements.

Nowadays the results of some investigations about its excellent nutritive qualifications have increases the interest for the arising of this Andean tuberous. It is a powerful reconstituent due to its diverse-nutrient composition: proteins, vitamins, minerals and amino acids. It is the ideal product to fight the lack of memory, fatigue, mal nutrition, lack of physical and mental energy; to preserve many years of life, fight the tension, the stress, and for the improvement of the sexual activity.

The recuperation and promotion of the maca crop is of great importance to increase the nutritional level of the Andean man who in pass times grew it in large extensions, inclusive utilizing the terrace system, which vestiges still exist today. In remote times, the maca, the cañihua, the corn and the shiril potato, according to many archeological studies constituted the basic food products of the large populations. So, any work trying to recuperate and promote them will positively help to recuperate hundreds of abandoned hectares in the high-Andean zone of our country.

With respect to the consumption and qualifications of the maca it is known that the Andean population utilize it to prepare pottage, sweets, and drinks, attributing to it stimulating, reconstituent and tonic effects. It is also used to fight the anemia of sick persons. In the rural medium, mainly in Junín and Pasco, they comment and express that the maca is a food that improves fertility. Many researchers have prove that it is a regulating product of the female menstruation and an excellent tonic for recuperation and control of those ladies in the middle of the critic age (menopause). It is relaxing for the nervous system and excellent for the insomnia.

Agronomy of the Maca

As we already have say, the maca is a typical plant from the puna region of Peru, cultivated at altitudes of 3,700 to 4,500 m. As it may be appreciated the maca grows in a little-favorable region, under temperatures up to -10°C.

This plant species is biannual, it is propagated using sexual seed. During its first year the plant stays vegetative and produces only one root similar to a radish. After preparing the land with natural fertilizers, mainly sheep manure, the maca seed,

which is very small and similar to anise; is scattered during the October and November months. After eight months under cultivation the harvest is made in June and July. To harvest, the stems and leaves are pulled with the help of a small tool called "zapapico" (pickaxe). The harvest is equal to the carrot; some could be consumed fresh, during 30 days, and the rest must be completely dried by exposure to the sun for 30 to 45 days. In this way the maca will be in conditions to be stored keeping intact its feeding and nutritional qualifications up to 15 years.

In this moment the macas for seed must be selected. For such a selection, size, health, weight and color must be taken in account. The macas selected in this way will be deposited underground, in pits which depth may vary between 0.40 and 1.20 m. Those macas are deposited in lines separated with straw ("ichu") brought from the puna and stored there for three months.

Now, the second year starts for the maca crop. During September and October the macas are transplanted from the pits to carefully-prepared fields, being planted in lines at a distance of 40 to 50 cm between plants. The cultivation for the maca seed production will take 7 to 8 months. The plant is rosette shaped of more or less 70 cm in diameter. Once the seeds are mature, what is known because the capsules containing them start to fall, the harvest starts. The rosettes will be taken out of the fields and carefully carried to canvas or plastic blankets to be dried, preferably in the shadow or where the sun light do not fall directly over them, because it could kill the embryo.

Once the capsules are completely dried, they will be rubbed with both hands and the seeds, that are very small, will be obtained. Then comes the winnowing to obtain pure and clean seeds. As an average each plant can produce about 30,000 seeds of 2 mm x 1 mm with a weight of 18 g, approximately.