MEETING CONCLUSIONS

The future of Mediterranean Stone Pine requires an effective commercial distinction from other pine seeds and a stable, increased production from agroforestry systems

Last 17th-19th November, an *International Meeting on Mediterranean Stone Pine for Agroforestry - AGROPINE 2011* was held in Valladolid, Spain, organised by the Stone pine subnetwork of the FAO-CIHEAM Research Network on Nuts. The meeting brought together about forty experts, researchers, public and private forest managers and land owners, as well as representatives of pine nut processing enterprises from Spain, Portugal, Tunisia, Turkey and Lebanon, with some contribution from France and Chile, in order to review the current state of the art in Mediterranean pine nut production in forests and orchards, and to discuss the challenges of the future.

The **pine nut, the edible kernel of the Mediterranean stone pine, Pinus pinea, is one of the world's most expensive nuts**. Although well-known and planted since Antiquity, pine nuts are still gathered mainly from natural forests in the Mediterranean countries, and the crop has only recently taken the first steps from wild harvested to domestication as an attractive alternative on rain-fed farmland in Mediterranean climates. The Iberian Peninsula accounts for about 75% of stone pine area in the world, **Portugal being the main pine nut producer, followed by Spain, Turkey, Lebanon and Italy**.

During the last century, the Mediterranean stone pine has experienced a range expansion, especially in the Southern and Eastern Mediterranean Basin, as well as a large increase in planted area in its native countries, both by forest restoration and farmland afforestation. The species performs well on poor soils and needs reduced cultural practices, it is affected by few pests or diseases and it resists climate adversities such as drought and extreme or late frosts. It is light-demanding and hence has potential as crop in agroforestry systems in Mediterranean climate zones around the world, in tree lines such as shelterbelts adjacent to farmland or pastures or in proper low density orchard plantations.

The **AGROPINE Meeting 2011** presented the current knowledge and on-going researches about ecological and silvicultural aspects of stone pine forests in the Mediterranean basin and the management applied for cone production as one of the multiple forest functions, fully compatible with soil and watershed protection, wildlife conservation, and landscape values. The main technological innovation in the last years has been the generalized use of **tree shakers adapted to stone pines for the mechanical cone** harvesting, which makes obsolete the manual cone yield by tree climbers, a very dangerous job.

Another innovation to increment the world production of Mediterranean pine nuts are **plantations of grafted stone pines**, as specific orchards or as agroforestry systems that combine with grazing or farming. Plantations on farmland could yield in the future more pine nuts than the natural forests, contributing to rural development and employment for local communities. This “next step” in the way to domesticate this tree allows the specific use of selected genotypes for higher cone yields, obtained from decades of evaluation in grafted multi-site trials.

The greatest interest during the meeting aroused in the **round table about two major problems of the pine nut sector**. The first challenge will be a **more effective control of the cone pests**, especially two native cone-boring larvae, the pine cone weevil *Pissodes validirostris* and the pine cone moth *Dioryctria*

mendacella, as well as the Western Conifer Seed Bug *Leptoglossus occidentalis*, recently introduced from Northern America to Europe. The damages caused by these insects reduce considerably the cone yield in amount and quality, and an **effective biological and integrated control of the pests** would improve considerably the economic benefit from stone pine.

The other major problem of the pine nut as food item is the **confusion reigning over the identification of the product** among traders, consumers, and even public authorities responsible for the control of the food industry chain. Pine nuts are among the most expensive nuts of the world, with retail prices about $US 60-80 per kilogram, but at the same time, due to the limited world production, they are a very minor food product in trade volume. There are more than twenty different pine species with edible seeds around the world, though only the kernels of a few major species are traded at international markets, especially Mediterranean, Chinese and Pakistani pine nuts, whereas American pinyon pine nuts are rarely exported. Nevertheless, **pine nuts from different species, or continents, are often not clearly labeled**, or they are even mingled, confounding the consumers, in spite of very disparate tastes and dietary values. No other pine seed has a similar taste to the genuine Mediterranean pine nuts from *Pinus pinea*, nor any other is as rich in protein - 35%, a value similar to raw soybeans. Also the processing quality can differ greatly among species, countries and providers, and so do prices in origin.

Thus pine nuts from different species are, and must be recognised as being distinct products and should be differenced in the market, as an issue of **consumers' rights** and even of **food safety**. This is especially true for Chinese pine nuts, whose commercial lots have been found sometimes mixed and mingled with seeds from other pine species, some of them even non-edible because of irritating terpenoids and other compounds. The ingestion of Chinese pine nuts (especially from *P. armandii*) is in the origin of the Pine Mouth Syndrome, an unpleasant bitter, metallic taste disturbance that can appear 1-3 days after consumption and lasts for days or even for weeks, sometimes combined with food aversion and other symptoms. Beside these consumer's health aspects, the **lack of traceability and correct product labelling, identifying the botanical species and the country of origin, is a clear incompliance with current legal requirements for food labelling and traceability in Europe** (*Regulation EC 178/2002*), based on principles such as transparency, risk analysis and prevention, the protection of consumer interests and the free circulation of safe and high-quality products within the internal market and with third countries. The stone pine supply chain must fulfil these regulations.

The follow-up of the 2011 meeting will be in form of the Stone pine subnetwork within the **FAO-CIHEAM cooperative research network on nuts**, a inter-regional network participated by CIHEAM and the Regional FAO Offices FAO-REUR (Europe) and FAO-RNE (North Africa and the Middle East). This Network forms part of the European System of Cooperative Research Networks in Agriculture ESCORENA. The next plenary meeting about stone pine is foreseen in 2015 in Portugal.

The abstract proceedings and all communications presented at the AGROPINE 2011 meeting are uploaded at the meeting web page www.iamz.ciheam.org/agropine2011.

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