Argania spinosa: a rare Sapotaceae from south-western Morocco

Argania spinosa (L.) Skeels is endemic to south-western Morocco (Fig. 1). Starting in Essaouira and lengthens until Goulmime, and from the high Atlas to the Atlantic Ocean, it covers more than 800.000 ha (Fig 2). In this area, where the climatic condition are inhospitable (temperature can reach 50 °C, annual precipitation don't exceed 200 millimeters), argan plays a great socio-economic and environmental role. Indeed, 90 % of local population incomes depend on an agroforestry system based on argan tree (Benchkroun, 1990). Beside this, argan tree is an efficient tool for soil stabilization and fighting against desertification (Nouaim et al., 1991). In addition, it constitutes a good source of oil that knows a large interest on behalf researchers. In fact the stone of Argan fruit (Fig. 3) contains one to three oleaginous kernels (6.5 % of the fruit weight) with high oil content (more than 50 % of kernel weight) (Prendergast and walker, 1992; Nerd et al., 1994). This oil is characterized by a high degree of unsaturation wherein linoleic acid and oleic acid are the major constituents (Farines et al., 1984a; Nerd et al., 1994; Rezanka and Rezankova, 1999; Khallouki et al., 2003). It contains two main unusual phytosterol, schottenol and spinasterol that accounts for about 90% of the sterolic fraction (Farines et al., 1981; Farines et al., 1984b; Charrouf, 1984; Khallouki et al., 2003) (Table 1).

Figure 1: a general view of an Argan tree growing in wild.

This species is endangered and its situation becomes more and more serious. A great reduction of the area covered by argan tree is observed. Indeed Nouaim et al., (1991) observed that the argan trees density has decreased to about 30 to 10 trees per hectare whereas Dupin (1949) reported an average density of 150 to 250 trees per hectare in the Souss plain (Morocco) and 50 trees per hectare in the Anti-Atlas. The reduction of its distribution area and trees density is probably due to human pressure, overgrazing and its vulnerability to *Fusarium oxysporum*.

The above-mentioned problems as well as others relative to the plant physiology and the process of oil extraction contribute to the low annual production of the argan oil in regard with the national and international demand. Unfortunately, no researches dealing with the selection of powerful individuals were undertaken. However, many studies have

demonstrated the great morphologic and genetic variability of this species. Indeed, El Moussadik and Petit, (1996) studying Moroccan argan populations using isoenzyme markers reported that inter-population genetic variability is greater than the intra-population one. Each Argan tree bears fruits with specific form. Different fruit forms, starting from the spherical to the spindle one, were distinguished since 1953 by chevalier. Fruit morphologique variation and its stability was demonstrated on multi-annual studies in different climatic conditions by Ferradous (1995) and Bani-Aameur et al. (1999) and proposed these morphological traits as potential markers of argan tree varieties.

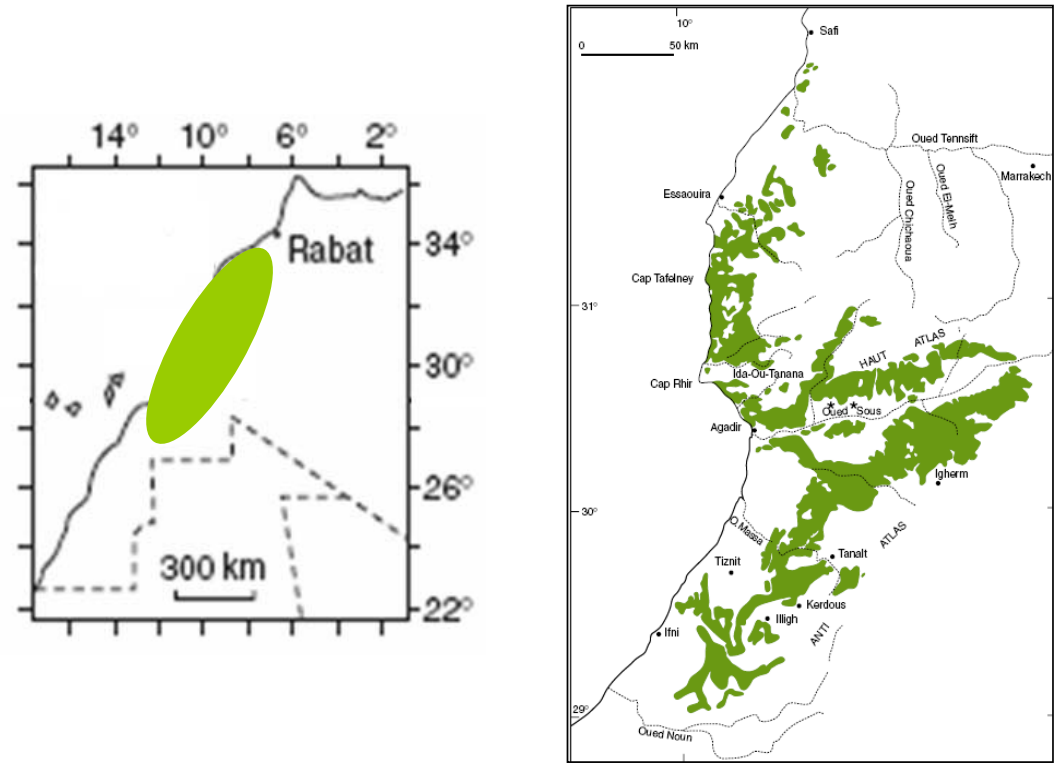

Figure 2: Distribution area of argan groove in Morocco

The high oil quality of argan constitutes an incentive for natives but that is not sufficient to protect this endangered species because the oil yield is steel low (about one litre per tree). It is necessary to study the genetic resources of argan tree in the goal to select superior individual for oil yield and quality and deepen our knowledge on cultural conditions and eco-physiological requirements of this species to improve its economic status and to bring argan oil an effective competitiveness toward orthodox oils such as olive and other oleaginous seeds.

Figure 3: Dry mature fruits, stones and kernel of argan tree

Componenets	Content
Main Fatty acids (%)	
Palmitic	13,5
Stearic	5.6
Oleic	45.2
Linoleic	31.6
Linolenic	0.1
Arachidic	0.4
Tocopherols (mg/Kg oil)	
γ-tocopherols	480
α-tocopherols	35
δ-tocopherol	122
Main Sterols (mg/100g oil)	
Schottenol	142
Spinastreol	115
Phenolics (µg/kg oil)	
Vanillic acid	67
Syringic acid	37
Ferulic acid	3147
Tyrosol	12

Table 1: Chemical composition of argan oil
(charrouf and guillaume 1999, Khalouki et al., 2003).

Contact

Dr. Majourhat Khalid, Departement of Plant Breeding, CEBAS-CSIC, Apartado de correos 164, 30100, Espinardo, Murcia, España, majourhat@yahoo.fr