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Pomological characterization of carob tree (*Ceratonia siliqua* L.) from the province of Chefchaouen (NW of Morocco)

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Abstract

A pomological survey of two types of carob tree from the Province of Chefchaouen, NW of Morocco (productive "dkar" and "lanta") shows that pods of productive "dkar" type (spontaneous type) present the high yield in seeds (20.5±7.74%) and are more straight than pods of "lanta" type (grafted type) and pod curvature is inversely proportional to tree age. Trees of productive "dkar" type promote endosperm (carob bean gum) content of seeds (47.6±4.53%). The tegument and the embryo-cotyledons complex (carob germ) constitute respectively 22.7% and 19.9% of seed dry weight (dw). According to the provenance, these components would attain in aged grafted-type 23.0% and 21.0% in the same order. Other morphometric parameters of pods and seeds are commented in these carob tree types and especially compared to the Mediterranean cultivars or varieties.

Key words: *Ceratonia siliqua* L., pod, seed, Province of Chefchaouen.

Introduction

The carob tree (*Ceratonia siliqua* L.) is an evergreen tree or shrub up to 15-20 m of height, with leaves of 10 to 20 cm of length and 4 to 10 leaflets (Emberger 1938, Foury 1954, Metro & Sauvage 1955, Quezel & Santa 1962/63). It is generally dioecious or monoecious, rarely hermaphrodite (Bonzom *et al.* 1878, Metro & Sauvage 1955, Batlle & Tous 1997). In mature stage, carob pod has an elongated shape up to 10-20 cm, straight or curved, with 1-4 cm of width and constituted by epicarp (tough), mesocarp (fleshy and sugary pulp) and seeds. The mesocarp is separated by 7 mm-cells, which correspond to 4-16 seeds per pod and c. 5000 seeds per kg of pods (Foury 1954, Bolanos 1955, Metro & Sauvage 1955, INRA 1965, Piotto & Piccini 1996, Cantalejo 1997). Carob seeds have 8-10 mm of length, 7-8 mm of width and 3-5 mm of thickness (Batlle & Tous 1997).

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The carob species represent the *Ceratonia* genera of *Caesalpinoideae, Leguminosae, Angiospermae, Spermatophyta* (Tutin *et al.* 1990/93). It is occurs in habitats of low zone of the Mediterranean vegetation with other species such *Pistacia lentiscus, Olea europaea* var. *sylvestris, Tetraclinis articulata, Juniperus phoenicea, Pinus halepensis* and *Quercus ilex*, forming an association of *Oleo-Ceratonion*, *Pistacio-Rhamnetalia* (Ouchkif 1988, Aafi 1996, Zouhair 1996). The carob culture is exercised in the Mediterranean countries, the Western Asia, Australia, South Africa and USA (Evreinoff 1960).

In Morocco, It is spontaneous or cultivated in the thermo-Mediterranean and the meso-Mediterranean stages, corresponding to the semi-arid and sub-humid bio-climates with minima not inferior than 3°C and altitudes up to 500 m outstandingly 900-1600 m (Foury 1954, Magini & Tulstrup 1955, INRA 1965, Rejeb *et al.* 1991, Zouhair 1996).