

The Pomological Variation Patterns of Chestnut (*Castanea sativa* Miller) in Kazdagi (Mt. Ida) Area of Turkey

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Abstract--- In order to identify Gene Management Zones (GMZs) for chestnut (*Castanea sativa* Miller) in the frame of *in-situ* conservation project conducted in Kazdagi, five chestnut sites were chosen as possible candidate ones. Pomological characteristics of chestnut fruits collected from labelled trees were observed. Pomological characteristics such as average fruit weight, fruit skin colour, kernel colour, fruit taste for chestnut were recorded. It was found that there were significant differences between and within sites.

Keywords--- Chesnut, *Castanea sativa*, pomological characteristics, *in-situ* conservation.

I. INTRODUCTION

CONSISTING of more than 9000 plant species, 30 % of them being endemics, the flora of Turkey is very rich in diversity. A wide range of different geological and climatic conditions and the location of the country has greatly contributed to the richness of this biodiversity. Turkey is located within the borders of several floristics regions namely: Euro-Siberian, Mediterranean, and Irano-Turanian [1].

A broad spectrum of germplasm is required for crop improvement in breeding programs. This genetic variation in plant populations may be considerable especially in centers of diversity, or gene centers, of particular plants [2]. Eight centers of variation, previously termed "**centers of origin**" were originally proposed by Vavilov [3]. Two of these ("**Near East**" and "**the Mediterranean**") extend within borders of Turkey where five areas were designed as "**gene microcenters**" by Harlan [4].

Sour and sweet cherries, plum, grape, apple, pear, mulberry, walnut, and filbert have parental or related species indigenous to Turkey. Several of these wild species of *Pyrus*, *Malus*, *Prunus* and *Vitis* were progenitors of present day cultivars. Some other species such as almond and apricot have been cultivated for many centuries. As valuable germplasm resources, they merit collection for two reasons, the broad genetic spectrum they represent and their wide diversity of tolerance to different ecological and climatic conditions [5].

For *ex-situ* conservation of fruit trees, genetic resources were kept in agricultural research institutes and stations, agricultural schools, state farms and agricultural faculties, totally 57 locations until 1985. An inventory of these collections was published [6] and later revised [7]. Unfortunately, most of the institutions had the tendency to keep the commercial varieties instead of fruit tree germplasm in their collections. After the evaluation programme, those institution have eliminated uneconomical but valuable genetic resources materials. So, most of them were lost in the course of time. Additionally, some modern cultivars were introduced and replaced with old cultivars. This situation caused extinction of many locally developed and climatically well adapted old cultivars.

As a result of selection studies were carried out on chestnut populations of Marmara Region in Turkey between 1975-1976, eight types were found as different and superior from each other to take into consideration of fruit characteristics [8].

23 different chestnut types were selected from Aegean Region materials according to do pomological evaluation between 1990-1992 [9].

In recent years, the maintenance of fruit tree germplasm materials have been centralized in some research institutes such as Aegean Agricultural Research Institute for plum, Atatürk Horticultural Research Institute for chestnut, and *etc.*

In-situ conservation of plant genetic resources project, as a complementary study to *ex-situ* conservation was aimed to conserve those plant genetic resources in their natural habitats, and Kazdagi, Ceylanpinar State Farm and Anatolian Diagonal were selected as pilot study areas.

Chestnut (*Castanea sativa* Miller) species were chosen as target species for Kazdagi area. The objective of this study was to determine the pomological variation patterns of those species in their habitats.

II. MATERIALS AND METHODS

At the beginning of the study, 16 chestnut sites were chosen as preliminary candidate sites after initial surveys. Then, with the following surveys, five chestnut (Mihlidere, Ayigedigi, Gicikdere, Sariot, Sivrikatran) sites were determined as possible candidate ones. The total 251 chestnut sample trees were pointed out at least 100 m. away from each other.

25 fruit samples were taken from each tree at the harvesting period. Pomological characteristics were recorded as follows:

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fruit weight (g), fruit skin colour, kernel colour and kernel taste for chestnut.

III. RESULTS AND DISCUSSION

The range of fruit weight was between 0.8 (min.) and 11.0 g. (max.) different at sites (Table I). The highest average fruit weight was obtained from Gıcikdere with 7.2 g.. The biggest variation was recorded at Sivrikatran site with a value of 221.2.

TABLE I
RANGE OF FRUIT WEIGHT AT CHESTNUT SITES

Site	Min.	Max.	Mean	Variation	St. error
Mihldere	2.0	10.7	5.3	182.2	1.8
Ayıgediği	0.8	7.7	5.5	101.2	1.6
Gıcikdere	4.2	11.0	7.2	95.7	1.8
Sariot	2.0	10.4	6.1	114.1	1.5
Sivrikatran	1.0	8.7	5.2	221.2	2.1

The frequency distribution of skin colour by sites is presented in Table II. Three different tones of brown were observed at chestnut fruits as skin colour. Brown skin colour samples were more common than light brown and dark brown skin colour ones.

TABLE II
FREQUENCY DISTRIBUTION OF SKIN COLOUR BY SITES (%)

Colour	1*	2	3	4	5
Light brown	27	23	17	14	6
Brown	48	56	47	76	88
Dark brown	25	21	36	10	6
TOTAL	100	100	100	100	100

*: Sampling sites

White and cream kernel colour were observed at fruit samples (Table III). White kernel colour samples were much more than cream kernel ones. White kernel colour is preferable for chestnut.

TABLE III
FREQUENCY DISTRIBUTION OF KERNEL COLOUR BY SITES (%)

Colour	1	2	3	4	5
White	74	67	77	74	80
Cream	26	33	23	26	20
TOTAL	100	100	100	100	100

*: Sampling sites

Almost all fruit samples examined were found sweet to be eaten.

The observation of pomological characteristics of chestnut populations is one of the ways to determine existing variability among them.

From the findings of pomological characteristics it can be concluded that there were significant differences were observed in chestnut trees for fruit colours and fruit weight within and between sites.

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