

CHARACTERISTICS OF WINTER BUDS AND BEARING WOOD IN HAZELNUT

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Abstract

Vegetative and mixed female buds as well as catkins were present on 1-year-old hazel growths at rest period. According to the presence of buds and catkins on 1-year-old growths, the following categories of the bearing wood were distinguished in hazelnut: female bearing twigs, mixed bearing twigs and male twigs. The structure of these growths appearing on the hazel tree seemed to be the characteristic of a cultivar, nevertheless such a structure could considerably be affected by ecological factors and applied agricultural practices.

Keywords: vegetative bud, mixed female bud, catkin, bearing wood

1. Introduction

Bearing in mind the specific nature of organogenesis cycle in hazelnut, it seems very important to be aware of the biological characteristics of its growth and development, as well as of the ecological factors affecting them. The hazelnut buds have been detailed by many authors (Chandler, 1960, Šćepoček et al., 1969, Voroncov et Štejman, 1982), whereas a little has been done on the morphogenesis of diverse categories of the bearing wood (Mussano et al., 1983., Mičić et al., 1987), and on their structure and presence on the tree, as a foundation of the pomotechnics.

Morphological characteristics and structure of the winter buds are presented in this study together with classification of the hazelnut bearing wood made according to the presence of these buds and of the catkins on 1-year-old growths.

2. Material and methods

Investigations were conducted in 1989 - 1990 on the following hazelnut cultivars: Avellino, Istarski Dugi and Gustav Celjski, in the planting of Slatina near Sarajevo. The trees of cultivars studied were planted in three replications of 6 trees each. Anatomical and morphological characteristics of the buds were found by means of opening buds under the stereoscopic microscope, and by separating the differentiated organs, each consisting of 5 mixed bearing twigs from the tree (the total of 90 twigs per year). On the same growths the following characteristics were determined: length, total number of

winter buds (vegetative and mixed female ones), number of shoots - catkin carriers and total number of formed catkins.

3. Results

One-year-old hazelnut shoots develop either from vegetative bud (vegetative shoots), or from female mixed bud (fruiting shoots). On the nodes of such shoots winter or summer buds were formed during the growing season. Winter buds appeared either as vegetative or female mixed buds, while the shoots with staminate catkins only, or with catkins and winter buds are developed from summer buds.

No differences in outer appearance were seen between vegetative and female mixed buds during dormant stage. However, there were some differences observed during flowering. On the segmented axis of the vegetative bud the differentiated primordia of the leaves were quite visible, with two stipules each, overlapping them entirely (Fig. 1). Meristematic dome with 3-4 scale leaves was differentiated in the leaf primordium axil.

Leaf primordia were differentiated on the bottom of female mixed bud axis with two stipules each, and meristematic dome with scale leaves in the leaf axil, too (Fig.2). Bractea with primordia of the two female flowers in the axil of each bract were differentiated on the top of female mixed bud axis. Moreover, two stigmatic styles as well as a thin layer of non-differentiated ovary meristem could be seen on female flower primordium.

Meristematic domes in the axils of leaf primordia resumed to differentiate over the growing season and, depending on the conditions, they formed either summer or winter buds (vegetative or female mixed buds). Relatively short shoot with staminate catkins on top, and with or without winter buds on the bottom was developed from summer bud. Depending on this, diverse categories of bearing wood are formed. According to the presence and percentage of buds and catkins 1-year-old bearing twigs may be divided as follows (Fig. 3):

- male twigs (1-year-old growths developed from winter buds having only catkins, or catkins and vegetative buds),
- female bearing twigs (1-year-old growths developed from winter buds having only female mixed buds or vegetative and female mixed buds),
- mixed bearing twigs (1-year-old growths developed from winter buds having catkins and female mixed buds, with or without vegetative buds).

The results obtained while analysing mixed bearing twigs in hazelnut over the two-year period, are given in Table 1, and the following conclusions may be inferred:

- In cv. Istarski Dugi no catkins were formed in 1990, and thereby there were no male and mixed bearing twigs, i.e. only female bearing twigs were developed;
- No significant differences in length of the twigs were observed between cvs Avellino and Gustav Celjski, whereas Istarski Dugi had significantly shorter mixed bearing twigs in 1989;
- Significant differences in the relation of cultivars and the years of study were expressed via number of developed summer buds, i.e. shoots - catkin carriers, as well as via total number of the catkins formed on the growths. In Avellino and Gustav Celjski, the number of shoots - catkin carriers was considerably higher in 1989, as well as total number of catkins on mixed bearing twig, higher by 20% in cv. Avellino, and by 35% in Gustav Celjski when compared to the results in 1990.

