

## POSITION OF VEGETATIVE SHOOT APEX ON NODES AS A FACTOR OF DIFFERENTIATION OF GENERATIVE BUDS IN APRICOT

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### Abstract

During dormancy the buds are arranged on apricot bearing branches singly or in groups - collaterally on the node. The investigation of differentiation and distribution of vegetative and generative buds on bearing branches of apricot proves that the bud character is correlated with its position along the fruiting branch and on the node. Thus individual buds can be generative (at the basal portion) and vegetative (at the terminal portion) of the branch, and the length of zones is cultivar-specific and is affected by cultural practices. With the collateral arrangement on the node (2 or 3 buds), all buds can be generative, or there can be one vegetative bud and the rest (1 or 2) are generative.

### 1. Introduction

Main assumption for successful application of biological control of fruit trees growth and with it for the application of all cultural measurements, is the knowledge of the cycle of growth and development of all growing points on determined categories of growth (Prica, 1986). The knowledge of regularities in the determination and differentiation of meristematic domes on the apricot shoots enables the utilization of the high biological potential in defining cultural practices, especially in pruning (Mičić and Đurić, 1995). In the course of differentiation of buds on bearing branches in a certain number of growing points the interruption of differentiation occurs and 'empty' buds are formed (Mičić *et al.*, 1992), which can cause mistake in analysis of damage caused by spring frost.

### 2. Materials and methods

Course of meristematic domes differentiation of all buds on mixed bearing branches of apricot cvs. Hungarian Best and Precoce di Thyrintos in the seasons from 1988 to 1992 from orchard Dubljani near Trebinje was investigated. In every term observation (15 terms in total) 20 mixed bearing branches were taken. The analyses of winter buds and their further differentiation i.e. formation and the bud differentiation of nodes along shoots, respectively were carried out by opening the buds under stereoscopic microscope and preparing histological sections. All samples were fixed according to Nawaschin. After dehydration they were embedded in paraffin, sectioned at 8-12  $\mu\text{m}$  and stained with Delafield's hematoxylin (Sass, 1958).

### 3. Results

In the vegetative buds during dormancy only one meristematic dome has differentiated, with a few scale leaves. Its differentiation in the spring gives rise to a shoot with leaves in the nodes of which the meristem, which represents the primary meristematic dome of the node, was retained during the primordia stage. This vegetative dome is protected with two scale leaves and when they cover it completely, the primary meristematic dome is divided into three domes, each of them differentiating their own scale leaves. These three

meristematic domes represent the base of collateral buds of the node. Central meristematic dome of the node, depending on the cultivar and its position along the shoot, can retain its vegetative character and form a winter vegetative bud, or can change in the direction of generative differentiation and form a flower bud. Lateral meristematic domes of the node never give rise to winter vegetative buds. They either atrophy in the early developmental stages or are directed into generative differentiation. As a consequence of the mentioned regularity in forming buds on nodes and along shoots, the bearing branches can have the following distribution of buds:

- Central node buds, disregarding if only they are formed or there are also lateral buds on nodes, at the basal part of bearing branches are generative and at the terminal portion are vegetative buds. The length of shoot with central generative bud and vegetative bud is the characteristic of cultivar, but it depends also on the cultural practices.
- Lateral buds on nodes are exclusively generative, disregarding their number or position on bearing growth.

Central meristematic domes on nodes at basal portion bearing growth and all lateral meristematic domes on nodes are predetermined on generative program of differentiation. Because of this all disturbances in their differentiation have as consequence forming of 'empty' buds. In fact, if of any reason meristem of these buds stops being active and atrophy or abortion occur, the activity has been retained only by the meristematic zone differentiating scale leaves. These buds differ only in size (being slightly smaller) from those in which differentiation was continued, and which entered dormancy in stage V of organogenesis. The buds with the interrupted differentiation or empty buds remain on the bearing branches up to flowering next spring, when they drop. The fact that on shoot there are meristematic domes which are directed exclusively to the process of generative differentiation, represents good model for investigation of the effect of various factors on the determination of meristematic domes.

## References

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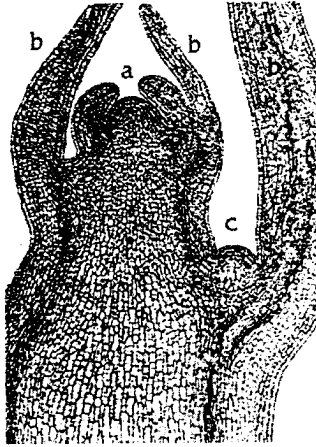


Figure 1. During its development in the spring meristematic dome of a winter vegetative bud (a) differentiates leaf primordia (b) in whose axil meristem, which represents the primary meristematic dome of the node, retains (c).

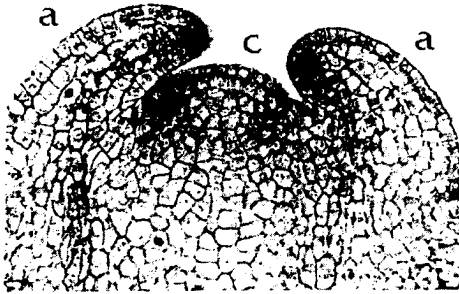


Figure 2. Immediately after its forming, primary meristematic dome (c) differentiates the first pair of scale leaves (a) - the primary scale leaves.

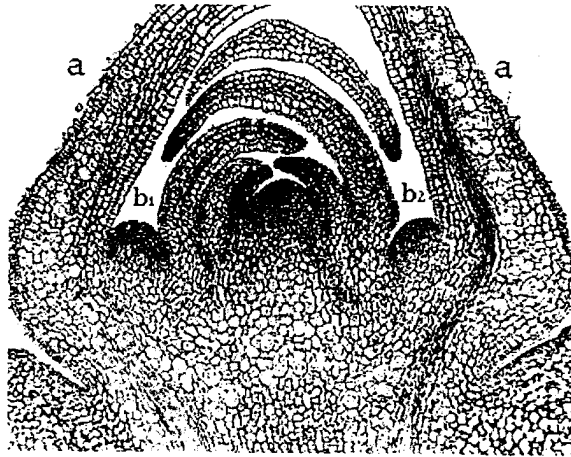


Figure 3. Differentiation of primary scale leaves (a) leads to primary meristematic dome division and to forming of three meristematic domes which represent the base of collateral buds of the node. Regardless of its position along a shoot in a leaf axil on all nodes three meristematic domes are formed. Differentiation of both central (c) and lateral domes (b1 and b2) is continued by forming of individual scale leaves.

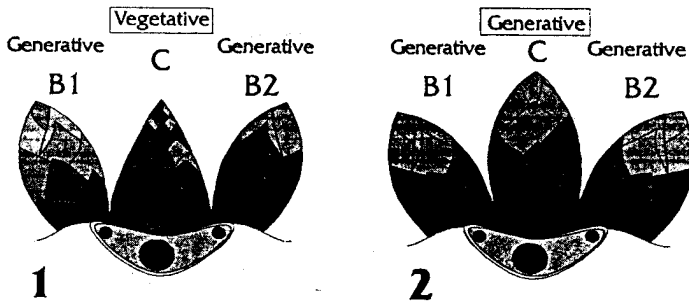


Figure 4. The type of a bud in which both central (c) and lateral meristematic domes (b1 and b2) will differentiate is determined by their positions on the node and along the shoot. Namely, during the normal development lateral meristematic domes can differentiate only generative buds or atrophy or abortion may occur, that is to say, they never retain vegetative character. Central meristematic domes along a shoot terminal portion retain vegetative character, whereas they formed generative buds at a shoot base. This line in central meristematic domes differentiation along a shoot is clearly distinguished.