

## DEGREE OF DIFFERENTIATION OF GENERATIVE BUDS AS A FACTOR OF BEARING IN APRICOT

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### Abstract

The analysis was carried out on the following issues: share and distribution of buds, degree of bud differentiation in rest period (histological analyses of organs and tissues), and realization of bearing potential at different growth waves in 3 apricot cultivars in the conditions of Čačak.

### 1. Introduction

The degree of generative buds differentiation coming into rest period is different, and influenced by climatic factors, cultural practices etc., besides all characteristics of each cultivar (Jackson and Sweet, 1972). The differences in differentiation degree of generative buds are especially observed depending on various growth waves (Costes *et al.*, 1995). The greatest differentiation degree of generative buds was noted on the first growth wave. These buds show better resistance to low temperatures in the period of physiological and ecological rest (Elmanov *et al.*, 1965; Isaeva, 1974). Generative buds with higher differentiation degree also show better bearing potential (Mičić *et al.*, 1992). However, in certain years, considerably better bearing potential was realized from the buds on the second growth wave, depending on climatic conditions in the beginning of growing season and during flowering. Therefore, in order to define specific cultural measurements of each cultivar, it is very important to determine limit values of differentiation degree of generative buds on some growth waves which, in certain ecological conditions, may represent the basis for cropping.

### 2. Material and methods

The analysis of share of vegetative, generative and 'empty' buds was done on 30 long bearing branches with more growth waves in 3 apricot cultivars: Cehin, Melitopol'skaya Ranyaya and Frühe Kittze in 1994-1995. The buds were opened under stereoscopic microscope and 50 generative buds at the onset of the season and 50 flowers at anthesis from each growth wave were fixed according to Nawaschin for histological analyses and then were embedded in paraffin. Histological section were sectioned at 8-12  $\mu$ m and stained with Delafield's hematoxylin. During season, share of fruits were analysed on all growth waves.

### 3. Results

The differences in differentiation degree of generative buds and in degree of flower development on different growth waves are in direct relationship with their productivity, depending on ecological and production conditions (Tab. 1). Better bearing, i.e. better realization of bearing potential was determined on the second growth wave (Tab. 2). It was obvious that the flowers with lower degree of differentiation at anthesis had more favourable conditions for fructification than the flowers from the first growth wave.

On the basis of histological analyses of generative buds at the beginning of the growing season and of flowers at anthesis it may be concluded that generative buds and flowers on

the first growth wave have the greatest degree of development (development of ovary, constitution and development degree of embryo sacs). The degree of differentiation of generative buds and flowers from the second and third growth waves is lower (less developed embryo sacs, i.e. delayed fructification capability). By increasing the number of growth waves, differentiation degree of flower buds decreases, all of which causing a delay in flower development when compared to the flowers from the first growth wave. Therefore it may be concluded that different degree of differentiation of generative organs, most of all in embryo sacs, from different growth waves, at the same time determines ecological valence of realization of bearing potential in given ecological and production conditions.

Determination of differentiation degree of organ primordia in generative buds which in certain ecological conditions represents the optimum necessary for realization of bearing potential, also makes the basis for defining cultural practises in apricot growing.

### References

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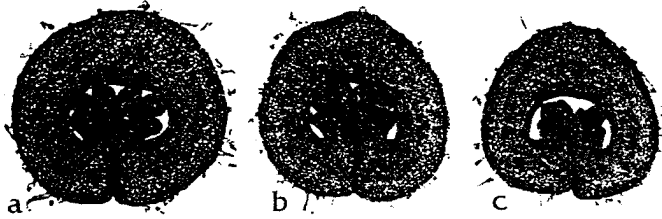


Figure 1. Histological ovary sections of apricot cv. Cehin taken in the initial phase of generative buds opening on the first growth wave: a) ovary from the first growth wave; b) ovary from the second growth wave; c) ovary from the third growth wave.

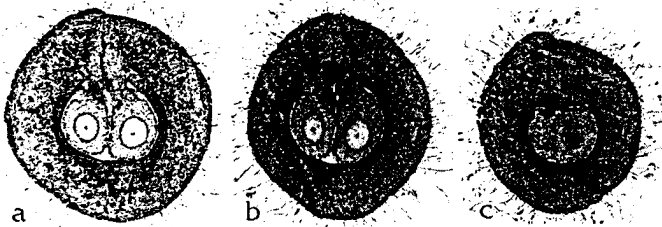


Figure 2. Histological ovary sections of cv. Cehin in full blooming phenophase on the first growth wave: a) a flower from the first growth wave; b) a flower from the second growth wave; c) a flower from the third growth wave.

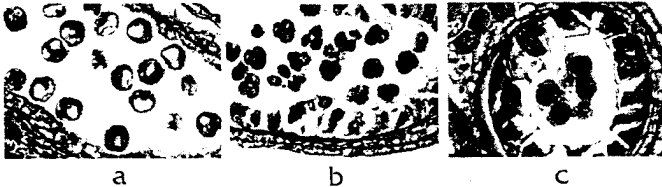


Figure 3. Histological sections of an anther in cv. Cehin in full blooming phenophase on the first growth wave: a) a flower from the first growth wave; b) a flower from the second growth wave; c) a flower from the third growth wave.

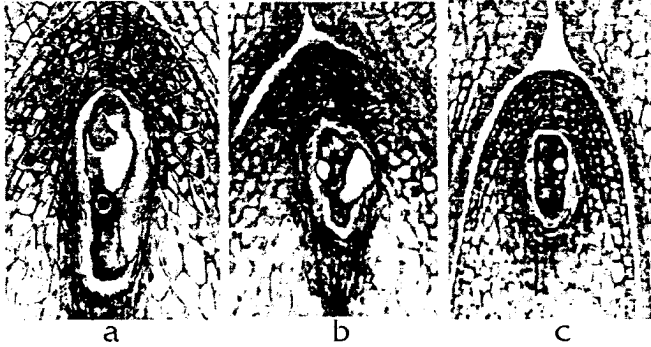


Figure 4. Histological sections of ovule in cv. Cehin in the area of embryo sac in full blooming phenophase on the first growth wave: a ) a flower from the first growth wave; b ) a flower from the second growth wave; c ) a flower from the third growth wave.

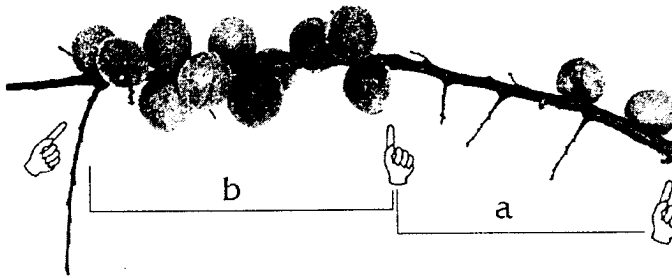


Figure 5. Bearing branch of cv. Cehin with ripe fruits on the first and the second growth wave.

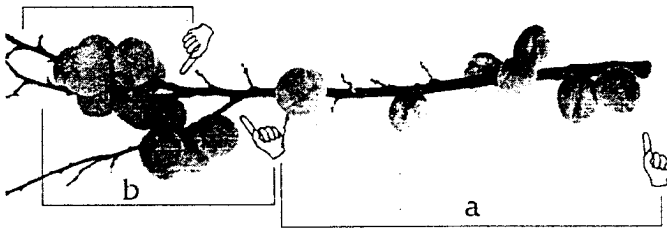


Figure 6. Bearing branch of cv. Frühe Kittze with ripe fruits on the first and the second growth wave.

Table 1. The share of vegetative (v), generative (g) and abortive (a) buds on the apricot mixed bearing branches

| Growth waves            | Average bud number | v    | % g a |      |
|-------------------------|--------------------|------|-------|------|
|                         | $\bar{x} \pm Sx$   |      |       |      |
| Melitopol'skaya Ranyaya |                    |      |       |      |
| I                       | 32.07 ± 2.53       | 0.50 | 0.23  | 0.25 |
| II                      | 46.65 ± 4.05       | 0.47 | 0.38  | 0.15 |
| III                     | 47.25 ± 8.30       | 0.38 | 0.46  | 0.15 |
| Cehin                   |                    |      |       |      |
| I                       | 40.50 ± 3.2        | 0.48 | 0.31  | 0.23 |
| II                      | 44.05 ± 4.95       | 0.46 | 0.20  | 0.34 |
| III                     | 38.49 ± 6.55       | 0.45 | 0.32  | 0.23 |
| Frühe Kittze            |                    |      |       |      |
| I                       | 37.30 ± 3.52       | 0.50 | 0.44  | 0.06 |
| II                      | 37.12 ± 5.69       | 0.46 | 0.49  | 0.05 |

Table 2. The average number of fruits on the different growth waves

| Cultivars               | Growth waves          |                        |                         |
|-------------------------|-----------------------|------------------------|-------------------------|
|                         | I<br>$\bar{x} \pm Sx$ | II<br>$\bar{x} \pm Sx$ | III<br>$\bar{x} \pm Sx$ |
| Melitopol'skaya Ranyaya | 1.58 ± 0.11           | 6.58 ± 0.44            | 0.37 ± 0.02             |
| Cehin                   | 3.26 ± 0.21           | 5.23 ± 0.35            | 1.05 ± 0.07             |
| Frühe Kittze            | 2.85 ± 0.19           | 5.47 ± 0.36            | ‡                       |