

## EVALUAREA AGROBIOLOGICĂ A SOIULUI DE AFIN DELICIA COMPARATIV CU SOIUL MARTOR BLUERAY

### AGROBIOLOGICAL ASSESSMENT OF THE Highbush BLUEBERRY DELICIA VAR. COMPARED WITH CONTROL BLUERAY VAR.

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#### Abstract

During 2005-2009 at Research Institute for Fruit Growing Pitesti Maracineni an agrobiological study of the highbush blueberry Delicia variety versus Blueray control variety was conducted. For the establishment of the experimental plots three planting substrates in the holes were applied: 5 kg manure+5kg peat, coniferous litter 10 kg, 5 kg manure+5kg peat +40 g sulphur. Over five years Delicia variety showed higher significant differences versus Blueray variety, concerning in: the number of annual shoots on the bush ( with 48.1%), number of flower buds on the bush (with 59.3% ) and average weight of fruit (with 24.6%). The yield of Delicia var. was similar with Blueray var.

**Keywords:** blueberry, planting substrate, variety

**Cuvinte cheie:** afin, substrat de plantare, soi

#### 1. Introduction

Highbush blueberry (*Vaccinium corymbosum* L.) is one of the most recent domesticated fruit species. He is coming from North America forest vegetation, is a wild plant and becomes a useful farm plant (Jozef Grajkowski et al. 2007). Blueberry fruit have started to become increasingly attractive to consumers because of their content in substances who improve human health. The first breeder of this species was dr. Frederic V. Coville (USA), his work focused on selecting wild grown species of the blueberry and improving such characteristics like fruit size and yield (Pliszka K. 2002). In our country, work to improve this species was initiated by dr. Paulina Mladin at Research Institute for Fruit Growing Pitesti-Romania (Mladin P.1999, Mladin P. 2001) After thirty years of hard improving work she has successful to obtain nine valuable varieties of highbush blueberry. One of the nine valuable varieties is Delicia. In this paper we follow the evolution of the agrobiological characters of the Delicia variety on three planting substrates, compared with the Blueray variety.

#### 2. Material and methods

The experiment was located in an experimental plantation established in 2004, in the Small Fruit Laboratory of the Research Institute for Fruit Growing Pitesti-Romania. The plants were spaced 1m apart in the row and 2.8 m between rows, according to the following experimental scheme: A Factor- cultivar, with two graduations: a<sub>1</sub>-Delicia, a<sub>2</sub>-Blueray; B Factor - the substrate applied at planting, with 3 graduations: b<sub>1</sub>-5 kg peat+5kg manure; b<sub>2</sub>= 10 kg coniferous litter; b<sub>3</sub>= 5kg peat+5 kg manure+40 g sulphur powder; C Factor- the study year, with 5 graduations c<sub>1</sub>-2005; c<sub>2</sub>-2006; c<sub>3</sub>-2007; c<sub>4</sub>-2008; c<sub>5</sub>-2009. The study trial was arranged as subdivided plots in three replications (2 plants per replication). In the 2<sup>nd</sup> spring after planting (2006), 100 kg N ai/ha as ammonium nitrate was applied on a 0.5m wide strip along the plants row. In 2008 and 2009 the experimental field was drip irrigated for maintaining on optimum water content in the soil. For quantifying the effects of planting substrate on the plant growth the following growth indicators were determined: the height of bush (cm), the diameter of bush(cm); the number of shoots per bush, the average length of annual shoots (cm) and the total length of annual shoots (TSL) (m). In the first three years, the length of annual shoots was measured for all shoots per bush and in the last two years (2008 and 2009) it was measured only for 30 shoots per bush. The following fruiting characteristics per bush were determined (2006-2009): the number of flower buds, the number of fruit, the average fruit mass (g) by weighing 100 berries in each plot replication of berry yield. The berry yield was determined in the last two years. For quantifying the effects of planting substrate on the fruit quality characteristics (2007-2009), some biometric fruit quality indicators (size index, calyx cavity, firmness) and basical chemical compounds of fruit including soluble solids, total sugar, titrable acidity, pH and phosphorus were determined. Biometric indicators were determined by measuring each fruit with a calliper. The index size was calculated by formula: (height +large diameter +small diameter)/3 (Botu and Botu, 1997). The fruit firmness was determined with a SHIMPO DFS apparatus on 25 randomly selected berries from each replication. Soluble solids content was determined in berry juice obtained from 10 fruits from every replication, by means of digital refractometer (PR Series). The total sugar content

was determined by Fehling –Soxhlet titrimetric method, organic acid content was determined by titration. Phosphorus contents were determined by flamephotometer-type Flapho 4). The data were statistically calculated by the standard deviation method at percentage 0.05 and was applied when significant differences resulted.

### 3. Results and discussions

#### 1. Influence of planting fertilization on some agrobiological characteristics of two studied highbush blueberry cultivars

On the average for the three planting substrates and on the experimental years, the two studied cultivars showed significant differences between them with different intensities for each of the analysed growth character. Such, Delicia variety recorded significantly lower differences by 24% in the height and the diameter of the bush, versus Blueray variety. On the average for the three planting substrates and the experimental years, the Delicia variety showed significantly higher differences by 48.1% in the number of annual shoots per bush and by 59.3% in the number of flower buds/bush (fig. 1).

On average for two cultivars, the b1 and b3 treatments registered significant higher values at all studied growth characteristics, versus b2 one. The treatment b3, versus b1, showed higher values by 8.7% in the total length of annual shoots and number of shoots per bush (fig. 1 and 2).

On average, for three planting substrates and three research years (2007-2009), the Delicia variety versus Blueray variety, registered a significant increase by 10.6% of size index, by 24.6% of the average mass of a berry, by 10.8% of soluble solids (%Brix), by 14.7% of titrable acidity, by 10.2% phosphorus, and by 10% of total sugar content. On average for the two studied cultivars and three research years, the b1 and b3 treatments, versus b2 one, except pH values and firmness, registered significant higher contents of all studied fruit quality characteristics. Under in the same conditions, the application of the b3 treatments determined a significant increase by 10.6% of size index, by 10.4% of total sugar content, by 10.1% the phosphorus content and average mass of a berry, versus b1 treatment. In exchange, the application of b1 treatment determined increase by 4% of the calyx cavity and by 5% of the firmness, versus the b3 treatment (fig.2).

#### 2. The influence of three planting substrates on some growth and fruiting characteristics of two blueberry cvs

On average, for experimental years, the two studied cultivars showed significant differences between them within each of the three fertilization treatments in seven growths and fruiting characters out of eight analysed. In the b1 fertilization treatment the two studied cultivars did not vary between them as to average length of the shoot (fig. 3) and berry yield. Substrate b1, versus b3, at the Delicia variety caused a piffling increase in the number of flowering buds and number of fruit per bush. In the same conditions at Blueray variety the b1 substrate, versus b3, released increase at height of bush and number of fruit per bush (fig.3).

Analyzing the influence of substrate b1, on the two varieties studied, we find that the Delicia variety, versus Blueray variety, recorded the highest values in seven out the nine quality fruit characteristics analysed. In the same conditions on the substrate b3, Delicia variety, versus Blueray variety registered the highest value in: size index, soluble solids, total sugar, average mass of a berry, titrable acidity and firmness (fig.4).

On the b2 substrate, the both varieties studied, had lower significant differences of all agrobiological characteristics analyzed, versus b1 and b3 substrate.

### 3. Conclusions

Delicia variety recorded significantly lower differences by 24% in the height and the diameter of the bush, versus Blueray variety.

Delicia variety showed significantly higher differences by 48.1% the number of annual shoots per bush and by 59.3% in the number of flower buds/bush, versus Blueray variety.

Delicia variety, versus Blueray variety registered the highest value in: average mass of a berry, size index, soluble solids, total sugar and titrable acidity.

On the b2 substrate, the both varieties studied, had lower significant differences for all agrobiological characteristics analyzed, versus b1 and b3 substrate.

### 4. REFERENCES

1. Jozef Gajkowski, Ieneusz Ohman, Zigniew Mlinski., 2007. Firmness and antioxidant capacity of highbush blueberry (*Vaccinium corymbosum* L) grown on three types of organic bed, Ed Agricultural University Slowackiego, vol 66, 155-159.

2. Piszka K, 2002. Highbush, or American, blueberry. Electronic Journal of Polish Agricultural Universities

3. Mladin P., Mladin Gh., Rădulescu M., 1999 – Realizări și perspective în ameliorarea genetică a afinului cu tufa înaltă (*Vaccinium corymbosum*) în România. Sesiunea Omagială – 130 ani a USAMV Cluj-Napoca, pg. 114-115.

4. Mladin Paulina, Mladin Gh., Rădulescu Maria, Stoiculescu Elena, 2001. Evaluarea agrobiologică a unor soiuri de afin (*Vaccinium corymbosum* L.) recent create la I.C.P.P. Lucrări științifice I.C.P.P., vol. XX, pg. 276-281

Tables and figures

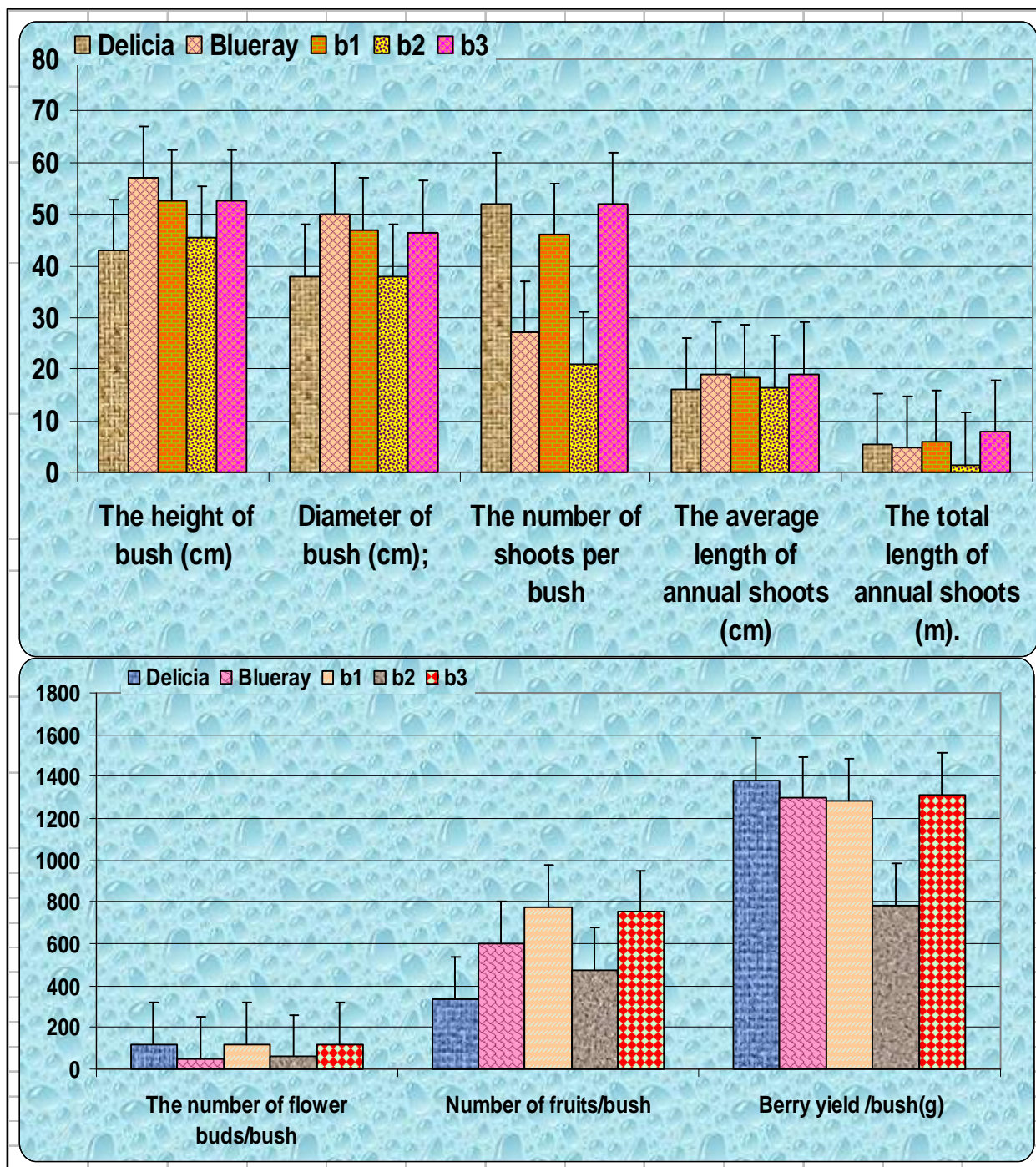


Fig.1. Influence of planting fertilization on some growth and fruiting characteristics of two studied highbush blueberry cultivars (average values of experimental factors A, B)

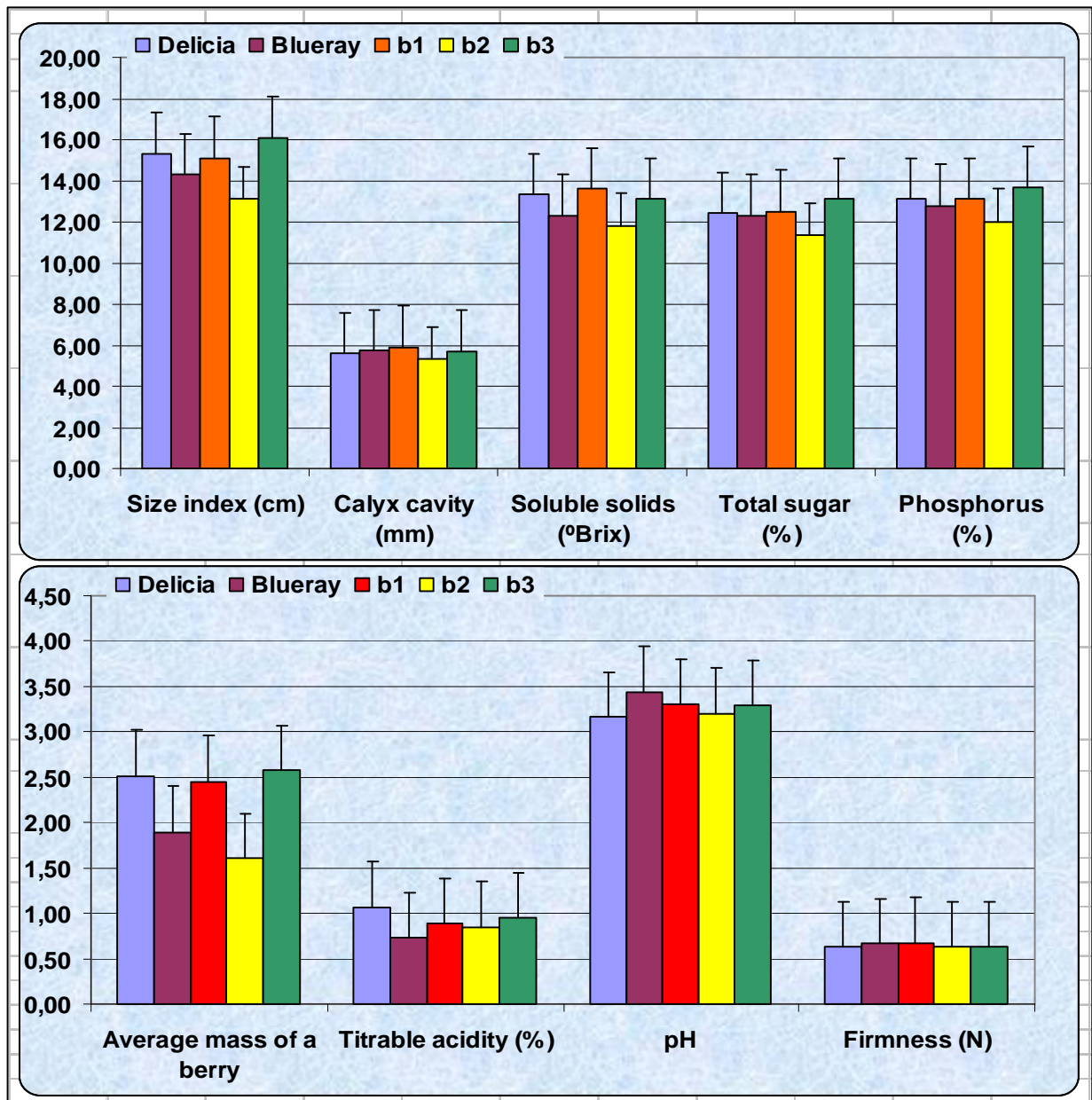


Fig.2. Influence of planting fertilization on some quality characteristics of two studied highbush blueberry variety (average values of experimental factors A,B)

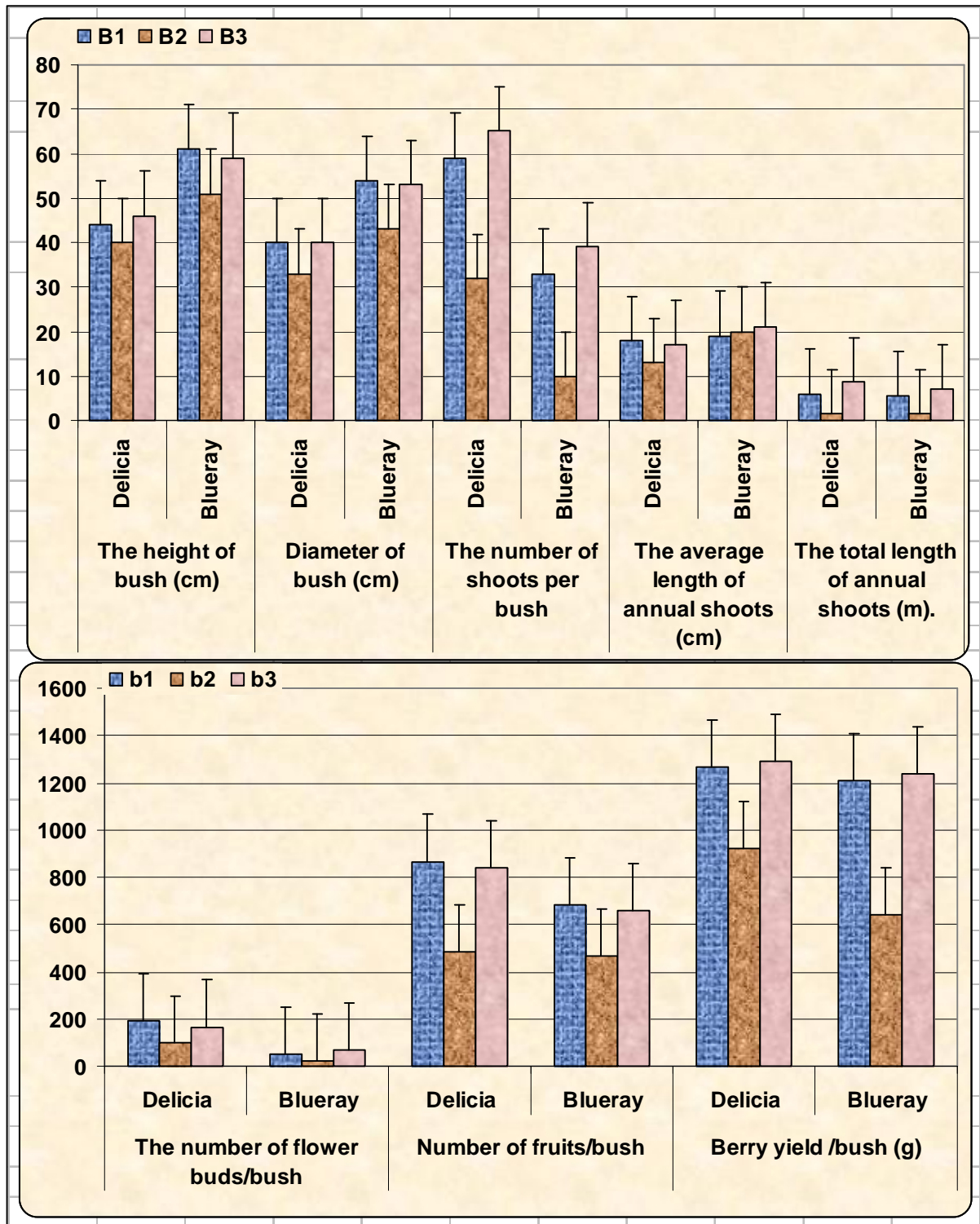


Fig.3 The influence of three planting substrates on some growth and fruiting characteristics of two blueberry variety (A/B factors interaction )

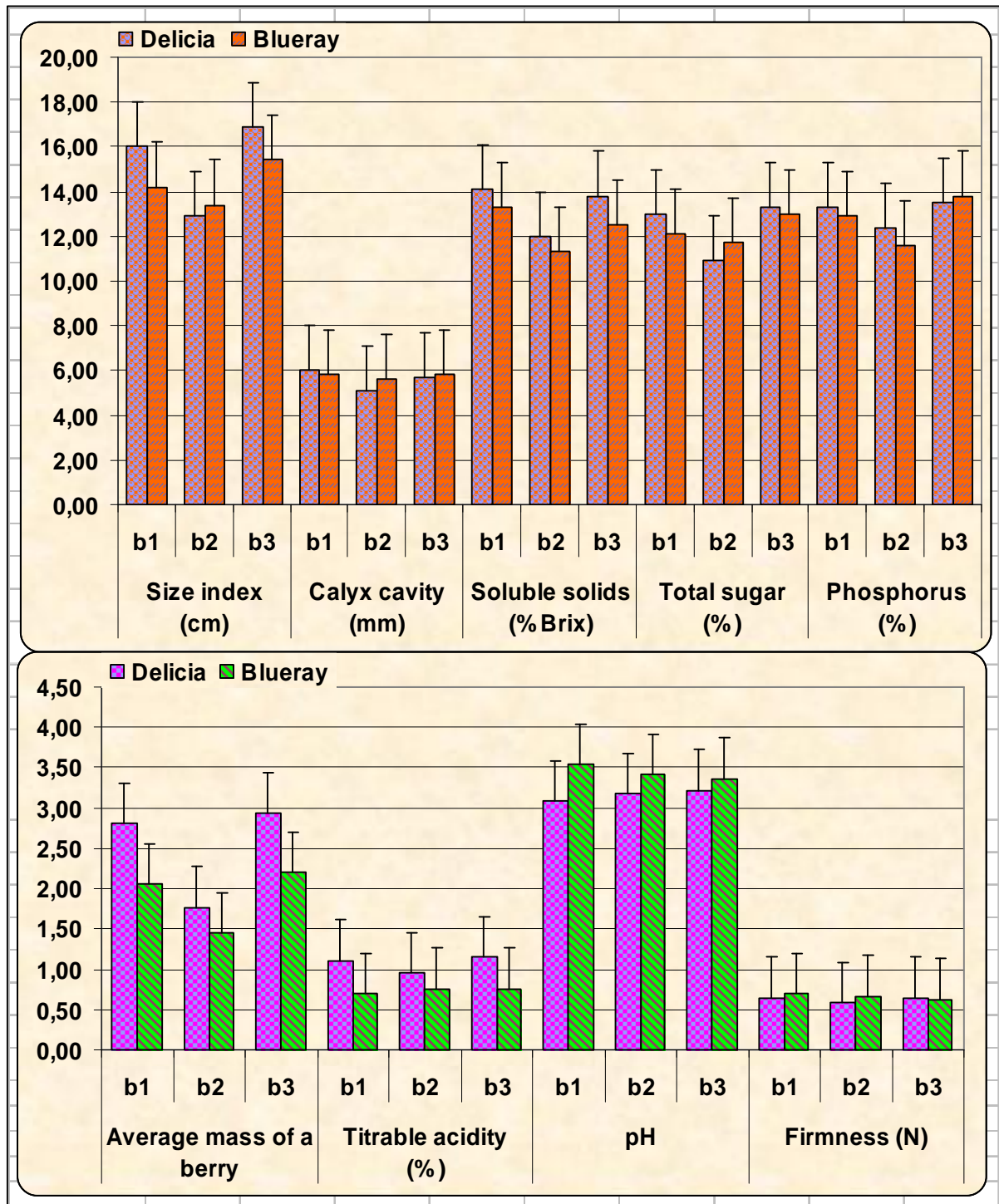


Fig.4 The influence of three planting substrates on some quality fruit characteristics of two blueberry variety (A/B factors interaction)