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THE BEHAVIOR OF SOME VARIETIES OF *IMPATIENS* SPP. ON DIFFERENT SUBSTRATES

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Abstract
Impatiens is used for home decoration, balconies, terraces and in parks and gardens. Impatiens are popular because they're easy-to-grow and flower in shade all season. The aim of the present study was to investigate the effects of some alternative substrates (compost + fallow) on the growth of a bedding annual plant. Results showed that it is possible to obtain high quality Impatiens ssp. plants grown in local material. The effect of changes in height, number of leaves and flowers, and leaf sizes are discussed. It is advisable to cultivate the three Impatiens *varieties on a substrate consisting of unimproved peat or NPK-improved peat as they have high productivity and great commercial appearance. Comparative study of Impatiens varieties on different substrates is necessary to recommend to the growers the most suitable substrates depending on the variety, leading to obtain great productions.*

Keywords: impatiens, production, substrates.

1. INTRODUCTION

Impatiens L. is an angiosperm belonging to a genus with difficult taxonomy, only the Impatiens subgenus containing 7 section (Yu et al., 2016).
Impatiens walleriana Hook. f. *(Balsaminaceae)* is a perennial, herbaceous floral plant, highly appreciated when blooming (Cho et al., 2017).
Impatiens hawkeri originating in New Guinea is a plant with purple lizards, green leaves with red ribbons and flowers of different colors, with the central white area and grows up to 45 cm.
Impatiens is a very graceful plant with easy care. This plant is common for decor of homes, balconies, terraces, parks and gardens.
Growing media or components for potting soil mixes are very important production factors in horticulture (Benedetto et al., 2006).
It is imperative to find alternatives to the substrate used in horticulture due to the rise of the peat price and the decrease in its availability (Frolking et al., 2001; Schilstra, 2001; Abad et al., 2001; Guerin et al., 2001; Garcia-Gomez et al., 2002).
In areas where peat is expensive and forest and coconut residues are not at hand, it is natural for nutrient substrates to contain compost (Zubillaga et al., 2001).

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Farms and nurseries use various seedling and potting media in the production of field transplants, container plants, and greenhouse crops (Kuepper and Everett, 2004).
To give plants the best conditions for growth and development it is very important to know the characteristics of the alternative components that make up the culture substrate.
In 2006 Dede claimed that although the vegetative framework was the same in both dry and fresh, the plants produced fewer flowers on the compost substrate.
The purpose of this research is to see how influencing the growth and development of *Impatiens* plants grown on alternative substrates produced from local (compost + fallow).

2. MATERIALS AND METHODS

The experience was carried out in a private solar, located near to Piteşti, Argeş. It is a bifactorial experience where the variants consisted of combining graduations A and B.

A- type of substrate:

A1- neutral pH improved peat + NPK;
A2- compost + fallow;
A3- peat + sand;
A4- peat unimproved;
B- variety:
B1 – *Impatiens hawkeri* Divine Salsa Mixed (figure 1)
It has large, orange, red and white flowers with a dark green leaf, 10 to 14 cm high, warm-tolerant and blooming throughout the summer, low maintenance and partial exposure to the sun. If it does not get wet and dry, it will fall flowers and blooms. It blooms in spring, late spring, summer or late summer. Fertilization once a month and average watering. Prefers light and well-drained soils. As use: pots, suspended baskets, tableware.

Figure 1. Divine Salsa Mixed

Figure 2. Divine Mix Improved

Figure 3. Divine Scarlet Red

B2 – *Impatiens hawkeri* Divine Mix Improved (figure 2)
It blooms towards the end of spring and summer end, height between 20 - 25 cm, width 30 - 36 cm, with a wide range of colors. Large flowers forming a dense canopy all over the plant. Requires partial exposure to sun, blooms in spring, summer. Prefers wet and well-drained soil. The color of the leaves varies from green to bronze to green, with large branches that produce flower masses for all seasons.

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B3 – *Impatiens hawkeri* Divine Scarlet Red (figure 3)
They are vigorous plants with a vertical position, blooming towards the end of spring, late summer, between 25-35 cm wide, 30-36 cm wide, with partial sun exposure, evenly branched plants filled with large red flowers on. Usage: suspended baskets, containers. The leaves are dark in color, it is extremely tolerant to fluffy molds and has a high capacity of gripping in the garden, is tolerant to heat, but also prefers shade areas, blooms throughout the summer.
Plants were delivered as seedlings (figure 4).

Figure 4 . Impatiens seedlings

On March 14, 2017, transplantation was performed in a multiplying greenhouse, in alveolar pallets of 140 wells filled with different types of substrate.
During the growing period the plants were properly groomed. Transplantation was made on plastic pots of ø 19. The air temperature oscillated between 16^{o}C in the second decade of March and 31^{o}C in the first decade of April. Moisture regulation both in the substrate and in the air was achieved by repeated watering. Permanently humidity was correlated with light and temperature to avoid stretching the seedlings. Changing the air composition was achieved by opening the entrance doors for ventilation, especially in the planting stage before planting, when the respiration and evapotranspiration were higher.
Biometric measurements have been made on plant growth in height, leaf number, leaf length and width, number of flowers.

3. RESULTS AND DISCUSSIONS

It was determined the rate of growth in plant height by performing measurements weekly starting from planting.
There are differences in terms of **growth in plant height** (figure 5) in that each variety has different preferences regarding culture substrate.
Divine Salsa Mixed was best developed on A1 and A4, Divine Mix Improved showed the highest increases on A1, and Divine Scarlet Red developed best on A1.

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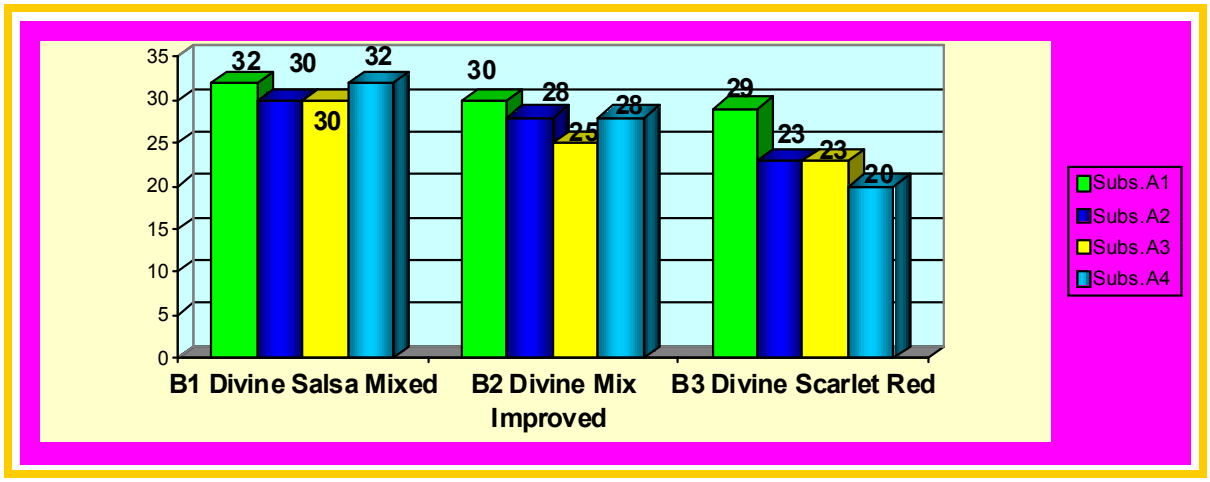

Figure 5. Plant height

All studied varieties had the highest values of height in A1, but increases in height on the substrate A4 had no great differences compared to A1, except Divine Scarlet Red. The fertilizer addition from the beginning of the research in A1 was consumed during the intense growth period from the beginning.

Variants cultivated on A3 showed the smallest values due to the fact that the sand is devoid of nutrients.

Regarding **leaf length** (figure 6) Divine Salsa Mixed and Divine Scarlet Red showed the highest values on the A3 substrate, and Improved Divine Mix on the A1 substrate.

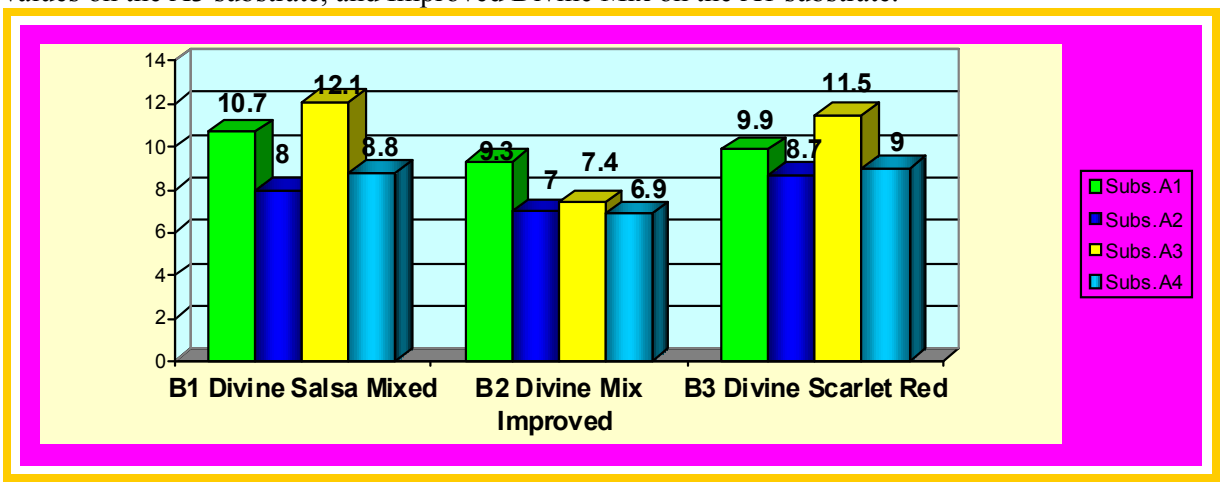

Figure 6. Leaf lenght

The sand in the A3 substrate composition helps to increase the length of the leaves.

The smallest results were recorded on the substrate composed of compost and fallow.

As far as the **width of the leaves** (figure 7) Divine Salsa Mixed has developed best on all culture substrates.

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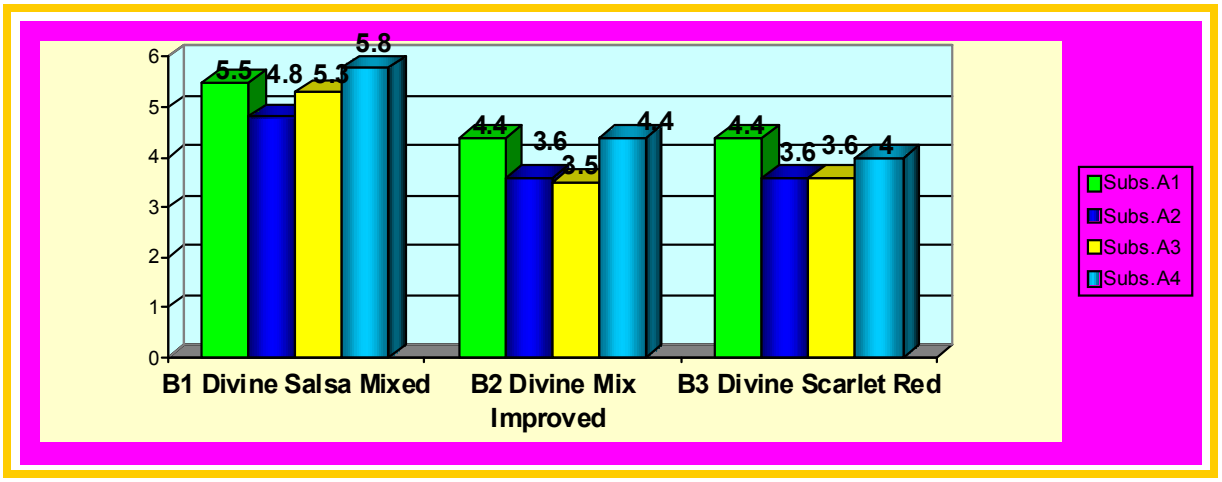

Figure 7. Leaf width

Divine Salsa Mixed presented the highest values of this character on A4, Divine Mix Improved on A1 and A4, and Divine Scarlet Red developed best on A1.

The substrates made of local materials showed the lowest values of leaf width for all studied variants.

Divine Salsa Mixed has developed best in terms of **number of leaves** (figure 8) on all crop substrates.

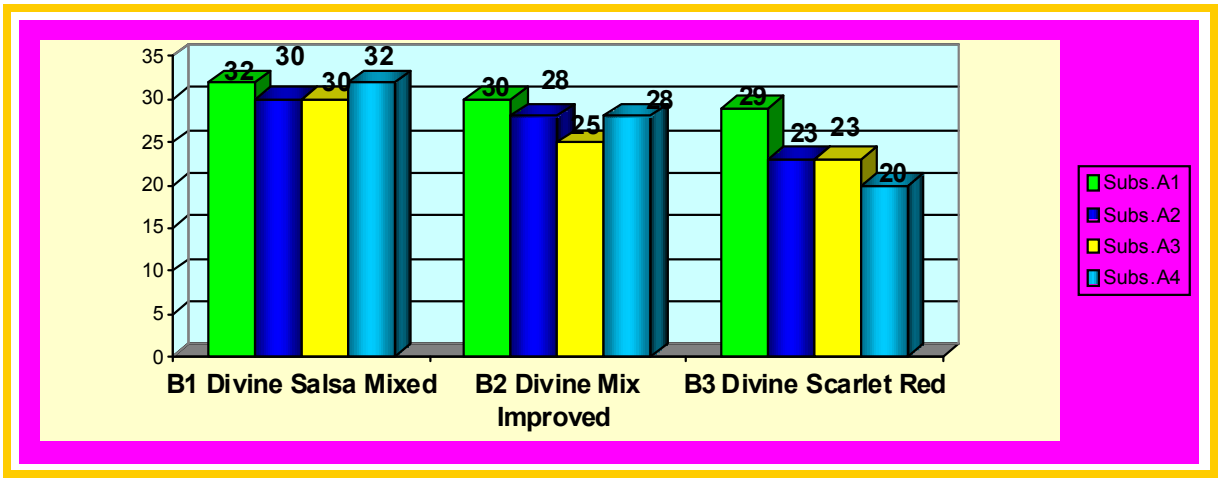

Figure 8. Number of leaves

All the studied varieties showed maximum values of the number of leaves per plant in the case of A1 substrate, improved peat with NPK.

Highlight the variety that has the largest **number of flowers** (figure 9), namely Divine Scarlet Red with a number of 20 flowers on the A4 substrate.

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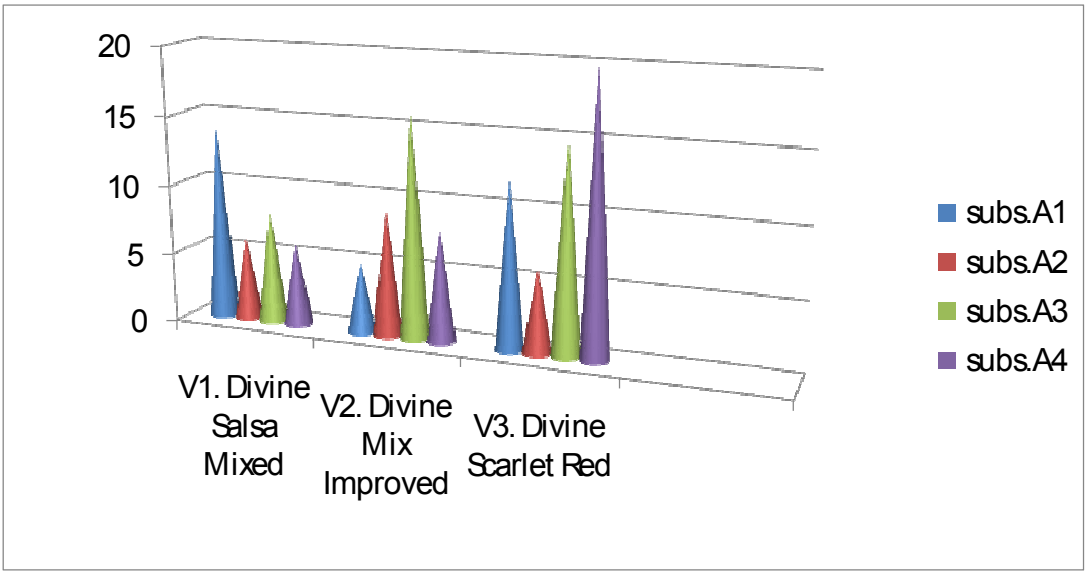

Figure 9. Number of flowers

Divine Salsa Mix has the largest number of flowers on A1, and the lowest on A2, followed by A4.
Divine Mix Improved presents the largest number of flowers on A3, and the lowest A1.
Divine Scarlet Red presents the largest number of flowers, 20 on the A4 substrate, and the lowest on A2.

4. CONCLUSIONS

Comparative study of *Impatiens* varieties is required to could recommend to growers the most suitable substrates for Impatiens culture.
All studied varieties had the highest values of height and number of leaves in improved peat + NPK, but increases in height on the unimproved peat had no great differences compared to improved one, except Divine Scarlet Red.
Variants cultivated on the substrates made of local materials showed the smallest values of height due to the fact that the sand is devoid of nutrients.
The sand in the substrate composition helps to increase the length of the leaves.
The substrates made of local materials showed the lowest values of leaf width for all studied variants.
There are differences in terms of flowers number in that each variety has different preferences regarding culture substrate.
The values recorded on the compost + fallow substrate are the smallest but not very large, so we can say that it can be used in *Impatiens* culture.
Following the study, it is advisable to cultivate the three *Impatiens* varieties on a substrate consisting of unimproved peat or NPK-improved peat as they have high productivity and great commercial appearance.

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