

## RESEARCH REGARDING CROPPING TECHNOLOGY OF *CELOSIA ARGENTEA* VAR. *CRISTATA* ‘FILEMON’ SPECIES

### CERCETĂRI PRIVIND TEHNOLOGIA DE CULTURĂ A SPECIEI *CELOSIA ARGENTEA* VAR. *CRISTATA* ‘FILEMON’

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**Abstract.** *This paper presents some research on the cropping technology of the species *Celosia argentea* var. *cristata* variety ‘Filemon’. The researches were carried out in the cultural conditions in NE Romania, in the didactic collection of the Floriculture discipline within UASVM Iași. The experiments were organized in four variants in which three different doses of Cropmax® were applied (V2 - 0.05%; V3 - 0.10%; V4 - 0.15%) and a control variant (V1). Representative results were recorded for variant V3, both in terms of percentage of emergence and morphological characteristics of plants. These studies are part of the research project 14644/2018 UASVM Iași.*

**Key words:** *Celosia argentea*, ornamental plant, technology

**Rezumat.** *În această lucrare sunt prezentate unele cercetări privind tehnologia de cultură a speciei *Celosia argentea* var. *cristata* soiul ‘Filemon’. Cercetările s-au desfășurat în condițiile de cultură din NE României, în colecția didactică a disciplinei de Floricultură din cadrul USAMV Iași. Experimentele au fost organizate în patru variante în care s-au aplicat trei doze diferite de Cropmax® (V2 – 0,05%; V3 – 0,10%; V4 – 0,15%) și o variantă martor (V1). Rezultate reprezentative s-au înregistrat la varianta V3, atât în ceea ce privește procentul de răsărire, cât și caracteristicile morfologice ale plantelor. Aceste studii fac parte din proiectul de cercetare 14644/2018 USAMV Iași.*

**Cuvinte cheie:** *Celosia argentea*, plante ornamentale, tehnologie

## INTRODUCTION

*Celosia* genus is part of the Amaranthaceae family and includes numerous plant species, originating from tropical Asia, Africa and America (Șelaru, 2006, 2008; Nermeen *et al.*, 2014).

*Celosia argentea* var. *cristata* - the cock’s comb (Cockscomb) is the most cultivated among the species of the genus. It is an annual species, with a straight, edged stem, the flowers are grouped in terminal, dilated, sinuous spike-type inflorescences. It has moderate demands on environmental factors. It blooms from June to October (Șelaru, 2006, 2008; Draghia and Chelariu, 2011; Nermeen *et al.*, 2014).

*Celosia* plants require large amounts of nutrients, especially nitrogen (Gill *et al.*, 1999; Akinfasoye *et al.*, 2008). These elements can be supplemented by applying

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chemical fertilizer treatments, but some research has shown that bio-fertilizers are an alternative to chemical fertilizers to increase soil fertility and plant production (Wu *et al.*, 2005; Akinfasoye *et al.*, 2008). In ornamental plants, very good results were obtained after the application of bio-stimulators (Pandey *et al.*, 2017; Dipanjali *et al.*, 2018; Nermeen *et al.*, 2014), organic foliar fertilizers (Draghia *et al.*, 2009; Nicu and Manda, 2014), as well as slow-release fertilizers (Buta *et al.*, 2011).

Cropmax® is a complex biological fertilizer that positively influences both the germination of seeds and the rooting of ornamental plant cuttings as well as their growth and development (Chelariu *et al.*, 2019).

The purpose of this work is to study the behaviour of *Celosia argentea* var. *cristata* ‘Filemon’ under growing conditions in Iași, Romania.

## MATERIAL AND METHOD

To achieve the proposed objectives, professional seeds of *Celosia argentea* var. *cristata* variety ‘Filemon’. It has vigorous, juicy, straight, yellow-green stems. The leaves are yellow-green, petiolate, smooth, whole, linear-lanceolate, ovoid, with a pointed tip. The flowers are yellow, bisexual, small, collected in flattened spike-shaped inflorescences. The colour of the seeds is black, they are small, round and shiny. The plant can reach heights of 70-100 cm (fig. 1).



A



B



**Fig. 2** Seedlings

**Fig. 1** *Celosia argentea* var. *cristata* ‘Filemon’

The research was carried out within the didactic and experimental collection of the discipline of Floriculture, UASVM Iasi, Romania, in the period 2019-2020, and depending on the main objectives and the research activities carried out, four experimental variants were organized (tab. 1).

In order to obtain the plants, the substrate consisting of two parts peat and one-part earth was used. Sowing took place in the greenhouse, on 18.04.2019, using 25 seeds for each individual variant. The seedlings were transplanted only once, in alveolar palaces (fig. 2).

After sowing, for each variant, were applied weekly treatments with Cropmax® in different concentrations (tab. 1).

Table 1

| Experimental design |                   |
|---------------------|-------------------|
| Variant             | Applied treatment |
| V1 - control        | Water             |
| V2                  | 0.05% Cropmax®    |
| V3                  | 0.10% Cropmax®    |
| V4                  | 0.15% Cropmax®    |

Measurements and biometric determinations were made, regarding the percentage of emergence, growth and development of plants. The obtained results were recorded in tables and interpreted statistically.

## RESULTS AND DISCUSSIONS

The research carried out highlighted the fact that the treatments with Cropmax® applied to *Celosia argentea* var. *cristata* 'Filemon', were beneficial, and the best result was recorded in variant 3, where treatments with a dose of 0.10% Cropmax® were administered.

Plant emergence started 5 days after sowing, in all experimental variants.

From the results obtained, we note that V3 variant has a 100% emergence rate since 27.04.2019, followed by V4 variant, V2 variant and V1 variant (tab. 2, fig. 3).

Table 2

| Variant | Date/emergence rate (%) |       |       |       |       |
|---------|-------------------------|-------|-------|-------|-------|
|         | 23.04                   | 25.04 | 27.04 | 29.04 | 01.05 |
| V1      | 88                      | 88    | 92    | 92    | 92    |
| V2      | 92                      | 92    | 92    | 96    | 96    |
| V3      | 92                      | 96    | 100   | 100   | 100   |
| V4      | 92                      | 92    | 96    | 96    | 96    |

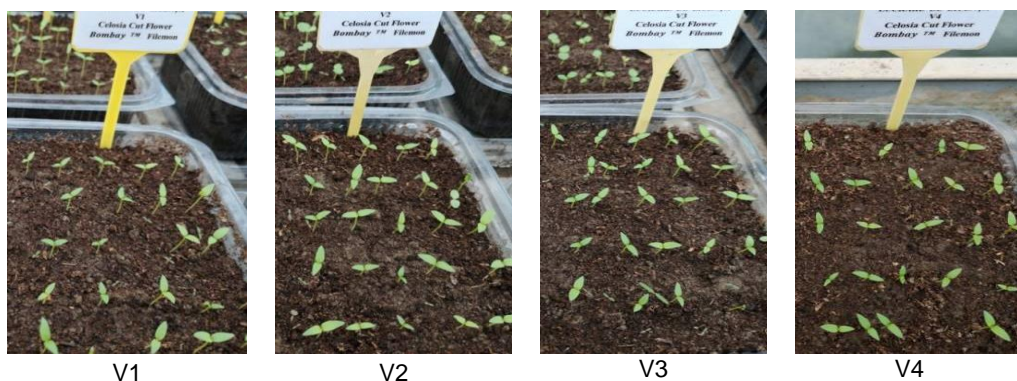


Fig. 3 The emergence of *Celosia cristata* 'Filemon' plants

Table 3

**Results regarding the degree of emergence in *Celosia cristata* 'Filemon'**

| Variant | Absolute mean values (pieces) | % to the control | ±d   | The meaning of the difference |
|---------|-------------------------------|------------------|------|-------------------------------|
| V1      | 23                            | 100.00           | 0.0  | control                       |
| V2      | 24                            | 104.35           | +1.0 | -                             |
| V3      | 25                            | 108.70           | +3.0 | **                            |
| V4      | 24                            | 104.35           | +1.0 | -                             |

LSD 5% = 1.1 pcs    LSD 1% = 1.7 pcs    LSD 0.1% = 2.7 pcs

From a statistical point of view, it was found that the differences compared to the control regarding the percentage of emergence were insignificant in V2 and V4 variants and distinctly significant positive in V3 variant (tab. 3).

Biometric determinations were made both on the seedlings at the establishment of the crop in the field (average height, average number of leaves and average length of the roots), and on the plants in the field (total height, total number of leaves and the size of the inflorescences).

Table 4 shows the morphological characters of the plants, before planting in the field.

Table 4

**Morphological characters of plants when planted in the field**

| Variant | Average plant height (cm) | Average number of leaves/plant (pieces) | Average root length (cm) |
|---------|---------------------------|---|--------------------------|
| V1      | 18.9                      | 10.2                                    | 2.48                     |
| V2      | 20.2                      | 11.5                                    | 2.88                     |
| V3      | 22.7                      | 12.2                                    | 3.01                     |
| V4      | 21.8                      | 11.4                                    | 2.56                     |

After planting in the field, treatments were administered in the established doses.

The total height of the plants in *Celosia cristata* 'Filemon' (tab. 5) reached the highest values in V3 variant, where the average value is 66.84 cm.

Table 5

**Results regarding the average height of the plants**

| Variant | Absolute mean values (cm) | % to the control | ±d   | The meaning of the difference |
|---------|---------------------------|------------------|------|-------------------------------|
| V1      | 58.42                     | 100.00           | 0.0  | control                       |
| V2      | 62.13                     | 103.67           | +0.4 | ***                           |
| V3      | 66.84                     | 119.27           | +2.1 | ***                           |
| V4      | 59.98                     | 110.09           | +1.1 | ***                           |

LSD 5% = 0.1 cm    LSD 1% = 0.2 cm    LSD 0.1% = 0.3 cm

From a statistical point of view, it was found that the differences compared to the control, regarding the average height of the plants, were very significant positive for variants V2, V3 and V4 (tab. 5).

Table 6

**Results regarding the average number of leaves/plant**

| Variant | Absolute average values (pcs.) | % to the control | ±d   | The meaning of the difference |
|---------|--------------------------------|------------------|------|-------------------------------|
| V1      | 12.2                           | 100.00           | 0.0  | control                       |
| V2      | 12.6                           | 103.28           | +0.4 | -                             |
| V3      | 13.9                           | 113.93           | +1.7 | **                            |
| V4      | 12.9                           | 105.74           | +0.7 | -                             |

LSD 5% = 0.9 pcs    LSD 1% = 1.4 pcs    LSD 0.1% = 2.2 pcs

From a statistical point of view, it was found that the differences compared to the control, regarding the average number of leaves of the plants, were insignificant in the V2 and V4 variants, and distinctly significant positive in the V3 variant (tab. 6).

The best results regarding the number of leaves were obtained with the V3 variant, where the average value was 13.9 cm (tab. 6).

Table 7

**Results regarding the average diameter of the inflorescences of *Celosia cristata* 'Filemon'**

| Variant | Absolute mean values (cm) | % to the control | ±d   | The meaning of the difference |
|---------|---------------------------|------------------|------|-------------------------------|
| V1      | 10.89                     | 100.00           | 0.0  | control                       |
| V2      | 11.31                     | 103.67           | +0.4 | ***                           |
| V3      | 12.97                     | 119.27           | +2.1 | ***                           |
| V4      | 11.96                     | 110.09           | +1.1 | ***                           |

LSD 5% = 0.1 cm    LSD 1% = 0.2 cm    LSD 0.1% = 0.3 cm

From a statistical point of view, it was found that the differences compared to the control, regarding the average size of the inflorescence, were very significant positive in the treated variants (tab. 7, fig. 4).



**Fig. 4.** Inflorescence size at *Celosia cristata* 'Filemon'

## CONCLUSIONS

The percentage of germination of *Celosia seeds* records very good results, obtaining an average percentage of 96%.

The treatments applied to the V3 variant, in a dose of 0.10 Cropmax®, gave the best results regarding plant emergence, the number of leaves and the dimensions of stems and inflorescences.

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