INFLUENCE OF VERMICOMPOST ON SEEDLINGS' OBTAINING AT SOME SPECIES OF ORNAMENTAL GRASSES

INFLUENŢA VERMICOMPOSTULUI ASUPRA PRODUCERII RĂSADURILOR LA UNELE SPECII DE IERBURI ORNAMNETALE

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Abstract. *The best alternative of nowadays environmental degradation is to realise a proper use of the available unutilized organic biodegradable wastes for converting them into compost within a short period. Vermicompost could be used as an excellent soil amendment for main fields and nursery beds and has been reported to be useful in raising nursery species plants. The current paper presents the influence of vermicompost on producing of seedlings at ornamental gramineous species Pennisetum setaceum. Vermicompost was utilized in doses of 10% (V1), 20% (V2), 30% (V3) and 0% (V4). For all variants the basic utilised substrate was formed by 2 parts peat and 1 part garden soil. All variants at which vermicompost was utilised provided a more vigorous seedling in comparison with control variant (V4) and the best results were recorded at V3. Vermicompost could promote early and vigorous growth of seedlings. Vermicompost has found to be effectively enhanced for root formation, elongation of stem and production of biomass.*
Key words: ornamental grasses, seedlings, vermicompost

Rezumat. *Cea mai bună alternativă actuală în ceea ce priveşte degradarea mediului înconjurător este realizarea unei utilizări corecte a deşeurilor organice biodegradabile neutilizate pentru transformarea acestora în compost într-o perioada scurtă de timp. Vermicompostul poate fi utilizat ca un excelent amendament al solului atât pe câmp cât şi în pepiniere unde s-a constat efectul lui benefic asupra diferitelor specii de plante. Lucrarea de faţă prezintă influenţa vermicompostului asupra producerii răsadului la specia de graminee ornamentală Pennisetum setaceum. Vermicompostul s-a utilizat în proporţie de 10% (V1), 20% (V2), 30% (V3) şi 0% (V4). Pentru toate variantele experimentale, ca substrat de bază s-a utilizat un amestec format din 2 părţi turbă şi 1 parte pământ de grădină. Toate variantele în care s-a utilizat vermicompost au dus la obţinerea unui răsad mai viguros comparativ cu varianta martor (V4), cele mai bune rezultate înregistrându-se la V3. Vermicompostul poate provoca creşterea timpurie şi viguroasă a răsadurilor. Vermicompostul s-a dovedit a fi eficient în formarea rădăcinilor, în creşterea tulpinilor şi a producţiei de biomasă.*
Cuvinte cheie: ierburi ornamentale, răsad, vermicompost

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INTRODUCTION

Vermicompost is a humus type material, obtained through vermicompostation which represent the process where earthworms are utilised to convert organic materials with different provenance. Vermicompost could contain coprolite, an undecomposed organic material and earthworms' cocoons and which could be, in general, superior to the conventional produced compost (Munroe, 2015).

Due to physical, biological and nutritional properties, vermicompost determine the improvement of seeds' germination percent and seedlings' quality. It could be considered as a source of bioactive molecules and microbial populations. Those bioactive compounds and microorganisms intensify the adsorption of nutrients, the initial development of roots and seedlings' development capacity (Atiyeh *et al*., 2000; McGinnis *et al*., 2004; Kalra *et al.,* 2010; Singh *et al.*, 2011; Mathivanan *et al*., 2012; Absar *et al.,* 2016).

The beneficial effect of vermicompost on seeds' germination and seedlings' quality was studied also at other plant species such as: petunia (Arancon *et al*., 2008), basil (McGinnis *et al*., 2004; Jelačić *et al.,* 2005; Absar *et al.,* 2016), *Arachis hypogaea* L. - ground nut (Mathivanan *et al.*, 2012), different legumes species (Suthar *et al.*, 2005, Singh *et al.*, 2011).

The current paper aimed to show the influence of vermicompost on producing of seedlings at *Pennisetum setaceum* species.

MATERIAL AND METHOD

As study material was used *Pennisetum setaceum* ornamental species. Pennisetum genus belongs to Poaceae botanical family and presents numerous taxons with ornamental value, also known under the name of ornamental grasses (Chelariu, 2013)

Experiences were organized in four experimental variants, represented by the rate in which vermicompost participated into substrate, respectively 10% (V1), 20% (V2), 30% (V3) and 0% (V4) (tab. 1). For all experimental variants as basic substrate was utilised a mixture formed by 2 parts peat and 1 part garden soil. To establish the experiments were used seeds from Tenerife, Spain. Research were carried out in the greenhouses belonged to Floriculture discipline from UASVM Iaşi, Romania

The used vermicompost in our experiments is a substrate obtained with earthworms at SC SUPERPĂMÂNT SRL, Iaşi Romania. As feed for earthworms was used a pre-composed mix, formed by manure from cattle, horses, swine, cereal straws, alfalfa, vegetal remains from trimming the lawn, water.

Table 1

Experimental design

Species	Biological material	Variant	Substrate for sowing
Pennisetum setaceum	seeds	V1	basic substrate + 10% vermicompost
		V2	basic substrate + 20% vermicompost
		V3	basic substrate + 30% vermicompost
		V4	basic substrate + 0% vermicompost (control)

Research were carried out during March-May 2017, period in which were made observations regarding seeds' germination rate, necessary period from sowing till emergence ends, seedlings' growing dynamics and seedlings' characterization before crops' establishing. The obtained results were statistically analysed.

RESULTS AND DISCUSSIONS

Vermicompost influenced germination of *Pennisetum setaceum* seeds function of the rate in which is founded in crop substrate. So, at variant V1 (10% vermicompost) germination rate was 82%, at V2 (20% vermicompost) percent was 91%, and at V3 (30% vermicompost) rate was 99%. At control variant V4, germination percentage was 74% (fig. 1).

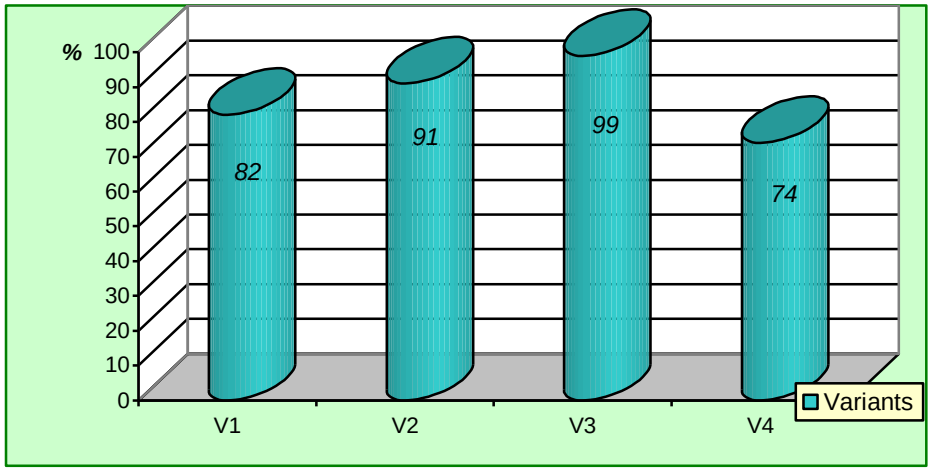

Fig. 1 Germination percentage (%)

Vermicompost influenced the moment of emergence start and determined the decreasing of seeds' germination period. So, at variant V3 (30% vermicompost) emergence started after 7 days from sowing, at variants V1 (10% vermicompost) and V2 (20% vermicompost) emergence started after 8 days from sowing and at variant V4 after 13 days (fig. 2). For a complete emergence, the necessary time calculated from sowing was 27 days for variant V3, 30 days for variant V2 and 31 days at variant V1. In case of variant V4 were necessary 41 days from sowing till emergence ended (fig. 2).

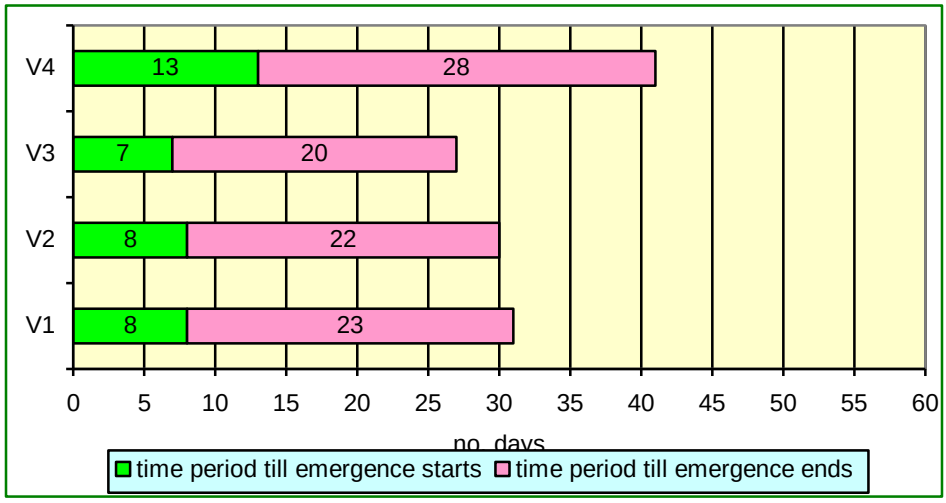

Fig. 2 Duration of germination (number of days from sowing)

Under the influence of vermicompost seedlings had a differential growing, function of its participation in the basic substrate. During research period was observed that seedlings from variants with vermicompost recorded growth of plants from 1.6 cm to 39.8 cm at V1, from 1.9 cm to 43.2 cm at V2 and from 2 cm to 47.7cm at V3. For the control variant V4 seedlings' growth was from 1.4 cm to 28.2 cm (fig. 3).

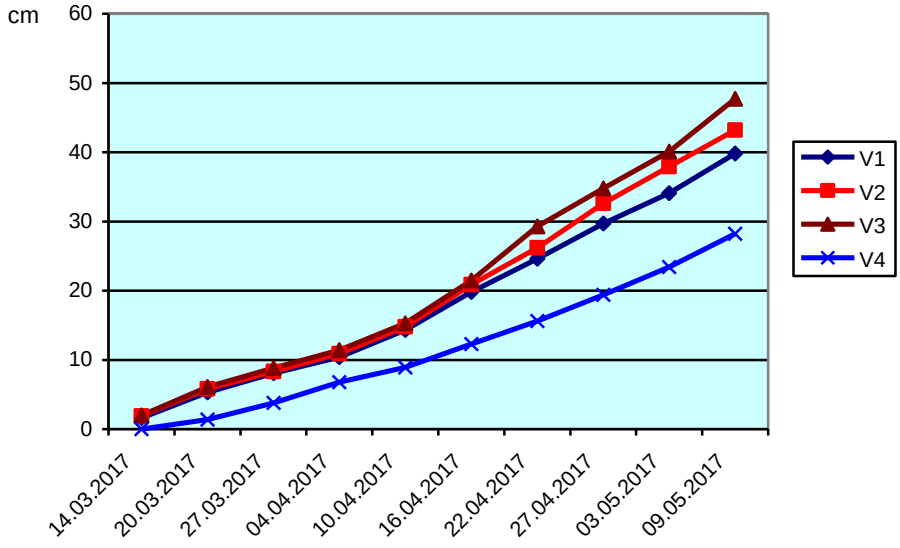

Fig. 3 Dynamics of seedlings' growing at *Pennisetum setaceum*

Table 2

Influence of vermicompost on morphological features of seedling at sowing in field

Variant	Mean height (cm)	Mean number of leaves per plant (pieces)	Mean number of roots per plant (pieces)
V_1	39.8***	10.8***	11.3***
V_2	43.2***	11.9***	12.5***
V_3	47.7***	12.7***	15.3***
V_4	28.2	8.6	8.3
	LSD 5% = 0.5 cm LSD 1% = 0.8 cm LSD 0.1% = 1.2 cm	LSD 5% = 0.2 pieces LSD 1% = 0.2 pieces LSD 0.1% = 0.4 pieces	LSD 5% = 0.3 pieces LSD 1% = 0.4 pieces LSD 0.1% = 0.7 pieces

Due to nutritional and biological value, vermicompost improve the quality of *Pennisetum setaceum* seedlings (tab. 2). Vermicompost (V1, V2, V3) determined the increasing of mean number of roots per plant, aspect which lead to formation of a higher mean number of leaves per plant than at control variant (V4) and implicitly to increase the seedlings' vigour.

CONCLUSIONS

At species *Pennisetum setaceum*, vermicompost determined the increasing of germination percentage and shortening of seeds' germination period.

Presence of vermicompost in substrate influenced the characteristics of *Pennisetum setaceum* seedlings, determining the increasing of main roots number per plant which also leaded to an increasing of leaves number and seedling height.

Seedlings with the best quality were obtained when in substrate exist a share of 30% vermicompost (V3).

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