

THE STUDY OF EVOLUTION AT THE SPECIES DACTYLIS GLOMERATA PRODUCTIVE CHARACTER UNDER THE INFLUENCE OF DIFFERENT DOSES OF SLUDGE FROM MUNICIPAL WASTEWATER TREATMENT PLANT

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Abstract: The Orchard grass (*Dactylis glomerata*, ssp. *Glomerata*) is a large scale plant, often exceeding 100cm in height. The stem is erect or genicular upward at the base. The shoots are bombed out and thick at the base and quickly lignify, which prevents them from falling easily (5). The *Orchard grass* is perennial grass forage with a great culture resisting from 5 to 8 years, depending on operating conditions, the culture area, etc. (5) By analyzing the production capacity of the species *Dactylis glomerata* depending on the amount of sewage sludge that has been given, we can observe an increase in its range, depending on the amount of sludge and implicitly the nitrogen given. Production of dry matter taken obtained from *Dactylis glomerata* biomass, under the influence of different doses of municipal sludge has the same growth curve as for the production of green mass. Plant height is also an important feature when talking about production, since this fact significantly influences production. In our case, the average height of plants varies between 88.5 cm (at the control) and 96.7 (the version sludge variant of 40t/ha) that height being registered in the biological limits described for this specie.

Key words: *Dactylis glomerata*, urban sludge, production, dry matter, height

INTRODUCTION

The orchard grass (*Dactylis glomerata*, ssp. *Glomerata*) is a large scale plant, often exceeding 100cm in height. The stem is erect or genicular upward at the base. The shoots are bombed out and thick at the base and quickly lignify, which prevents them from falling easily. (5)

The Orchard grass is perennial grass forage with a great culture resisting from 5 to 8 years, depending on operating conditions, the culture area, etc. (5)

Nowadays, in most of the countries in the world, *Dactylis glomerata* is situated among the first cultivated graminaceous fodder concerning the extension, productivity, fodder value and multiple usage as a fodder plant.

In Romania, *Dactylis glomerata* is cultivated in simple mixtures which are exploited in hays system, or in complex mixtures for pasturage, near the *Lolium perenne*, the biggest weight in those 4.9 mil. ha of woods and hays.

Using sludge from wastewater treatment plants in agriculture is a current topic. The topic has both agronomic and ecological importance, the development of well documented studies regarding the quantity and quality of sludge used safely in agriculture stands as a priority.

The current paper deals with some issues regarding the quantity and quality of orchard grass forage grown on soils that have been applied with different doses of sludge from sewage wastewater treatment plants.

MATERIAL AND METHOD

One Orchard grass culture was taken under study (*Dactylis glomerata*).

The research was conducted in pedoclimatic conditions of C mpia de Vest (The Western Plain) during 2011- 2012 (years I-I of production).

In terms of climate a deficit in rainfall was recorded in June and August 2011, in June and September 2012.

Parcel area was of 12 m².

Table 1

Sketch of the experimental Orchard grass

R III V ₃	V ₁	V ₂	V ₀
R II V ₂	V ₃	V ₀	V ₁
5 m R I V ₀ 3 m	V ₁ 15 t/ha (22,5 kg sludge)	V ₂ 20 t/ha (30 kg sludge)	V ₃ 40 t/ha (60 kg sludge)

Production capacity was determined by the method of repeated mowing; plant height was measured with a centimeter as 100 plants per variant were taken into consideration and then the average of measurements was made.

The amount of dry matter was determined by the thermoscale SCALTEC.

RESULTS AND DISCUSSIONS

By analyzing the production capacity of the species *Dactylis glomerata* depending on the amount of sewage sludge that has been given, we can observe an increase in its range, depending on the amount of sludge and implicitly the nitrogen given.

Given that sludge doses of 15t or 20t were administered, productions are not significantly higher among themselves, but higher than the control.

The highest production is obtained when the quantity of sludge applied is around 40t/ha (fig.1)

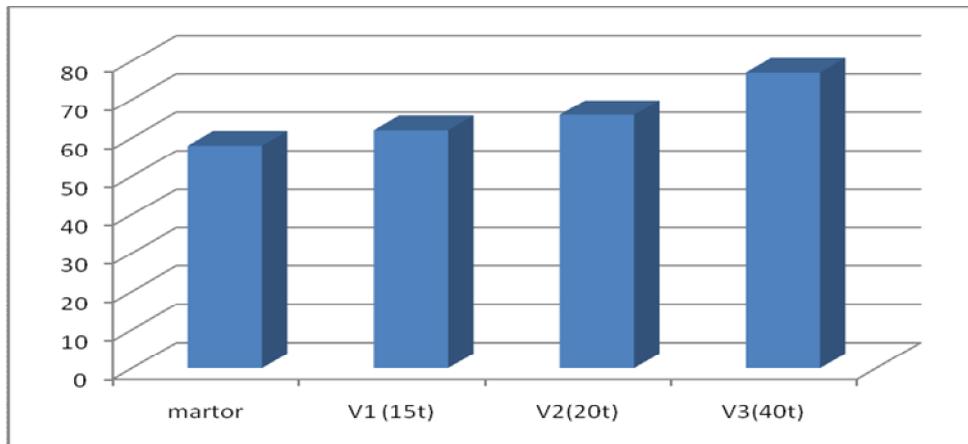


Fig.1. Graphic representation of the production of green mass at species *Dactylis glomerata*

Production of dry matter taken obtained from *Dactylis glomerata* biomass, under the influence of different doses of municipal sludge has the same growth curve as for the production of green mass, production at doses of 15t/ha and 20t/ha respectively are approximately similar, and dry matter production where sludge doses of 40t/ha were applied is significantly higher than the witness and the other two above mentioned doses (fig.2)

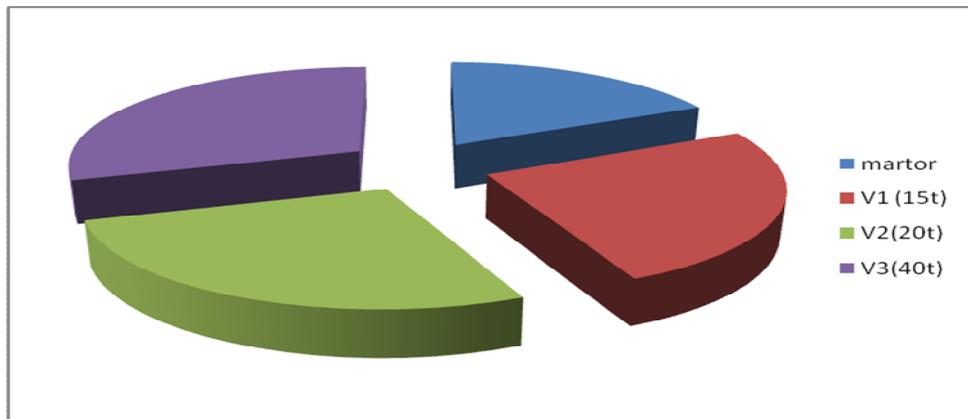


Fig.2. Graphic representation of the production of dry matter at species *Dactylis glomerata*

Plant height is also an important feature when talking about production, since this fact significantly influences production. In our case, the average height of plants varies between 88.5 cm (at the control) and 96.7 (the version sludge variant of 40t/ha) that height being registered in the biological limits described for this specie, biomass and the dry matter production were influenced directly also by the foliar area and number of siblings. (Fig. 3)

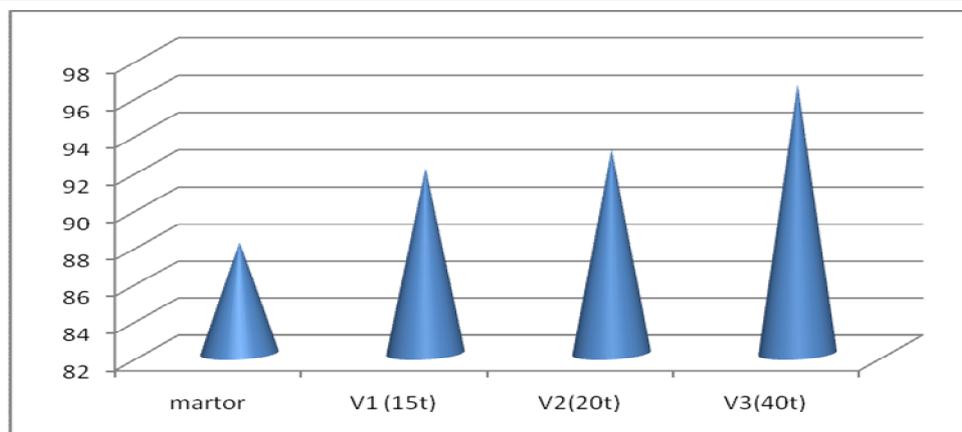


Fig.3. Graphic representation of siblings height the species *Dactylis glomerata*

CONCLUSIONS

After analyzing the three characteristics determinant for forage production at the species *Dactylis glomerata*, we can draw one conclusion only, namely that all determining characteristics on production, also studied in the present work, as well as other determining characteristics on the production are influenced positively by applying municipal sludge instead of fertilizer.

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BIBLIOGRAPHY

1. MILICĂ C.I., CULICĂ S., 1976- Particularități fiziologice în utilizarea azotului de către gramineele perene, lucr.st. Măgurele - Brașov, vol.II.
2. MOISUC A. DUKICI D., 2002 – Cultura plantelor furajere, Ed.Orizonturi Universitare.
3. NELSON C.J. 1977 – Combining ability and heritability for perline content in tall fescue, Plant breeding abstract, p.177-179.
4. PUJA I., HEINKE KLEMM, 1978 – Consideratii privind folosirea speciei *Dactylis glomerata* L., înființarea pajiștilor temporare în teren arabil – lucr.st. Măgurele -Brașov, vol.IV.
5. VARGA P. si colab. 1998- Ameliorarea plantelor furajere si producerea de samnata. Editura Lumina.