THE INFLUENCE OF CULTIVAR AND DENSITY ON EARLY CABBAGE

INFLUENȚA CULTIVARULUI ŞI A DENSITĂȚII LA VARZA ALBĂ TIMPURIE

STOLERU Carmen[1], STOLERU V.[1], STAN T.[1], AVASILOAIEI D.I.[1]
e-mail: vstoleru@uaiasi.ro

Abstract. *The topic under study aims at establishing the most appropriate varieties for area of the Romanian and the most appropriate density in the organic. The highest early cabbage production during 2006-2008 were obtained from cultivar K001 F1, respectively 32,00 t/ha. Regarding the influence of planting density on total production in early cabbage, the highest yield were carried out in variant when it was planted 47,619 pl. / Ha, where 31.76 t / ha. Regarding the influence of combinations of cultivar and planting density can be said that the highest yields were obtained when K001 F1 cultivar planted at distances of 70 cm x 30 cm, carried out the production of 33.54 t / ha.*
Key words: cabbage, cultivar, densities, production, organic sistem

Rezumat. *Tema luată în studiu are ca scop stabilirea celor mai adecvate cultivare pentru zona de NE a Romaniei si stabilirea celor mai adecvate densitati in functie de cultivar, în cadrul sistemulului ecologic de cultivare. Cele mai ridicate producții la varza timpurie, în perioada 2006-2008, au fost obținute de cultivarul K001 F1, respective, 32,00 t/ ha. În ce priveşte influența densităților de plantare asupra producției totale la varza albă timpurie, cele mai ridcate producții au fost realizate in varianta când s-au plantat 47.619 plante/ha, caz în care producția a fost de 31,76 t/ha. Referitor la influența combinațiilor dintre cultivar şi densitatea de plantare se poate spune că cele mai ridicate producții au fost obținute în cazul cultivarului K001 F1, plantat la distanțe de 70 cm x 30 cm, producția realizată fiind de 33,54 t/ha.*
Cuvinte cheie: varza albă, cultivar, densități, productie, sistem ecologic

INTRODUCTION

The role of organic system is to produce cleaner food, more appropriate to human metabolism, in the fully correlation with environmental development and conservation (Munteanu and Stoleru, 2012).

Achieving crop for early white cabbage, under optimal conditions, mean primarily, satisfy the requirements under the best environmental factors to the plants. Therefore, cultural practices should provide technological factors and their values, which to satisfy these requirements, based on ecological cultivation system, which is very restrictive.

The successful of organic cabbage crop in the open field depends heavily on a number of links means of technology, properly applied such as:

[1] University of Agricultural Sciences and Veterinary Medicine, Iaşi, Romania

land choosing, crop rotation, cultivar selection, planting time, planting distances, fertilization and crop protection against weeds, pathogens and pests.

As is known, the main environmental requirements of the cabbage crop are: temperature, light, soil, air and nutrients. Meet the best of the requirements of cabbage to the above environmental factors, should be given the natural circumstances of growing medium because it is almost impossible to ensure optimal plant conditions they need.

The technology can only regulate, to adjust or correct the values of environmental factors, specific measures, which mean the establishment of optimal indices of some technological factors.

Also, if one takes into account the biological and genetic characteristics of species, that this factor can be adjusted by proper choice cultivars. All this motivates the base carrying out research, optimizing some technological factors of early organic cabbage crop in field conditions.

Among the factors that depend on productivity and quality of vegetables the cultivar is the most important because its biological potential will be expressed in terms of appropriate technologies (Stan, 1999, Ciofu, 2003, Munteanu, 2003).

When choosing the most suitable cultivar for head cabbage, will take into account the following criteria: climate and soil conditions, growing place, the goods: fresh consumption, industrialization, seeding date, planting and harvesting period, resistance or tolerance to pests and diseases, adaptation to extreme environmental conditions, extreme temperatures, high salt tolerance levels, economic use of natural fertilizers, consumer preferences on appearance, taste, size etc.

Of course, a cultivar can't have all these requirements, but depending on the goods and the requirement of both consumers and farmers preferences, will choose the most appropriate in the circumstances (Dejeu, 1997).

MATERIAL SI METHOD

In view of reasons set out, the subject under study aims at establishing the most appropriate density and cultivation in ecological system in the NE area of Romania.

In order to achieve the goal, was organized an experience, which included the following objectives: influence of cultivar, planting density and the influence of combinations of two factors on early white cabbage production.

To achieve its purpose at "V. Adamachi "Teaching Station Iasi, between 2006-2008 has been made in the open field experience, the crop of white cabbage, the proposed technological factors were studied by work objectives.

The biological material used for early white cabbage crop was represented by cultivars, adapted to the microclimate of the NE area of Romania: Timpurie de Vidra (fig. 1.), Dittmark, Golden Acre şi K001 F1 (fig. 2.);

Experimental plot design used in the experiments was randomized blocks type (Săulescu, 1967, Jităreanu,1994). Harvested area of experimental plots covered the 30 plants.

Fig. 1 - Early cabbage – Timpurie de Vidra (original)

Fig. 2 - Early cabbage – K001 F1 (original)

Considering the importance studying factors in the growing technology, their ability to change, need to study a large number of repetitions each experimental factors, but also taking into account the possibilities of organizing experience, established hierarchy of factors, as follows:

1. A factor – cultivar, with four graduations: Timpurie de Vidra, Dittmark, Golden Acre, K001 F1;
2. B factor – (crop density) with three graduation: 50.000 pl./ha - (80 x 25 cm); 47.619 pl./ha (70 x 30 cm) si 41.666 pl./ha (60 x 40 cm).

The seedlinds were produced in the UASVM Iasi greenhouse, at the discipline of vegetable growing, in the cellular trays, with trunk pyramid-shaped of 68 cm^3 volume. The crop was performed on a level ground, well flattened for application of drip irrigation. The soil is a cambic chernozem leached medium, pelic, epicalcaric, well supplied in nutrients (Stoleru, 2010). Prepare the ground was done in stages, in autumn and spring, according to the literature.

The crop establishes was carried out by planting seedlings, at distances specified in the second decade of April.

The cabbage crop was care according to technology arising from the literature consulted (Stoian, 2005, Munteanu, 2008), care being taken the major technological measures: aerates soil, weed control, pathogens and pest control, fertilization and irrigation. Harvesting was done manually, at best time of maturity for consumption, since by 10.06 to 15.07.

Collection and processing the experimental data. The experimental data collection was carried out observations and biometric measurements, according to the experimental technique used in experiments.

The experimental variants were compared to with the average experience, the percentage reporting and differences. The influence of experimental factors was assessed using ANOVA. The significance of differences was assessed on the basis of differences limit for three degrees of confidence (95%, 99%, 99,9%) (Săulescu, 1967).

RESULTS AND DISCUSSION

The influence of cultivar on total production at early cabbages. Regarding to the influence of cultivar on total yield of early cabbage crop, during

2006-2008, it ranged from 27.86 t / ha at Timpurie de Vidra to 32.00 t / ha on K001 cultivar (table 1).

As with differences obtained from the average experience, one can say that K001 F1 hybrid achieved a significant production, compared with Timpurie de Vidra variety, which showed significant differences distinctly negative, respectively -2.17 t / ha.

The greatest difference between the two varieties was registered, when comparing the K001 with Timpurie de Vidra, the difference being 4.14 t / ha.

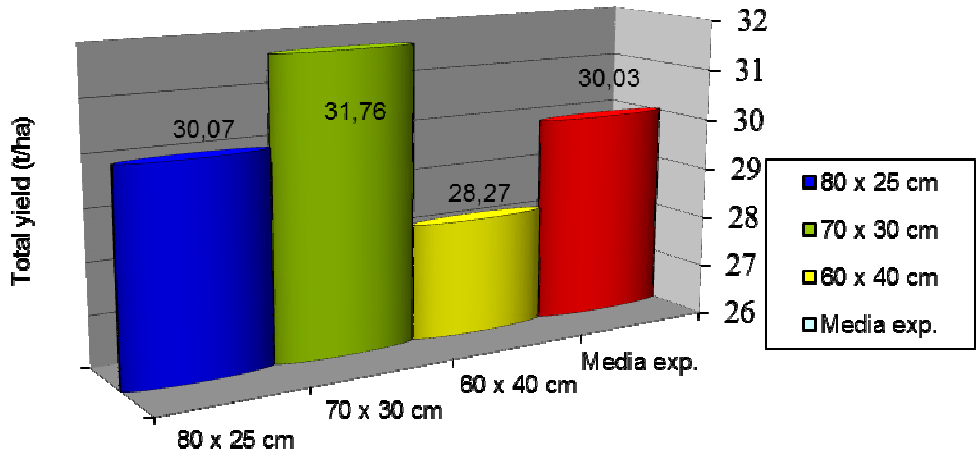
Table 1

Influence of cultivar on production from organic early cabbage (2006-2008)

Variants		Total yield			
		t/ha	% to the average	differences to the average (t/ha)	significance of differences
1	Timpurie de Vidra	27,86	93	-2,17	00
2	Dittmark	29,52	98	-0,15	-
3	Golden Acre	30,74	102	0,71	-
4	K001 F1	32,00	107	1,97	*
x	Average	30,03	100	0,00	-

LSD 5%=1,46 t/ha, LSD 1%=2,13 t/ha, LSD 0,1%=3,69 t/ha.

The influence of planting distance on early cabbage production. Distance between plants in the row and between rows is a technological factor influencing crop density, which is number of plants per unit area. This technological factor, determined directly from the feeding soil surface, light regime etc.



LSD 5%=1,56 t/ha, LSD 1%=2,34 t/ha, LSD 0,1%=3,67 t/ha

Fig. 3 - Graphical representation the influence of planting distance on white cabbage yield

The total production obtained in case of a crop of early cabbage ranged from 28.27 t/ha for distances of 60 cm x 40 cm to 31.76 t/ha, for distances of 70 cm x 30 cm.

The differences obtained between experimental variants and average experience, ranged from -1.76 t / ha for distances of 60 cm x 40 cm, up to 1.73 t / ha for 70 cm x 30 cm variant, the difference obtained was considered positive significant (fig. 3).

The influence of cultivar x planting distance on total production in early cabbages. The total production ranged from 27.06 t / ha for Timpurie de Vidra planted at distance of 60 cm x 40 cm, up to 33.54 t / ha for K001 F1 cultivar, planted at distances of 70 cm x 30 cm, the difference being statistically assured 99%.

Positive differences compared to the average have been obtained when K001 F1 cultivar planted at distances of 80 cm x 25 cm and the cultivar Golden Acre, planted at distances of 70 cm x 30 cm. Negative differences distinct significant and significant were obtained the Timpurie de Vidra variety, planted at distances of 60 cm x 40 cm and 80 cm x 25 cm and Dittmark, planted at 60 cm x 40 cm (table 2).

Table 2

The influence of cultivar x planting density on total yield of organic early cabbages

Variants		Total yield			
no.	**specification**	**t/ha**	**% to the average**	**difference to average (t/ha)**	**significance of differences**
1	Timpurie de Vidra x 50.000 pl./ha	27,60	92	-2,43	0
2	Timpurie de Vidra x 47.619 pl./ha	28,96	96	-1,07	-
3	Timpurie de Vidra x 41.666 pl./ha	27,06	90	-2,97	00
4	Dittmark x 50.000 pl./ha	29,15	97	-0,88	-
5	Dittmark x 47.619 pl./ha	31,66	105	1,63	-
6	Dittmark x 41.666 pl./ha	27,75	92	-2,28	0
7	Golden Acre x 50.000 pl./ha	30,74	102	0,71	-
8	Golden Acre x 47.619 pl./ha	32,84	109	2,81	**
9	Golden Acre x 41.666 pl./ha	28,65	95	-1,38	-
10	K001 F1 x 50.000 pl./ha	32,80	109	2,77	**
11	K001 F1 x 47.619 pl./ha	33,54	112	3,51	**
12	K001 F1 x 41.666 pl./ha	29,64	99	-0,39	-
x	Media experienței	30,03	100	0,00	-

LSD 5%=1,67 t/ha, LSD 1%=2,75 t/ha, LSD 0,1%=3,57 t/ha

CONCLUSIONS

1. Regarding the influence of cultivar on total production in early crop, during 2006-2008, it ranged from 27.86 t / ha at Timpurie de Vidra to 32.00 t / ha K001 cultivar.

2. The total production obtained for early cabbage crop, ranged from 28.27 t / ha for density of 41,666 pl./ha to 31.76 t / ha for density of 47,619 pl./ha.

3. The total production ranged from 27.06 t /ha for the Timpurie de Vidra planted at distances of 60 cm x 40 cm, up to 33.54 t /ha for K001 F1 cultivar, planted at distances of 70 cm x 30 cm, the difference is statistically assured 99%.

REFERENCES

1. **Ciofu Ruxandra, Stan N., Popescu V., Chilom Palaghia, Apahidean Al. S., Horgoş A., Berar V., Lauer K.F., Atanasiu N.**, **2004** - *Tratat de legumicultură*, Editura Ceres, Bucureşti.
2. **Dejeu L., Petrescu C., Chira A.**, **1997** - *Horticultura şi protecția mediului*. Editura Didactică şi Pedagogică, Bucureşti.
3. **Indrea D. si colab., 2007** – *Cultura legumelor*. Editura Ceres, Bucuresti.
4. **Jităreanu G.**, **1994** – *Tehnică experimentală*, curs litografiat U.A. Iaşi;
5. **Munteanu Neculai, Stoian Lucian, Stoleru Vasile, Fălticeanu Marcela**, **2008** – *Baze tehnologice ale legumiculturii ecologice*, Editura Ion Ionescu de la Brad, Iaşi;
6. **Săbăreanu Carmen Maria**, **2010** – *Research on the technology for white cabbage growing in ecological vegetable system, in conditions of Iasi county*. Teză de doctorat, USAMV Iasi.
7. **Săulescu N.A., Săulescu N.N.**, **1967** – *Câmpul de experiențe*, Editura Agro-Silvică Bucureşti;
8. **Savițchi P., Stan N., Panait Tinca, 1979** – *Precizarea epocilor de plantare la varză în solarii în județul Iaşi.* Cercetări Agronomice în Moldova. Culegere de articole, vol. 2, Hortiviticultură.
9. **Stan N., Munteanu N.**, **2001** – *Legumicultură, volumul II*. Editura "Ion Ionescu de la Brad", Iaşi.
10. **Stoian L.**, **2005** – *Ghid practic pentru cultura ecologică a legumelor*. Editura Tipoactiv, Bacău.