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RESEARCH OF TECHNOLOGY DIVERSIFICATION OF THE CULTURE OF THE CARROT ON SOIL BROWN- RUSSETS

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Abstract

Carrots require a deep friable soil for shapely roots. A well enriched loam deeply dug 25-30 cm is best suited for most varieties. For heavy soils is better to select short types as Carrot Rondo , Baby Type , Nantes, Chantenay Red Core. Carrot seeds are small and slow to germinate if they do not have sufficient moisture in the soil. Therefore, carrot crops require irrigation prior to germination to prevent a crust from forming on the soil which impedes germination [1,11]. A good irrigation and nutrient supply are required to enhance quick growth for good quality carrot roots. Too much nitrogen on carrots will cause excessive top growth and poor root development. Accumulating nitrates is made in the first place in leaf then in central cylinder and less in parenchyma [4].Weed management is essential for carrot crops to reduce the compete between them for sunlight , water, nutrients ,space and to produce maximum yields. A plot experiment was carried to study the cultural practices management in order to increase yield and enhance the quality of carrot roots.

Key words: management, moisture, variety, weeds

INTRODUCTION

The carrot is a specific plant of temperate climate and has no pretensions to temperature, but it is pretentious to water nonetheless, especially in the germination period and to light.
Soils in which it develops are well aerated, permeable, profound, with a light-to-medium texture and with a pH comprised between 6.5 – 7.
It has been found that on heavy soils the carrot does not react well, especially the assortment with a long vegetation period (over 130 days).
On such soils carrots can be successfully cultured by proper culture practice and by choosing he proper seeds, i.e. from the short vegetation period assortment, 60-90 days. Superior quality roots can be obtained with a proper form and color, that grow fast and without too many restrictions.
In order to highlight all these aspects and to improve the classical culture technology of the carrot, an experimental field has been placed in Prahova county and the research focuses on the following targets:

- studying an assortment of cultivars,
- studying some culture practices and some factors influencing the production and quality of the carrot roots.

MATERIAL AND METHOD

The experiment has been placed on a brown-reddish soil with clayish texture in Prahova County.
As a biological material, seeds have been used from the short vegetation period assortment: Carrot Baby Type, Purple Haze F1, Rainbow F1, Scarlet Nantes. The description of the cultivars used in this experiment is to be found in Table 1.

Table 1.Biological materials used for study

Variety	Germination (days)	Vegetation period		Root		Variant
		Maturity	No. of days	Shape	Length (cm)	
Purple Haze F1	10-15	semiearly	80-90	conical	20-25	V1
Rainbow F1	6-14	semiearly	70-80	cylinder	19-22	V2
Baby Type F1	17-21	early	50-60	conical	10-12	V3
Scarlet Nantes	10-21	early	60-65	cylinder	15-17	V4

[12]

Sowing date: 1st of March

The preparation of the seedbed is very important in the culture of the carrot if we wish to obtain quality, straight roots, without secondary ramifications.

The classical technology recommends the preparation of the land starting with the autumn, by suppressing the prior culture, disking, exploitation leveling, using chemical fertilizers, 250 kg/ ha superphosphate and 150 kg/ ha potassic salt and 20-30 cm deep ploughing to incorporate the fertilizers [4,6,7].

In early spring perpendicular harrowing is done on ploughing, ammonium nitrate fertilizers are used, the land is crushed and modeled if sowing is to be done on modeled land.[4,8].

Precision sowing influences the thickness growths of the carrot so that the planting density can be amended function of the results we wish [9,10].

Through such a planting scheme a density of 100 pl/ m² is obtained, with the advantage that the culture maintenance works can be done by equipments such as hoeing machines, harvesting machines, but also uniformity can be obtained in culture.

In the case of heavy soils the sowing depth must not exceed 1.5 cm.

Two experimental crops in rotation have been created, C1 and C2, using the sowing scheme and the aforementioned cultivars.

Unformed field with 2 rows per lane, 4 cm distance between rows, 4 cm between plants per row and 50 cm distance between lanes.

On the crop in rotation C1 the classical carrot culture technology has been applied and on the crop in rotation C2 certain culture practices have been created, to underline their influence on the quality and production of carrot roots.

On the crop in rotation C2 two harrowing works have been performed, one perpendicular on the other and after sowing a slight rolling has been performed, and then textile material was placed on the sowed area in order to maintain the soil moisture, knowing that in the last few years, springs have been droughty and the carrot seeds require sufficient water to germinate.

At the same time, in order to avoid hoeing or additional herbicidation, the space between the rows has been mulched with newspaper so that the carrot plants shouldn't have competitors among weeds.

In the classic culture, in order to have a weedless culture, 1-2 mechanical hoeings are necessary, 2 irrigations during the germination period and after the plants emerge, irrigation is done every 8-10 days function of the soil conditions.[2,3,10].

Phytosanitary protection measures have not been necessary, but in the case of some smaller areas, nets against pests can be put up.

The culture in the crop in rotation C2 has been fertilized with a smaller amount of ammonium nitrate, i.e. 50 kg/ha .

The amounts of fertilizers have been divided into 3 doses and applied in 3 different intervals [1,5] on both crops in rotation.

Observations and measurements have been made on the seed germination, on the influence of nutrition on the growth and development of the carrot plants.

RESULTS AND DISCUSSIONS

The germination has been influenced by the application of the textile material to maintain the soil moisture, so that on the crop in rotation C2 this occurred 2 days earlier than on crop in rotation C1. As an emergence percentage, one may follow the values in figure 1.

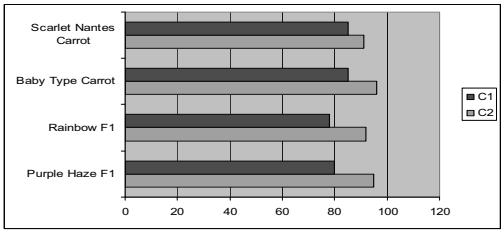

Fig. 1. The emergence percentage

Table 2. Number of days of emergence

Variety	C1	C2
	Germination (days)	Germination (days)
V1	13	10
V2	12	6
V3	18	15
V4	15	10

The plants in the crop in rotation C2 grew faster not having competitors, while on the crop in rotation C1 weekly hoeing have been performed in order to destroy the weeds.
For this reason, a certain ununiformity of the growths in this culture has been found, many plants developed more slowly.
The growth parameters have been measured 15 days and 30 days after the sowing and they have proved that the nutrition level influenced the plants' growth.
Measurements made 15 days after the emergence have shown bigger growths of the leaves in crop in rotation C1 that has been fertilized with a bigger dose of nitrogen, i.e. 100 kg/ha as compared to 50 kg/ha applied to the area C2.
And the measurements made 30 days after the emergence have revealed that on the crop in rotation C1 the growth of the aerial part is significantly bigger than on crop in rotation C2, the values can be checked in tables 3 .

Table 3. Leaf length variation

Cultivar	C1		C2	
	L1	L2	L1	L2
V1	10.1	20.7	8.5	15.4
V2	9.8	18.9	7.2	17.3
V3	8.0	16.9	7.9	16.5
V4	10.3	21.1	8.8	17.8

L1 = length of leaf after 15 days (cm);
L2 = length of leaf after 30 days (cm)

60 days after it has been found that the measured carrot roots show the fact that on the crop in rotation C2 where fertilization has been done with less nitrogen, the growths are significant as compared to the crop in rotation C1 where the aerial part is more developed. (see the values in table 4a,4b)

Table 4a.Influence of cultural practice on root length and girth variation (intermediate results)

No		Characteristic dimension of cultivar	
	Cultivar	L (cm)	Ø (cm)
1	V1	20-25	10-12
2	V2	17-18	10-12
3	V3	10-11	6
4	V4	15-17	10-12

L= length of root; Ø= thickness of root

Table 4b. Characteristic dimension of cultivars

No		C2		C1	
	Cultivar	L (cm)	Ø (cm)	L (cm)	Ø (cm)
1	V1	19.1	8.3	18.0	7.8
2	V2	16.3	8.2	15.7	7.1
3	V3	9.7	4.7	7.9	3.5
4	V4	16.2	10.9	15.1	8.2

L= length of root; Ø= thickness of root

Table 5. Weight root and leaves variation

Cultivar	C2		C1	
	WR +L (g)	WR (g)	WR +L (g)	WR (g)
V1	420	243	379	207
V2	286	146	269	117
V3	170	75	145	55
V4	296	167	276	141

WR+L = weight root + leaves; WR = weight root

CONCLUSIONS

The culture practices applied to heavy soils influence the conditions for the culture of the carrot so that good results can be obtained.
A production of 4.5 kg roots/ m² has been obtained in the case of the classical culture but with a good mechanization while on the crop in rotation C2, where the germination took place earlier and the culture was weed less, a production of 6.5-7 kg roots/ m² has been obtained.
In order to obtain a good carrot culture it is not enough only to choose the cultivar or the type of soil but the culture practice is also important, being the one that can influence the climatic conditions in the grower's favor.

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