

## RESEARCHES REGARDING THE RESPONSE OF SOME BIOTYPES OF CORIANDRUM SATIVUM L. UNDER THE PEDOCLIMATIC CONDITIONS IN THE SOUTH/WESTERN ROMANIA

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### ABSTRACT

The researches were carried out on a moderate gleyed aluvisoil in Bârzava Water Meadow (Lunca Bârzavei), an area where the average annual precipitations is of 630 mm and the average air temperatures of 10.8 °C. The studies varieties were Sandra and Omagiu from Romania, the Aromat variety from Republic Moldavia and the variety Proveniența de Voivodina from Serbia. This paper contains data regarding the influence of the seeding period on the crop, on the volatile oil content and on the volatile oil production. As regarding the influence of the seeding period on crops, the results obtained for all varieties reveal a crop decreasing tendency if the seeding is done later, as compared to the results obtained when the seeding was done at the beginning of March. The richest crop was of 1451 kg/ha and was obtained for the variety Aromat, seeded in the period March 1 to March 5, a variety which also gave the highest content of volatile oil, which is 1.17 % and the highest production of volatile oil, which is 17.21 kg/ha.

**Keywords:** *Coriandrum sativum* L., varieties, crop, volatile oil production

### INTRODUCTION

Coriandrum is cultivated for its fruits (Coriandri fructus), which contain volatile oil (Aetheroleum coriandri). These varieties have a volatile oil content of 1% to 1.8%. (MUNTEAN et al., 2007).

In Romania the seeding is done during the winter windows, in February – March, the distance between rows being of 25 cm – 50 cm (VERZEA, 2000). The sprout density should be of 200 plants / m<sup>2</sup> (PĂUN, 1988).

In the regions with short and warmer winters, the coriander can be seeded on summer, at the end of August, or early in spring, in February – March (BÎLTEANU, 2001).

### MATERIAL AND METHOD

The researches were bifactorial, with three repetitions, the A factor being the cultivated variety – a<sub>1</sub> – SANDRA; a<sub>2</sub> – OMAGIU; a<sub>3</sub> – AROMAT; a<sub>4</sub> – PROVENIENȚA DE VOIVODINA).

B Factor – seeding time (b<sub>1</sub> – March 1 – 5; b<sub>2</sub> – March 10 – 15; b<sub>3</sub> – March 20 – 25 and b<sub>4</sub> – April 1 – 5).

The foregoing plant was the winter wheat. The fertilization was uniformly done with N<sub>60</sub>P<sub>60</sub>K<sub>60</sub>.

The weed control was done by herbicidation with Eradicane (6l/ha). During the vegetation period there has been done a treatment with Decis CE 29 (0,05%) in order to control the fruits wasp (*Systole coriandri*).

There have been done determinations regarding the height of the plants, the degree of ramification, the number of shadows and of fruits/plant, the mass of a thousand seeds and

there has been determined the volatile oil content, the fruit crop and the volatile oil production when the plants reached their maturity.

## RESULTS

Table 1 contains the crop results according to the cultivated variety and the seeding period obtained during the experimental cycle.

**Table 1. Synthesis of the crop results according to the variety and to the seeding period**

| A Factor<br>Variety | B Factor – The seeding period |                |             |             | Averages of the A factor – The cultivated variety |     |                     |               |
|---------------------|-------------------------------|----------------|-------------|-------------|---|-----|---------------------|---------------|
|                     | 1 – 5 III                     | 10 – 15<br>III | 20 – 25 III | 1 – 5<br>IV | Crop<br>kg/ha                                     | %   | Difference<br>kg/ha | Signification |
| SANDRA              | 1151                          | 979            | 628         | 455         | 803   | 100 |                     |               |
| OMAGIU              | 1373                          | 1156           | 840         | 500         | 979   | 122 | 176                 | XXX           |
| AROMAT              | 1451                          | 1235           | 866         | 520         | 1018  | 127 | 215                 | XXX           |
| VOIVODINA           | 1187                          | 1010           | 785         | 466         | 862   | 107 | 59                  | XX            |

**DL 5% = 34    DL1% = 52    DL0,1% = 84**

### Averages of the B factor – The seeding period

| Specification    | 1 – 5 III | 10 – 15 III | 20 – 25 III | 1 – 5 IV |
|------------------|-----------|-------------|-------------|----------|
| Crop kg/ha       | 1298      | 1095        | 779         | 485      |
| %                | 100       | 84          | 60          | 37       |
| Difference kg/ha |           | 203         | -519        | -813     |
| Signification    |           | 000         | 000         | 000      |

**DL 5% = 46    DL1% = 63    DL0,1% = 84**

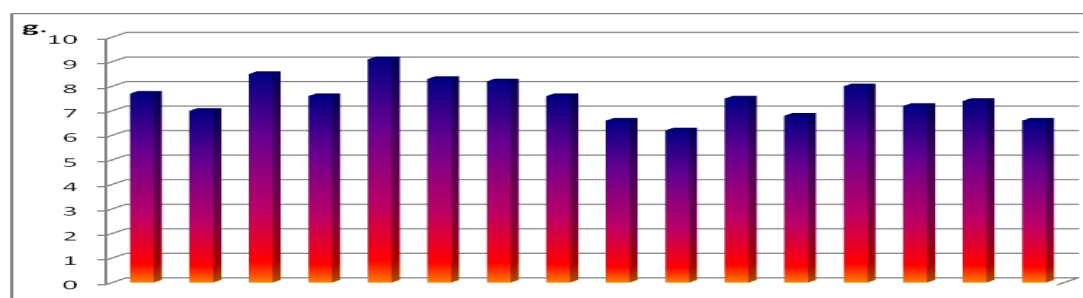
The results revealed that the richest crop was obtained for the variety Aromat, which exceeded the crop results obtained for the reference variety Sandra with an average of 27% for the four seeding periods, respectively with a very significant difference of over 200 kg/ha. To notice is that this variety produced a crop of over 1450 kg/ha, if early seeded, that is during the first days of March.

Among the local varieties the best one was the variety Omagiu.

The Romanian varieties Sandra and Proveniența De Voivodina are less adapted to the area where the researched were carried on.

As regarding the influence of the seeding period on crops, the results obtained for all varieties reveal a crop decreasing tendency if the seeding is done later, as compared to the results obtained when the seeding was done at the beginning of March. The crop differences are very significant negative, with over 200 kg/ha in case of a 10 days delay, with over 500 kg/ha in case of a 20 days delay and with over 800 kg/ha in case of a 30 days delay.

The evolution of the mass of a thousand seeds according to the variety and to the seeding period is presented in *Figure 1*.

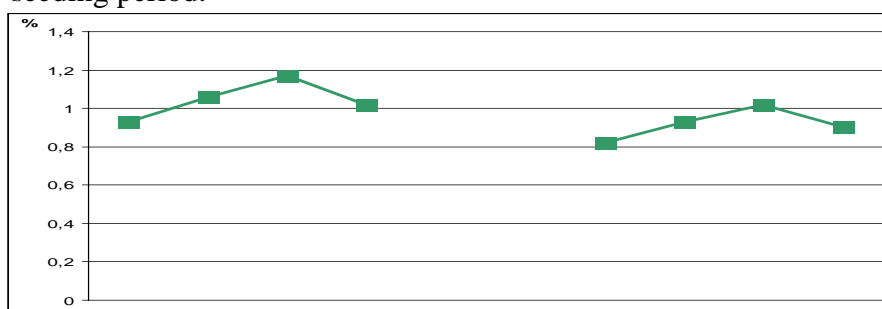


|        |     |        |     |        |     |           |     |        |     |        |     |        |     |           |     |
|--------|-----|--------|-----|--------|-----|-----------|-----|--------|-----|--------|-----|--------|-----|-----------|-----|
| 7,7    | 7,0 | 8,5    | 7,6 | 9,1    | 8,3 | 8,2       | 7,6 | 6,6    | 6,2 | 7,5    | 6,8 | 8,0    | 7,2 | 7,4       | 6,6 |
| E1     | E2  | E1     | E2  | E1     | E2  | E1        | E2  | E1     | E2  | E1     | E2  | E1     | E2  | E1        | E2  |
| SANDRA |     | OMAGIU |     | AROMAT |     | VOIVODINA |     | SANDRA |     | OMAGIU |     | AROMAT |     | VOIVODINA |     |
| 2011   |     |        |     |        |     |           |     | 2012   |     |        |     |        |     |           |     |

**Figure 1. The evolution of the mass of a thousand seeds (g) according to the variety and to the seeding period**

To notice is the fact that by all varieties the mass of a thousand seeds has decreased when the seeding was done later, because the grains were formed and ripened during a period of hydric and thermal stress in the variant seeded with 30 days delay.

Figure 2 presents the evolution of volatile oil content according to the cultivated variety and to the seeding period.



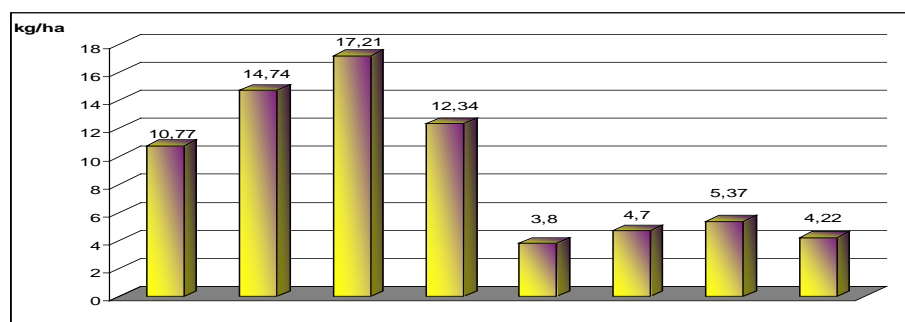
| VARIETY        | SANDRA      | OMAGIU | AROMAT | VOIVODINA | SANDRA      | OMAGIU | AROMAT | VOIVODINA |
|----------------|-------------|--------|--------|-----------|-------------|--------|--------|-----------|
| % volatile oil | 0.93        | 1.06   | 1.17   | 1.02      | 0.82        | 0.93   | 1.02   | 0.90      |
| $\bar{X}$      | 1.045       |        |        |           | 0.917       |        |        |           |
| Difference %   |             |        |        |           | -0,128      |        |        |           |
| Seeding period | March 1 – 5 |        |        |           | April 1 – 5 |        |        |           |

**Figure 2. The variation of the volatile oil content (%) according to the variety and to the seeding period**

The highest volatile oil content for both seeding periods was registered for the variety Aromat, and the lowest content was determined for the variety Sandra.

Postponing the seeding from the beginning of March to the beginning of April determined the decrease of the volatile oil content as result of overlapping of the accumulation period with the daily high average temperatures specific in case of late seeding.

The volatile oil production determined for the 4 varieties during the experimental cycle according to the seeding period (Figure 3) shows a variation amplitude of between 3,80 kg/ha and 17,21 kg/ha in the researched field.



| VARIETY          | SANDRA      | OMAGIU | AROMAT | VOIVODINA | SANDRA      | OMAGIU | AROMAT | VOIVODINA |
|------------------|-------------|--------|--------|-----------|-------------|--------|--------|-----------|
| Production kg/ha | 10.77       | 14.74  | 17.21  | 12.34     | 3.80        | 4.70   | 5.37   | 4.22      |
| Difference kg/ha |             | 3.97   | 6.44   | 1.57      |             | 0.90   | 1.57   | 0.42      |
| "X"              | 13.76       |        |        |           | 4.25        |        |        |           |
| Difference kg/ha |             |        |        |           | -9.51       |        |        |           |
| Seeding period   | March 1 - 5 |        |        |           | April 1 - 5 |        |        |           |

**Figure 3. The volatile oil production (kg/ha) according to the variety and the seeding period**

The average results for the four varieties reveal a decrease of over 9 kg/ha volatile oil when the seeding takes place 30 days later, this happening because we encounter a delay in the formation of fruits and in the accumulation of volatile oil until the period with high temperatures in the summer, which determined not only a crop decrease, but also a decrease in the volatile oil content.

## CONCLUSIONS

*Coriandrum sativum* L. finds favourable conditions on the aluvisoils in Bârzava Water Meadow (Lunca Bârzavei) in the Western Romania. We can obtain here economically efficient crops, with an acceptable level of volatile oil.

The varieties Aromat und Omagiu distinguished themselves themselves among the researched varieties and there is not justified to continue to cultivate the varieties Sandra and Provenienței De Voivodina.

Among the periods, the early seeding, at the beginning of March, proved to be the best in providing the maturity of fruits before the high temperatures of the summer season come,

as these high temperatures, together with the hydric and thermal stress negatively influence the crops and the volatile oil content.

#### ACKNOWLEDGEMENTS

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