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A NEW VARIETY OF *ORIGANUM VULGARE* L. – DENIS, CREATED AT VRDS BACĂU IN ECOLOGIC AGRICULTURE CONDITION, CERTIFIED IN 2007 YEAR

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Abstract: Oregano is a perennial plant of 0,6 – 0,8m high. The flowers are small, coloured in red till lilac-lavender. It blossom from July till September, being pollinated by bees. The utility rate of plants is 3 : 5.
In the literature is mentioned as a plants with multiple uses: *culinary* (as a condiment plant or for the preparation of a aromatised tea, the leaves can be consumed fresh or cooked); *ornamental* (is decorative through port, bush and flowers: often is cultivated in pots); m*edicinal* (is has an antiseptically and expectorant effects, being used also in affections of respiratory systems, indigestions, arthritis, aromatherapy etc); melliferous (is a good melliferous plant); *in biologic agriculture* (with repellent effect for insects, is recommended for association with many vegetable species, also because the plants cover very well the soil, thus providing an herbicide effect); *cosmetics* (perfume, soap, spay industry).

Key words: *Origanum vulgare* L., common name oregano, origami, arigan, marjoram belongs to *Lamiaceae* family and its origin habitat is Europe.

Introduction

The researches aimed toward the creation of new varieties at perennial plants with multiple uses that correspond with the actual trends, able to be cultivated also after the techniques and principles of biologic agriculture.

The study of germ-plasma resources, the creation of new initial breeding material, selection and multiplication of valuable lines, were accomplished in „bio" cultivation conditions, in the experimental polygon ecologically certified, from V. R. D. S. Bacău.

The objectives of the present study were focused toward the introduction in open field cultivation systems of varieties of utile perennial plants, through the creation of new germ-plasma resources, the selection of a valuable biological material with genetic stability, the improvement of decorative qualities, the production of multiplication material with

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biological and phyto-sanitary qualities that correspond with the international quality standards and that are well adapted in the pedo-climatic conditions from our country.

Materials and methods

The researches were accomplished at V. R. D. S. Bacău, during 2001- 2005 years, on a local population of *Origanum vulgare* L. with a large genetic variability, from which, through individual and on families repeated selections, the main selection criteria being the decorative character, adapted for pot cultivations, a line was obtained. This line is characterised through uniformity, stability, authenticity and was forwarded to ISTIS Bucharest for the accomplishment of DHS test and then certified in 2008 under the name of ″Denis″.

For the decorative characters the following quantitative and qualitative characteristics have been screened: plant's height; bush diameter; the port; the ratio height/diameter, the number of floral cane per plant; the inflorescence diameter; the colour of flowers; the blossom period; the blossom precocity; the resistance to low temperatures during the winter, the degree of plant's branching. The cultivation was conducted according with the biologic agriculture regulations (low inputs): two phasial fertilisations with Cropmax 0,2 %, in the vegetation period and before blossom; four manual weeding on row and three with machines between the rows.

The dry matter and water contain was determined through the drying of plants at 105°C.

The minerals were determined through the calcinations of plants at 560°C, followed by the solubilisation in HNO3 concentrated and in solution of 1%, being analysed through an inductor spectrometer coupled with plasma (ICP-ES) IRIS INTREPRID.

The extraction of the volatile oil was achieved through hydro-distillation in an equipment type Neoclevenger. The separation of the volatile compounds was realised through a chromatograph with gas Agilent, utilising an capillary column DB-5 of 25 m long. The utilised gas was helium.

The identification of the compounds was achieved through a spectrometric detector (Agilen), and the verification of the results was made based on Kovats indices.

Results and discussions

At the *Origanum vulgare* specie, the biologic material from the germplasm collection is extremely valuable for its utilisation in the breeding program for the creation and promotion of new cultivars.

The studies regarding the quantitative characteristics, the main criteria for the initial breeding material creation and selection, through which the decorative characters are underlined, are presented in **Table 1**.

The studies concerning the qualitative characters are focused toward the plant's port, the colour of flowers, blossom period, earliness at blossom, resistance to low temperatures during the winter; the degree of plant's branching. The results are presented in **Table 2**.

Due to the high variability degree of the initial biologic material, the individual selection was made on mother plants (vegetative), followed by the selection on families obtained after the generative multiplication (with seeds from elite plants that produced

seeds in the same year of vegetation). Thus, we tried to shorten the selection period, the stabilisation of the selected line and the achievement of the objectives established from decorative point of view. Another goal was the achievement of the selected material uniformity.

Due to the fact that *Origanum vulgare* L. is specie recognised first of all as a spicy, aromatic and medicinal plant the studies were focused also on the determination of the mineral content and the essential volatile oil components.

The studies accomplished at ″Denis″ variety concerning the mineral content from mature stems, young stems, leaves, flowers and roots, expressed in mg/100 g f.w. (Table 3) shows that, in all parts of plants the quantities of calcium and potassium are the highest: the calcium vary from 562, 36 mg/100 g f.w. (leaves) to 116,79 mg/100 g f.w (roots); the determined potassium shows the fact that the highest accumulations are in leaves (1970 mg/100 g f.w) and flowers (557,64 mg/100 g f.w). High values were recorded for magnesium in flowers (132,37 mg/100 g f.w), young stems (101,66 mg/100 g f.w) and roots (98,61 mg/100 g f.w).

In the young stems the highest content is in: Ca (522,34 mg/100 g f.w), K (216,33 mg/100 g f.w) and Mg (101,66mg/100 g f.w).

In the mature stems the highest content is in: K (227,49 mg/100 g f.w) and Ca (211,54 mg/100 g f.w).

In leaves, the highest content is in: K (1970,35 mg/100 g f.w), Ca (562,36 mg/100 g f.w) and Ba (129,68 mg/100 g f.w). Tracks of Mg, Al and Na minerals can be also noted.

In flowers, the highest content is in: K (557,64 mg/100 g f.w), Ca (163,77 mg/100 g f.w), Ba (116,74 mg/100 g f.w) and Al (116,41 mg/100 g f.w).

In roots, the highest content is in: K (331,06 mg/100 g f.w), Ca (116,79 mg/100 g f.w), Al (98,98 mg/100 g f.w) and Mg (98,61 mg/100 g f.w). Tracks of Fe and Na minerals can be also noted.

The compounds of the volatile oils that were identified (un number of 33 compounds) through the correlation between the spectrum and the retention time (Table 4 and Figure 1), shows that, the most important compounds are: gama-terpinen (18,58 %), p-cimen (15,07 %), beta-cariofilen (13,46 %), cariofilen oxid (5,42 %), sabinen (5,12 %), trans-beta-ocimen (4,31%), cis-beta-terpineol (4,19 %).

The important compounds are registered between 1 % to 3 %: terpinen-4-ol (2,72 %), borneol (2,69 %), germacren D-4-ol (2,53 %), alfa-farnesen (2,46 %), m cis-beta-ocimen (2,34 %), alfa-cadinol (2,14 %), alfa-terpinen (2,05 %), camfen (1,7 %), alfa-pinen (1,3 %), alfa-himacalen (1,45 %), tau-muurolol (1,02 %) and alloaromadendren (1,01 %).

Except the number of 6 compounds (under 0,50 %), the rest of them (8 compounds) are registered below 0,5% to 1 %: mircen (0,98 %), silvestren (0,94 %), terpinolen (0,76 %), Thujen (0,69 %), alfa-cariofilen (0,64 %), Elixen (0,63 %), beta-pinen (0,61 %) and longifolen aldehidç (0,5 %).

The chromatogram of the essential oils is presented in **Graphic 2**.

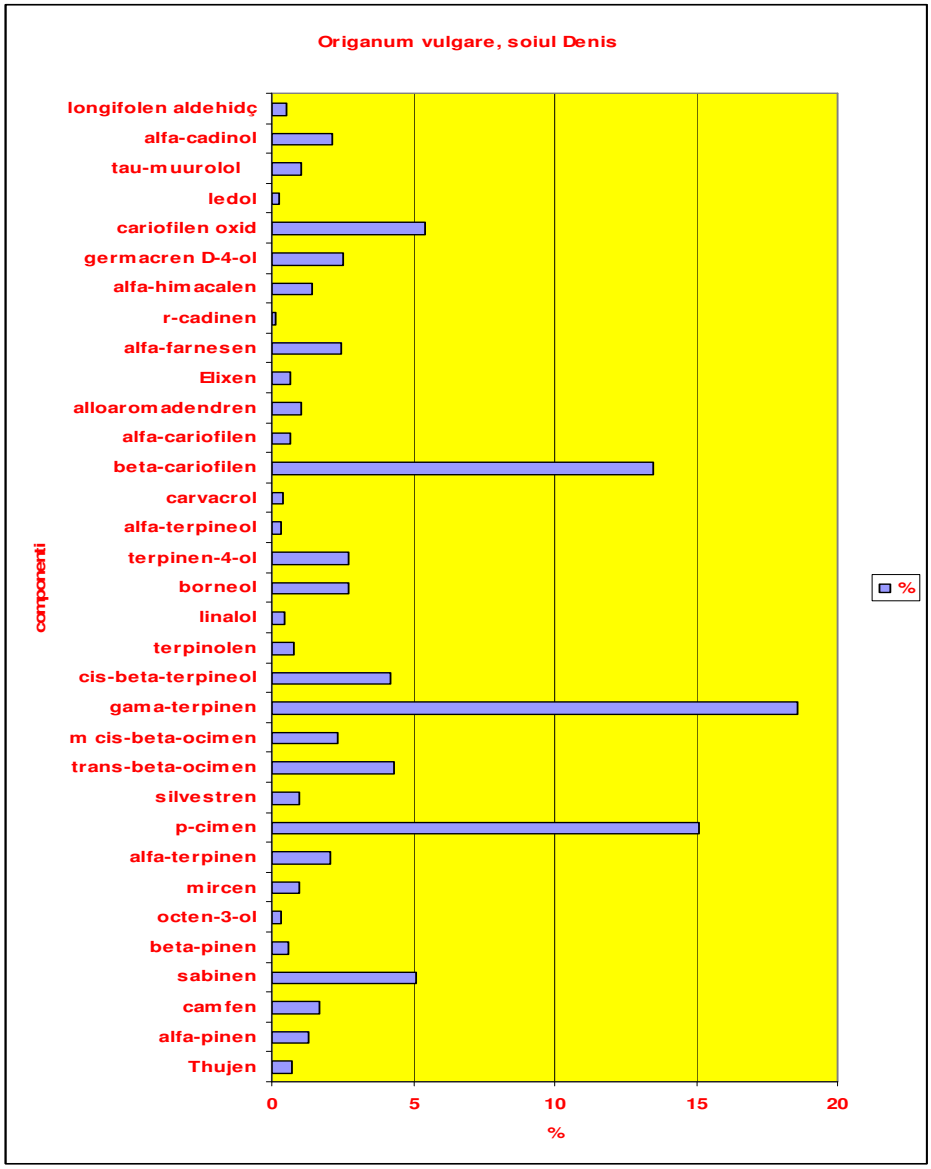

Fig. 1. Graphical representation of the essential oils at Origanum vulgare L., variety "Denis"

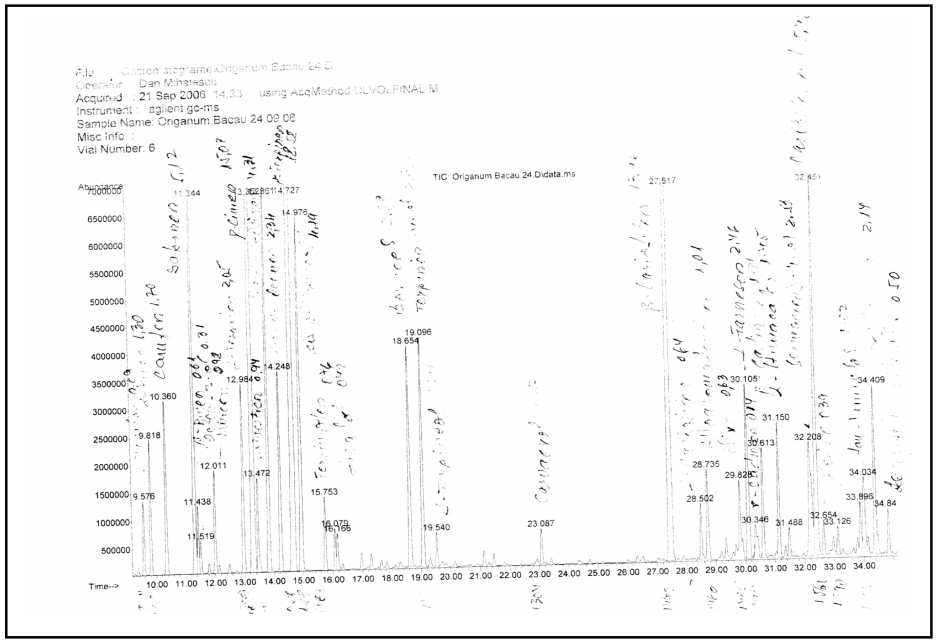

Fig. 2. The chromatogram of the essential oils at *Origanum vulgare* L.*,* variety "Denis"

Conclusions

- The accomplished studies underline the value of the biologic material that was created, selected and multiplied at V. R. D. S. Bacău at *Origanum vulgare* L. species, during 2002-2006 years.
- The utility as a decorative specie is emphasized by the quantitative and qualitative characteristics, followed and accomplished through selection and propagation, both for the creation of the initial material and for the breeding program.
- The studies concerning the content in minerals, on mature stems, young stems, leaves, flowers and roots expressed in mg/100 g f.w., shows the fact that in all plant's parts the calcium and magnesium content is the highest; the determined potassium shows the biggest accumulations in leaves. Magnesium has high values in flowers, young stems and roots. The highest content of the mature stems is in K and Ca.
- The study of the volatile oil content through the identification of a number of 33 compounds, confirms the multiple utility of the plant (especially as a spicy, aromatic and medicinal plant).
- The cultivation in unconventional conditions, in the perimeter of the biologic farm from V. R. D. S. Bacău, through the application of the low input technologies, assures the quality of the selected and propagated biologic material.

Table 1. The quantitative characteristics of the new cultivar ″Denis″, comparing with its original population

Cultivar	Plant's height cm	Plant's diameter cm	Ratio H/D	No of flower cane/ plant	Length of flower cane cm	Diameter of inflorescence cm
Local population	45-50	35-40		7-10	40-45	4-5
Soiul ″Denis″	35-45	30-45		8-12	30-55	5-7

Table 2. The qualitative characteristics of the new cultivar ″Denis″, comparing with its original population

Cultivar	Plant's port	Colour of flowers	The blossom beginning	The blossom period	Resistance to winter	Branching degree
Local population	bush	pink-lilac	20-25 June	June - Aug	good	strong
Soiul ″Denis″	branched bush	dark pink-lilac	10-55 June	June - Sept	very good	very strong

Table 3. The mineral content per plant`s organs at the analysed of *Origanum vulgare,* variety ″Denis″ (mg/100 g f.w.)

Elements	Young stems	Mature stems	Leaves	Flowers	Roots
Al	34,35	10,33	40,98	116,41	98,98
B	77,75	0,24	0,69	0,518	0,48
Ba	0,00	48,76	129,68	116,74	97,82
Ca	522,34	211,54	562,36	163,77	116,79
Cr	0,144	0,08	0,25	0,26	0,23
Cu	0,21	0,22	0,58	0,417	0,33
Fe	21,87	6,79	17,26	82,61	68,53
K	216,33	227,49	1970,35	557,64	331,06
Mg	101,66	49,65	80,67	132,37	98,61
Mn	1,29	0,47	0,77	2,836	1,96
Na	10,15	9,06	47,20	48,09	40,04
Ni	0,00	0,00	0,00	0,15	0,00
P 1859	4,45	6,87	14,90	4,72	2,72
P 2136	10,62	9,20	23,92	9,23	6,11
Pb	0,07	0,08	0,13	0,10	0,06
Sr	1,45	0,44	2,02	0,40	0,22
Zn	0,62	0,54	1,50	1,86	1,36

Table 4 . The analysis of volatile oil 1% in pentan

Nr. crt.	The content in volatile oil	%
1.	Thujen	0,69
2.	alfa-pinen	1,3
3.	camfen	1,7
4.	sabinen	5,12
5.	beta-pinen	0,61
6.	octen-3-ol	0,31
7.	mircen	0,98

8.	alfa-terpinen	2,05
9.	p-cimen	15,07
10.	silvestren	0,94
11.	trans-beta-ocimen	4,31
12.	m cis-beta-ocimen	2,34
13.	gama-terpinen	18,58
14.	cis-beta-terpineol	4,19
15.	terpinolen	0,76
16.	linalol	0,42
17.	borneol	2,69
18.	terpinen-4-ol	2,72
19.	alfa-terpineol	0,34
20.	carvacrol	0,37
21.	beta-cariofilen	13,46
22.	alfa-cariofilen	0,64
23.	alloaromadendren	1,01
24.	Elixen	0,63
25.	alfa-farnesen	2,46
26.	r-cadinen	0,14
27.	alfa-himacalen	1,45
28.	germacren D-4-ol	2,53
29.	cariofilen oxid	5,42
30.	ledol	0,29
31.	tau-muurolol	1,02
32.	alfa-cadinol	2,14
33.	longifolen aldehidç	0,5

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