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MORPHOLOGICAL RESEARCHES REGARDING THE INFLUENCE OF TOPSIN M TREATMENTS ON MENTHA LONGIFOLIA (L.) HUDS. SPECIES. NOTE 2.

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INTRODUCTION

The abusive and disordered employment of pesticides have the potential to harm human health and the environment and pose ecological risk to ecosystems.

Because of possible health effects, widespread use and insufficient data, pesticide monitoring in plants is necessary. Some of the pesticide monitoring aspects refere to the investigation of the pestide influence on the morphological features of medicinal plants.

Data from literature report that pesticides may affect morphological features of plants, as following:

- smaller and fewer leaves, smaller axial organs (carbamate and amido-type erbicides (5);
- depigmentations along the nervures, necrosis at the edge of the leaves (urea and sulphonylurea derivates; alchyl N-phenylcarbamates and alchyl-N-phenylthiocarbamates) (1, 2, 3);
- variation of the lenght of the leave limb and the lenght of the whole plant (fungicides) (4). Topsin M is a common systemic fungicide used as protective/curative substance for alimentary and medicinal plants. That's why it's relevant to evaluate the influence of Topsin M upon the morphological features of *Mentha longifolia*, a volatile oil producing medicinal plant and parental species for the hybrid *Mentha* × *piperita*.

MATERIALS AND METHODS

Plant materials were brought from the experimental lots in "Anastasie Fatu" Botanical Garden, Iasi. In this experimental area, parallel cultures of *Mentha longifolia* (L.) Huds. have been made in 2001-2003 period.

Thus, every year there have been two experimental fields: a field which had no pesticide treatment (control field) and a field which had been treated with pesticide.

The antifungal treatment was achieved in vegetative phase by spraying a wettable powder of Topsin M 70 PU (TM) (Oltchim Rm. Valcea-Romania) as 0,1% and 0,4% aqueous solutions. Investigated samples of *Mentha longifolia* are presented in table 1:

Table 1. Samples of *Mentha longifolia*

Nr.	Sample	Codification
1.	Control 2001	M.l. M 2001
2.	Treatment TM 0,1% 2001	M.l. TM 0,1% 2001
3.	Control 2002	M.l. M 2002
4.	Treatment TM 0,4% 2002	M.l. TM 0,4% 2002
5.	Control 2003	M.l. M 2003
6.	Treatment TM 0,1% 2003	M.l. TM 0,1% 2003
7.	Treatment TM 0,4% 2003	M.l. TM 0,4% 2003

The morphological study was achieved through the analysis of the parameters concerning aspect, colour and dimensions of the leaves (officinal product) from both treated and untreated plants, as following:

- the shape;
- the edges, base and top;
- covered hairs for the both faces of leaves;
- the length and breadth (cm), depending of the leaf insertion: top, middle or the base of stem. For each type of leave, for each variant of treatment and for each control, there have been made 10 measurements of the studied parameter.

The dimensional parameters data were statistically analysed through the *Oneway Anova* method using J.M.P. Programme 5.0.1.2. (SAS Institute, Cary N.C., S.U.A).

RESULTS AND DISCUSSION

Mentha longifolia leaves from both untreated (fig. 1) and TM 0,1% (fig. 2) and TM 0,4% (fig. 3) treated plants have the some morphological features of the leave.

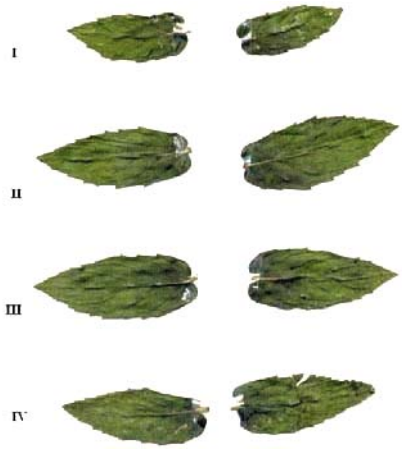

Fig. 1. Control plants

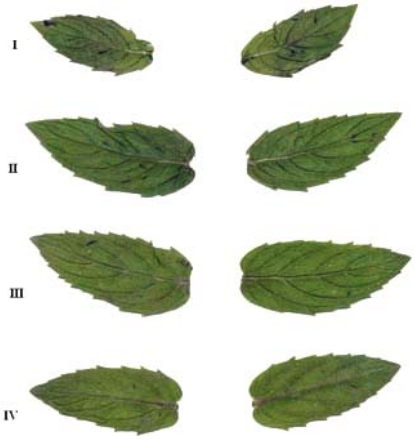

Fig. 2. TM 0,1% treated plants

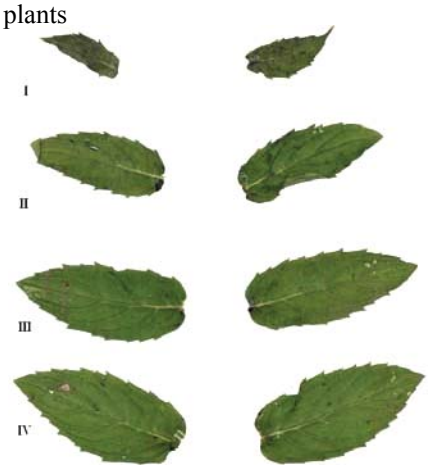

Fig. 3. TM 0,4% treated plants

The leaves lanceolate or oblong were sessile and arranged opposite on stem.

The tip of the limb is sharp and the base is narrowed.The edges of the leaves are convex and almost parallel and have triangular teeth, 1-4 mm distanced forward orientated.

The nervation is pennate and proeminent on the lower surface. Leaves have covered hairs placed especially along the nervures on the lower surface.

The leaves are dark green on the upper surface and lighter on the lower surface. The powdered leaves have an aromatic, characteristic smell.

The dimensional parameters of both untreated and treated vegetal material are shown in table II, as minimal and maximal values registered for each type of leave.

Table 2. The dimensional parameters (cm) of foliar limb of *Mentha longifolia*

Year	Sample	Top leaves		Middle leaves		Basal leaves	
		lenght	breadth	lenght	breadth	lenght	breadth
2001	M.l. M	2.0 – 2.5	0.9 – 1.7	3.0 – 4.2	1.2 – 1.6	2.8 – 4.1	1.0 –1.7
	M.l. TM 0,1%	2.4 – 2.9	1.4 - 1.9	3.2 – 4.2	1.3 – 1.8	3.0 – 4.4	1.2 – 1.9
2002	M.l. M	2.3 – 2.9	1.1 – 1.6	3.5 – 4.3	1.2 – 1.8	3.0 – 4.3	1.3 – 1.6
	M.l. TM 0,4%	1.9 – 2.9	0.8 – 1.4	3.6 – 4.2	1.1 – 1.6	3.0 – 4.1	1.2 – 1.6
2003	M.l. M	1.7 – 2.3	0.7 – 1.2	3.5 – 4.3	1.4 – 1.6	3.0 – 5.0	1.3 – 1.9
	M.l. TM 0,1%	2.3 – 3.3	1.2 – 1.9	3.8 – 4.4	1.7 – 2.0	2.9 – 3.8	1.3 – 1.8
	M.l. TM 0,4%	2.4 – 4	1 - 1.9	3.9 – 4.8	1.2 – 2.1	2.7 – 3.6	1.3 – 1.9

The dimensional parameters data were statistically analysed through the *Oneway Anova* method using J.M.P. Programme 5.0.1.2. (SAS Institute, Cary N.C., S.U.A) (6).

Statistical data (x - mean; SD - standard deviation; p*- indicator for evaluation of statistical significance) were presented in tables 3 and 4:

Table 3. Biometrical data of *Mentha longifolia* leaves – the length of foliar limb (cm)

Nr.	Sample	Top leaves			Middle leaves			Basal leaves		
		x	SD	p*	x	SD	p*	x	SD	p*
1.	M.l. M 2001	2.23000	0.176698	**0.0006**	3.71000	0.369534	0.6643	3.22000	0.456557	**0.6619**
2.	M.l. TM 0,1% 2001	2.57000	0.188856		3.78000	0.339280		3.32000	0.545283	
3.	M.l. M 2002	2.61000	0.228279	0.3450	3.82000	0.342540	0.4504	3.39000	0.472464	0.8614
4.	M.l. TM 0,4% 2002	2.49000	0.317805		3.92000	0.225093		3.43000	0.535516	
5.	M.l. M 2003	2.10000	0.240370	0.18409	4.02000	0.274064	- 0.16502	4.39000	0.645411	**0.47821**
6.	M.l. TM 0,1% 2003	2.77000	0.394546		4.14000	0.206559		3.39000	0.369534	
7.	M.l. TM 0,4% 2003	2.94000	0.602218	**0.35409**	4.46000	0.283627	**0.15498**	3.17000	0.333500	**0.69821**

It is considered that the results are statistically significant if **p* *is lower than 0.05***, in case of 2001 and 2002 samples, or if **p* has a positive value** for 2003 samples.

Table 4. Biometrical data of *Mentha longifolia* leaves – the breadth of foliar limb (cm)

Nr.	Sample	Top leaves			Middle leaves			Basal leaves		
		x	SD	p*	x	SD	p*	x	SD	p*
1.	M.l. M 2001	1.24000	0.250333		1.41000	0.137032	**0.0400**	1.30000	0.262467	
2.	M.l. TM 0,1% 2001	1.63000	0.176698	**0.0008**	1.57000	0.182878		1.52000	0.278089	**0.0855**
3.	M.l. M 2002	1.36000	0.171270	0.0150	1.48000	0.161933	0.3386	1.42000	0.113529	0.3618
4.	M.l. TM 0,4% 2002	1.15000	0.177951		1.40000	0.200000		1.47000	0.125167	
5.	M.l. M 2003	1.01000	0.172884		1.52000	0.063246	**0.14982**	1.69000	0.196921	- 0.19197
6.	M.l. TM 0,1% 2003	1.44000	0.195505	**0.18511**	1.84000	0.107497		1.66000	0.142984	
7.	M.l. TM 0,4% 2003	1.34000	0.279682	**0.08511**	1.72000	0.234758	**0.02982**	1.61000	0.246982	- 0.14197

The statistical data reveal that the following dimensional variations compared to the corresponding controls are significant:

- increase in lenght and breadth of the top leave limb at the 0,1% treated plants;
- increase in breadth of the middle leaves limb at 0,1% treated plants as well as an increase of lenght and breadth of the same leave at 0,4% treated plants;
- decrease in lenght of basal leaves limb at TM 0,1% and TM 0,4% treated plants;
- increase in breadth of basal leaves at TM 0,1% treated plants.

SUMMARY

Topsin M is a common systemic fungicide used as protective/curative substance for alimentary and medicinal plants. That's why it's relevant to evaluate the influence of Topsin M upon the morphological features of *Mentha longifolia*, a volatile oil producing medicinal plant and parental species for the hybrid *Mentha* × *piperita*. We noticed statistical significant variations (Oneway Anova) of the dimensional features of the leaves from Topsin M treated plants comparing to the control.

CONCLUSIONS

Antifungal treatment with Topsin M did not affect morphological features of *Mentha longifolia* leaves, excepting dimensional features.

We noticed statistical significant variations (*Oneway Anova*) of the dimensional features of the leaves from Topsin M treated plants comparing to the control, as following:

- lenght and breadth of top leaves limb increase at 0,1% TM treated plants;
- lenght and breadth of middle leaves limb increase at 0,4% TM treated plants;
- only the breadth of middle and basal leaves limb increase at TM 0,1% treated plants;
- length of basal leaves limb decrease at TM 0,1% treated plants.

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