CORRELATION SOIL POLLUTION - DEVELOPING OF ENDANGERED *OROBANCHE* SPP.

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Abstract

It is a study about the influences of soil conditions in the context of soil pollution, in the habitats of populations of Orobanche, in 21 resorts (10 in Romania and 11 in Baden - Würtenberg) in hilly and collinear areas. Orobanche populations targeted research that is developing in natural ecosystems in Romania and Baden-Württemberg (southern Germany), similar areas in terms of physical and climatic conditions and biodiversity. The soil sample tests focused on humidity, determination of pH, determination of ammonia nitrogen, nitrate nitrogen, phosphorus, assimilable organic carbon. The tests performed did not mention too high values; it was expected, considering that most resorts are located in protected, fertilized and unexplored areas.

Key words: pollution, soil sample analysis, natural ecosystems, *Orobanche* populations.

INTRODUCTION

This work is a study of the influence of soil conditions in the context of soil pollution in habitats *Orobanche* populations in 21 stations (10 in Romania and 11 in Baden-Württemberg) in hilly and collinear areas. *Orobanche* populations targeted research that is developing in natural ecosystems in Romania and Baden-Württemberg (southern Germany), similar areas in terms of physical and climatic conditions and biodiversity. The Flora of Romania (Buia, 1961) describes 22 species of the genus *Orobanche* and regions that are widespread. After Demuth (1996), in Baden-Württemberg (Southern Germany) there grow 21 species of *Orobanche* as well and several of them are endangered (Drăgulescu C. 2003). Soil sampling was done during spring-early summer because this is the period when *Orobanche* species are directly dependent on soil conditions for germination (Bar-Nun N. et Mayer A.M.,1993).

MATERIAL AND METHOD

The analysis of soil samples collected in the resorts already studied was performed at the Environmental Protection Agency in Arad.

Humidity. Weigh approx. 30-40 g of soil. After weighing, the vial is placed in the oven, which is maintained at a temperature of 150oC until

completely dry. The amount of water is calculated from weight difference before and after drying soil.

Determination of pH. Weigh 20 g soil, then add 50 ml distilled water free of CO2. Stir with a magnetic stirrer for 1 hour. After mixing, measure the pH with a glass electrode (pH meter ORION Search, USA).

Determination of ammonia nitrogen. In a 300 ml vial weigh 30 grams of freshly collected soil, add 90 ml 0.1 M K2SO4, stir with a stick and leave the rest until the next day for clarification. Take 10 ml of extract in a 50 ml flask, add 3 ml Seignette salt and 1 ml Nessler reagent and make the mark with distilled water. Measure absorption at 440 nm with spectrophotometer (UNICAM UV-VIS England).

Determination of nitric oxide. Use 20 grams of soil recently collected, extracted and filtered with 100 ml CaSO4. Take 10 ml of extract then place it in a porcelain cup, add 1 ml of sodium salicylic. After evaporation, add 1 ml concentrated H2SO4. The capsule content is then inserted into a 50 ml flask with distilled water. Add salt Seignette 11-12 ml. After 10 minutes in the spectrophotometer it calorimeters (UNICAM UV-VIS England).

Determination of easily assimilable phosphorus by extracting the soluble phosphates in soil, with an acid ammonium acetate-lactate buffer pH 3.7. Samples are measured after 30 minutes at 470 nm with spectrophotometer (UNICAM UV-VIS England).

Determination of organic carbon. Organic Carbon dioxide is oxidized by excess dichromate (K2Cr2O7) in the presence of H2SO4 at a temperature of 95 ° C. As catalyst it is used mercury sulfate (HgSO4).

RESULTS AND DISSCUSIONS

The soil solution composition is influenced by soil temperature and moisture in the soil micro flora and micro fauna activity intensity of soil, the metabolism of higher plants, the processes of decomposition of organic residues in soil, which determines the dynamics of the soil solution concentration, both diurnal and seasonal. For different soil types there is an increase overall, very important, in the concentration of soil solution, especially in upper horizons during spring - early summer.

The increase of soil solution concentration occurs as a result of water loss through evapotranspiration, during the massive growth of plants, and in solution there enter abundant s from the roots and various heavy discharge decomposition of organic waste. For this reason, the collection of samples was made during spring-early summer. Also, this is the period when the *Orobanche* species are directly dependent on soil conditions for germination. Subsequently, as root parasites, they no longer depend on the soil nutritional point of view directly, but indirectly through the host plants.

Soil solution contains ions, molecules, colloidal substances in a state of dispersion, which is found in varying degrees, depending on various factors that act in the formation and evolution of soils in the sites surveyed (table 1).

Table 1

The results of chemical analysis of soil samples.

Crt no	Resort	pH	N-NH4+ ppm	N-NO3- ppm	P assimilable ppm	C organic %
1	Baiertal bei Wiesloch	7,73	2,21	2,43	44,31	1,56
2	Böschung Ihringen	8,15	1,40	2,12	14,07	0,39
3	Cluj-Napoca, The Botanical Garden	5,80	0,64	9,29	35,10	2,51
4	Covăsânț	6,53	17,1	30,93	20,63	3,38
5	Mocanu Hill basis	8,1	20,74	5,24	42,15	1,46
6	Mocanu Hill ridge	8,0	31,33	3,35	18,9	2,21
7	Mocanu Hill middle	6,7	42,0	6,63	31,28	2,91
8	Tarcea	6,8	32,6	6,24	32,25	2,55
9	Gârbovăț	5,5	20,2	31,25	46	4,2
10	Gârda de Sus	5,00	13,50	5,40	1,45	1,69
11	Hemsbach, zona Alteberg	7,41	4,01	6,43	88,5	3,58
12	Ihringen (zona Kaiserstuhl)	7,93	2,53	5,70	85,5	1,38
13	Inzigkofen, zona Sigmaringen	7,60	3,31	19,56	29,64	3,37
14	Macea	5,57	7,62	2,1	28,36	1,58
15	Argen Nature Reserve	7,37	2,89	4,93	11, 02	3,09
16	Badberg Nature Reserve	7,69	3,52	3,25	11, 77	2,69
17	Zakel Nature Reserve	6,5	21,45	4,06	15,2	1,95
18	Zeller Horn Nature Reserve	6,31	3,93	42,5	2,88	3,25
19	Tübingen Botanical Garden	7,58	2,60	1,30	13,23	3,41
20	Überlingen, Goldbach area	7,20	3,09	4,34	21,75	2,26
21	Wollmatingen, Konstanz area	7,52	2,01	3,91	50,2	2,28

CONCLUSIONS

Soil tests were limited to data that could be important for the development of *Orobanche* (Van Hezewijk M.J. & Verkleij J.A.C., 1996, Wegmann K., 1999).

Measured pH values are between 5.0 and 8.15. Agriculture noxious weed, such as some of *Orobanche* species, germinate in the pH range of 3.8 to 9.0 (Van Hezewijk, 1994). So *Orobanche* has good conditions, in this

regard. *O. crenata* and *O. ramosa* do only attacks of moderate intensity on host crops in heavily fertilized with ammonium-based fertilizers (Pieter, 1991). 4 mM ammonium sulfate inhibits *O. crenata* germination in vitro, while 16 mM potassium nitrate does not affect germination (Van Hezewijk et al, 1996). The tests performed did not mention too high values; it was expected, considering that most resorts are located in protected, fertilized and unexplored areas.

Nitrate favorably influences the strigolactons exudation by the host plant roots. Strigolactons exudation and thus the species of *Orobanche* germination is also stimulated by phosphate deficiency (Yoneyama A. et al, 2007). Nor from this point of view there are any extreme values. Verrier (from Altadis Tobacco Research Institute of Bergerac, France - direct information) has successfully used the Virgin tobacco crop fertilization with phosphate, to reduce *O. ramosa* attack.

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