SAFETY ISSUES ON SPONTANEOUS *OROBANCHE* SPECIES,IN CONTEXT GLOBAL WARMING

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Abstract

In the present paper rare Orobanche spp. were studied in their habitats in Romania and in Germany. Ecological factors like climate and weather were investigated. Global warming is an important ecological factor that can influence the development of Orobanche people staying. In the context of global warming, research potential effects of weather and climate on rare species in Orobanche spontaneous Romania, compared with those grown in the Baden-Württemberg (southern Germany) aimed at finding the causes for which these species are becoming rarer, some are even endangered. Proposals will be presented for the support and maintenance of rare species in their habitats.

Key words: climate warming, climogram, weather data, precipitation distribution, Orobanche seeds

INTRODUCTION

Processes taking place rapidly and variable states of the atmosphere, especially in the troposphere, for a certain time are usually designated as long (Hupfer, 1996). If the weather is momentary state of the atmosphere in a certain place, then after that definition, climate is average weather. The climate is "static manifestation of the atmosphere that characterizes a relatively long period of time" (Hantel M. et al, 1987). World Meteorological Organization (WMO) established the time frame for calculating the average values of the time 30 years (Claussen M., 2003). Therefore, often, to compare the climate is chosen as reference period 1931-1960, and 1961-1990. By international convention the normal value is calculated for at least 30 years (Ciutina V., 2004) and considered the reference period 1961-1990.

Study climate and weather are important, because seeds of Orobanche require special conditions (Sauerborn J.,1989, Teryokhin E.S.,1991, Wegmann K.,1994, Wegmann K., 1999) , especially during germination (10 to 15 days in moist soil conditioning and warm-up phase, continued 10 days in soil moisture and temperature of 20 ° C for proper germination). Expected results may lead to development of methods for preserving rare species, and secondly, to identify new ways to combat pests in agriculture (Visser J.H., 1989).

MATERIAL AND METHOD

In four of the resorts surveyed, two in Baden-Württemberg, Germany (Tübingen and Wollmatingen Botanical Garden in Konstanz) and two in Romania (Steppe Reservation Zakel Hill), I watched daytime temperature and precipitation values based on data from institutions Local Botanical Gardens Tübingen, Ried Wollmatinger Environment Center, Department of Ecology and Environment at the University "Lucian Blaga" Sibiu, Minis vineyard Research Station (Drăgulescu C. & Bude M.C.,1999, Drăgulescu C., 2003). In 2005-2008, in March, April and May were made termopluviograme because these elements are very important for early climate development cycle of Orobanche species.

Selecting a suitable climate zones researched resorts on Koppen classification (Strahler & Strahler, 2005). In formulas, the first letter denotes the climate, the second type, and following, the subtype of climate. Climate diagram of each station was based on data drawn from the nearest meteorological station. Among the basic climatic indicators were used sum, average and normal. Normal value is the value of a multi-item climate and is used to compare two different regions.

Climate data for the Botanical Garden are calculated by the method of translation from Tübingen (Buiuc M., 1997), based on climate chart Rottenburg. Corresponding to this method, if the exhibition are preserved, for the altitude of 100 m, the temperature drops by 0.6°C. Because the Botanical Garden Tübingen temperature readings were read morning, noon and evening, and not four times a day (hours 01, 07, 13 and 19 - local time), as required by international conventions (Vanc F., 2005). Average temperatures for this resort could be compared to the period 2005-2008.

RESULTS AND DISSCUSIONS

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 studies result in the statement, that the number of places, where Orobanche occurs, and the number of individuals, where they were found, is generally declining (Negrean G., 2006, Oltean M. Et al, 1994).

Climatological characterization of the Steppe Reservation Zakel Hill. The resort is within the climate region Dfbx (fig.1): cold snowy forest weather (microterm), but with warm summers, with average annual temperature of 9.5 ° C, rainfall of 461.4 mm annually.

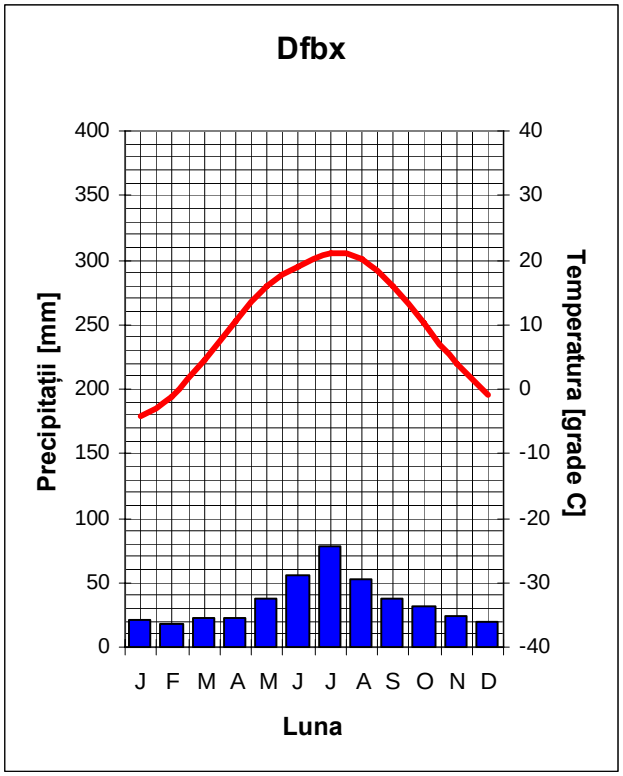

Fig. 1 Climogram of Zakel Hill

Table 1

Comparison with the normal climatological values (Zakel 2005-2007)

Average / annual amount	2005	2006	2007
Temperature (° C)	8.6	8.8	10.7
Precipitation (mm)	595.5	509.3	541.9
Difference from normal (° C / mm)	-0.9 / 134.1	-0.7 / 47.9	1.2 / 80.5

Comparing the annual climatological values climate of the period 2005-2007 (Table 9), above the average multiannual rainfall is observed every year. In 2005-2006, the average temperature is lower than the average multi-annual (0.7 ° C and 0.9 ° C), and in 2007, by 1.2 ° C higher.

Comparison of chronological climatological data for the spring, during 2005-2008 (table 1), allows us to see a slight tendency to thaw and an increase in the volume of rainfall. Temperature values are, overall in eight of the 12 months increased by up to 2.5 ° C. However, rainfall is higher, the monthly volume of up to 40 mm in nine of the 12 monitored spring months.

Climatological characterization of Tübingen Botanical Garden. University Botanical Garden is located in the region of Cfb climate (Koppen classification system after): temperate rainy (humid mesothermal) with hot summers, the average annual temperature is 7.1 ° C and average annual rainfall 810.2 mm (Fig.2).

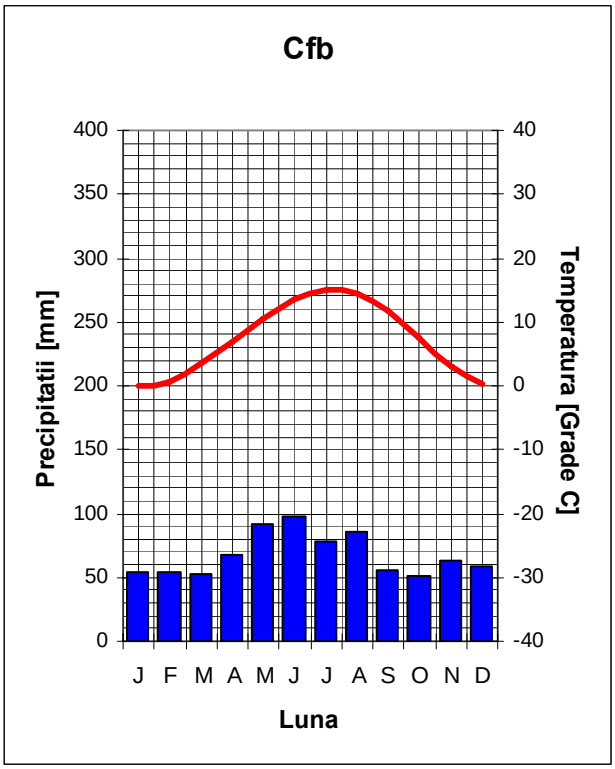

Fig. 2 Climogram Tübingen

Table 2

Comparison of climatological values (Tübingen 2005-2007)

Average / annual amount	2005	2006	2007
Temperature (° C)	10.9	11.4	11.9
Precipitation (mm)	798.6	675.9	723.8
Difference from normal (° C / mm)	-11.6	-134.3	-86.4

Comparing the annual averages of rainfall and the amount temperature during (2005-2007) is a slight warming trend (table 2) and also decreases the volume of rainfall. In 2007, the smallest amount of rainfall recorded in April, which may be a negative factor for the germination of Orobanche species. Rainfall during this period are 11.6-134.3 mm lower than normal.

Comparison of chronological climatological data for the spring, during 2005-2008, allows us to see a slight tendency to thaw and rainfall volume growth, including in 2008. Temperature values are, overall in eight of the 12 months increased by up to 2.5 ° C. In 7 out of 12 months monitored quantity is higher than normal rainfall, with up to 20 mm. In May of each year, temperatures were higher, rising to 15.1 ° C in 2005, 18.0 ° C in 2008.

Climatological characterization of the Covăsânț station. Type climate has Cfbx (Fig. 3): temperate rainy (humid mesothermal), not too cold winters and hot summers, with average annual temperature of 10.7 º C, annual rainfall of 624.9 mm, most falling in the early summer rains.

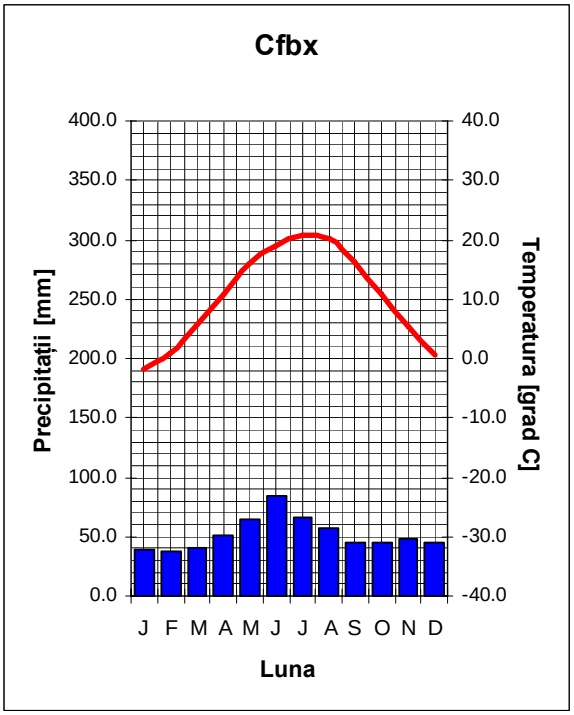

Fig. 3 Climogram Covăsânț

Table 3

Comparison with the normal climatological values (Covăsânț, 2005-2007)

Average / annual amount	2005	2006	2007
Temperature (° C)	11.3	12.9	12.9
Precipitation (mm)	832.0	746.4	656.8
Difference from normal (° C / mm)	+0.6 / 208.0	+2.2 / 122.4	+2.4 / 32.8

Temperatures, especially during the summer and annual precipitation in 2005-2007, show values above normal (1961-1990 average)

each year (tab.13. Rainfall is distributed unevenly, compared with normal ranges throughout the year.

Spring months in the period 2005-2006, Covasant (climodiagrame 1952-1966), in their majority, are wetter than normal, while the spring months are drier than the 2007-2008 normal Overall, the warmer spring months than normal (six), is equal to the number the colder spring months and normal in the period 2005-2006. The general trend of warming in 2005-2006 is spring time, but the other seasons, especially summer.

Climatological characterization of the Konstanz station. Shall be within the region Cfb climate, mesothermal, temperate rainy (humid mesothermal), not too cold winters and hot summers with average annual temperature of 9.2 ° C and 847 mm average annual rainfall (Fig. 4).

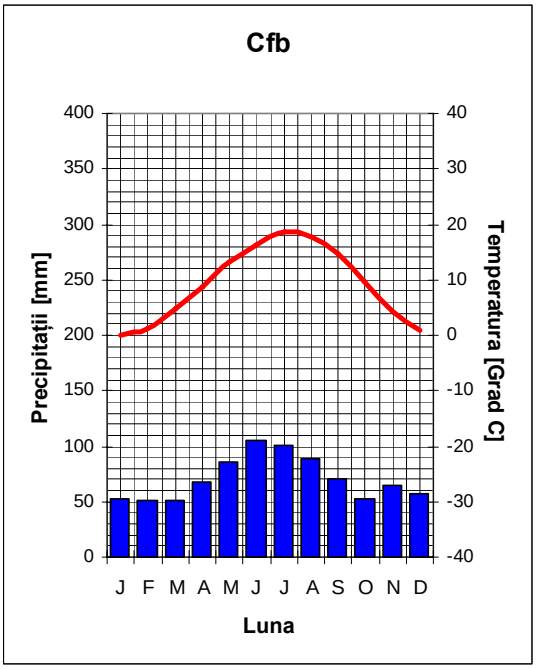

Fig. 4 Climogram Konstanz

Table 4

Comparing with the normal climatological values (Konstanz)

Average / annual amount	2005	2006	2007
Temperature (° C)	9.8	9.7	11.4
Precipitation (mm)	748.2	749.4	916.1
Difference from normal (° C / mm)	0.6 / -98.8	0.1 / -97.6	2.2 / 69.1

Comparing the annual average temperature and precipitation amount with normal values (average for 1961-1990) is a slight warming trend, and

also decreases the volume of rainfall, except in 2007 when the annual rainfall amount is slightly higher, 69.1 mm respectively (Table 4). In 2007, the smallest amount of rainfall recorded in April, which may be a negative factor for the germination of Orobanche species (Cubero J.I., 1996).

Comparison of detailed monthly and daily average values of temperature and precipitation for the spring, during 2005-2008 in Konstanz, allows us see maintenance, including in 2008, the slight warming trend and increased rainfall in 7 out of 12 months monitoring is warmer and more humid, in 10 months is warmer and more humid in 9 months.

CONCLUSIONS

The global average surface temperature, important climate indicator, increased in the 20th century by 0.6 ° C. The calculation model estimates for Baden-Württemberg 2050 a further increase in temperature of 0.6 to 1.5°C, depending on the area. This could be favorable for the development of *Orobanche* species. In any case, the beginning of summer rainfall will be more likely to decrease, which would be unfavorable to their germination.

Climate warming plays a minor role, although it would favour *Orobanche.* Collected local weather data over the past 4 years showed a distinct tendency towards dryer spring months (April-June). The precipitation over the days and months is irregularly distributed and changes from year to year. Dry spring months are unsuitable for conditioning and germination of *Orobanche* seeds. This explains, why some *Orobanche* spp. were not found in every year.

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