Research on the evolution of the precipitations in period 2010-2012 in the Municipality of Timișoara and their effect crop protection forest curtain “Technology park alternative energy and photovoltaic park” from Covaci, Timiș County

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Abstract The time at which precipitation falls and their quantity are important elements of analysis to study the influence of rainfall on the occurrence of droughts which in turn leads to calamity crops and forestry. To determine the causes of dry mass forest crop protection installed curtain „Technology Park for alternative energy Photovoltaic Park” in Covaci, to analyze the evolution of rainfall over the past three years as a determining factor for the occurrence of droughts.

Key words precipitation, seedlings, forest culture, forest vegetation, drying, drought

Forest vegetation is the decisive factor for improving climate in the plains, but at the same time to protect economic objectives. Therefore the design “Technology Park alternative energy and Photovoltaic Park” in Covaci, situated 3.0 km from Timișoara, was considered the set up of a protection curtain, consisting of forest vegetation. The objective is primarily to protect “Photovoltaic Park” and UTR 2 of the “alternative energy Technology Park and Photovoltaic Park” that will be built in unincorporated Timișoara (Covaci area). "Referring to the social purpose of the project, establishing forest protection curtain is that short-term, is during the realization of the investment will create new jobs in the area because for the work of afforestation is required force recruitment local labor. Long-term social effects will be those arising from the investment by the very establishment of the forest, it has a number of positive effects on the local community, among them: protection “Photovoltaic Park” and settlements and other targets in the area against winds and drought, improving air quality, improving human health, creating new spaces for recreation and relaxation by improving the landscape of the surrounding area Timișoara and Covaci, "in PT In 2010 - 2011 was drafted to establish a protective curtain around “PARK technology for alternative energy and photovoltaic park”.

Afforestation works for setting the curtains were made in autumn 2011. Curtain forest covers an area of 9.0431 hectares and consists of two units Station (U.S.): U.S. 1 in area of 5.0769 ha of afforestation-16St composition with 11Fr 21St.r 10Te.a 21Me 21Pd and U.S. 2 an area of 3.9661 ha of afforestation composition 16St 21St.r 10Te.a 21Me 21Pd 11Fr.

Curtain protection was provided on the outside with hedge the Glade (Gl), a length of 2130 ml having an area of 0.2556 ha. Plantation success, at the perimeter, was 79% for forest species from U.S. 1 and U.S. 2 and 98% for hedge consist of Glad (as PV input in vegetation from 2012).

The inventory of seedlings in the fall of 2012, by placing the 200 sq markets, in accordance with the technical forestry by counting viable seedlings showed a rate of only 9% are in growing seedlings (from U.S. 1 and U.S. 2) rest 91% of the seedlings dry. To hedge the Glade was found that 25% of the seedlings are viable. It was found that the percentage of success in the spring was 79% and 98% for hedge maintenance and care and cultures were performed according to the project, the percentage of surviving seedlings was very low (9% respectively hedge 25%) due to prolonged drought in the summer of 2012. To know in detail the causes calamity plantations and in order to find solutions as viable in the future to avoid such situations have initiated this research on the evolution of temperatures in the last three years taking into account the importance of this factor climate for drought phenomenon.
**Material and Method**

The analysis of rainfall was based on meteorological observations in the last 3 years the driest months of the year (May-October) months during which there is a danger of massive drying seedlings planted area of improvement Becicherecu. Breakfast consists of two units stationary as shown above.

**Results and Discussions**

Data were used for analysis (number of days with precipitation in a month and the intervals at which they fell) from Timisoara Airport Meteorological Station, the station nearest breeding area under observation.

The data were used to obtain rainfall charts. Diagrams obtained are very suggestive in terms of development timeframes and how rainfall occurred in the last three years and their influence on forest plantations under observation. Rainfall amounts monthly, annual and multi-annual (mm) are presented in the following table:

<table>
<thead>
<tr>
<th>Month</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
<th>VII</th>
<th>VIII</th>
<th>IX</th>
<th>X</th>
<th>XI</th>
<th>XII</th>
<th>Anual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Station</td>
<td>Timişoara</td>
<td>41</td>
<td>40</td>
<td>42</td>
<td>50</td>
<td>67</td>
<td>81</td>
<td>60</td>
<td>52</td>
<td>47</td>
<td>55</td>
<td>48</td>
<td>48</td>
</tr>
</tbody>
</table>

Potential evapotranspiration (mm), monthly and annual averages, are as follows:

<table>
<thead>
<tr>
<th>Month</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
<th>VII</th>
<th>VIII</th>
<th>IX</th>
<th>X</th>
<th>XI</th>
<th>XII</th>
<th>Anual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Station</td>
<td>Timişoara</td>
<td>0</td>
<td>1</td>
<td>23</td>
<td>53</td>
<td>97</td>
<td>123</td>
<td>135</td>
<td>123</td>
<td>81</td>
<td>44</td>
<td>16</td>
<td>2</td>
</tr>
</tbody>
</table>

It appears that the annual potential evapotranspiration calculated by Thornthwaite method, exceeds the annual average rainfall. Also in the growing season (April-June) evapotranspiration exceeds the amount of precipitation. Rainfall, the main source of supply of soil water storage capacity along with it, has a crucial role in plant growth and development. Their distribution is different depending on the movement barrel.

The amount of water reaching the soil is influenced by minor forms of relief (depression, whites abandoned Crovul, area wide depression). That may considerably affect water storage and aerohidric regime of soils. The influence of rainfall on agroecosystems is closely correlated with the temperature and the wind conditions.

Drought is a direct influence on the climate factor as precipitation falling at a time and the number of consecutive days without rainfall. Since the quantities of rainfall periods studied were very small I looked more deeply number of rainy days and the intervals at which they fell as a defining element of drought intensity.
Fig. 1 Number of days with precipitation in May

Fig. 2 Number of days with precipitation in June

Fig. 3 Number of days with precipitation in July
From the diagrams above (developed based on meteorological observations taken from Timișoara Airport Meteorological Station) where he plotted the number of rainy days in a month (the months: May to September and years: 2010-2012) is finds evidence that in 2011 and 2012 the number of days with precipitation fell (per month) compared with 2010. This has led to the increasing range of days without precipitation which reached up to 48 consecutive days without precipitation (basically from 02.08.2011 to 20.09.2011) and in 2012 the number of intervals over 10 days without rainfall is very common: 11 to 22 June (11 days without precipitation), June 25-July 15 (19 days without precipitation), July 25 to August 27 (32 days without precipitation), August 27 to September 15 (18 days without precipitation). Lack of rainfall for a period exceeding 10 days in conjunction with high temperatures above 30 degrees for extended periods of time led to the phenomenon of drought which caused drying of seedlings planted, and the other species forestry and agriculture less adapted to arid climates excessive.

For the period of dry climate, specific Banat Plain, ground water reserves are depleting gradually accumulated through evapotranspiration and its consumption by plants. Water loss is compensated by rainfall but water reserve depletion begins when a net deficit of precipitation, evapotranspiration consumes current rainfall, leaving an extra demand of the atmosphere, unsatisfied by the precipitation.

**Conclusions**

Drying seedlings planted in protective curtain around the Covaci photovoltaic park was caused drought which in turn has arisen due to lack of rain for longer than 10 consecutive days during 2012 especially when the number of intervals over 10 days without rainfall is very common: 11 to 22 June (11 days without precipitation), June 25-July 15 (19 days without precipitation), July 25 to August 27 (32 days without precipitation), August 27 to September 15 (18 days without precipitation). Lack of rainfall and high temperatures in this period (average temperatures in the months of July-August 2012, increased by 2-5 degrees, average temperature viscosity than previous years, and deficit rainfall during this period was very high) phenomenon caused of drought.

Deficit rainfall in this period compared to evapotranspiration is the amount of dry nature of the climate and the soil, requiring irrigation, forestry and agricultural crops. For a sum of Banat Plain rainfall in May, June and July of less than 100 mm compromise the crop.

It is expected that future droughts in this area to be becoming more frequent and higher intensities reason for the success of any crop (agricultural or forestry) need an irrigation system that can help in times of drought seedling roots plantations until they reach ground water level to survive (5 -10 years).
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