

O 44. THE CLASSIFICATION LOCAL AREA BASED CLIMATIC DATA USED

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ABSTRACT: Bio climate concept is a wide concept and from ecologic angle it shows content elements combination that predominate or determinate the planted and animal life. The bio climate of one zone is considered as a combination between vegetation zone and climatic elements. The bio climate study on Korça - eco zone and the bioclimatic indexes give a view about the conception and using values of bio climate classification indexes. This study based on Emberger and FAO Model of learned Frenchman, which is the most quoted on studies with bioclimatic character on Mediterranean eco-zone for period 30 years. The Emberger Classification is known and applied, because it gives a detailed using about studied zone. The Emberger Classification is based on pluviometric index Q and vegetation index and gives a more detailed classification than others. After mathematic data processing and comparison of bioclimatic indexes according to respective classes is concluded that according to Emberger Korça – eco zone is classified on three respective bio climates: Micro zone with semiarid bio climate with coefficient $Q < 60$ and annual precipitations 400-600 mm per year, in which take parts: Sheqeras and Gurshqipe; Micro zone with sub humid bio climate with coefficient $60 < Q < 90$ and annual precipitations 600-700 mm per year, in which take parts: Dvorani, Zvirina, Bilishti, Liqenas (Korça); Micro zone with humid bio climate with coefficient $90 < Q < 150$ and annual precipitations over than 700 mm per year, in which take parts: Shtylla, Korita, Gjonbabasi, Vithkuqi, Voskopoja. We have arrived in the following conclusions from this study: Bioclimatic classification in general of Southwestern eco zone Albania and in particular of eco zones must taken in consideration for cultivated plants regionalization; Using of bioclimatic maps for agro-ecosystems construction on Korça zone; The change of precipitations amounts per every 100 m is oscillated from 40 to 60 mm; The insolation report for Korça micro zones is oscillated from 0.50-0.

Key words: local area, classification, climatic data

1. INTRODUCTION

The production is a biologic index. When the cultivation conditions are optimal it is outcome of bio-chemic process at plants. The concept for production is related by the viewpoint of its and so, have the potential production, maximal production, biologic production, agronomic production etc. By practice viewpoint production is a plant, or part of its. Over them, production is result of eco climatic factors and human work impact.

Often production is converted with cultivated vegetation yield. This one varies from a year to another one in quantity and quality, even then the used techniques by persons are equal. So, this variability is a direct or indirect outcome of eco climatic factors impact, which aren't depended by person and could not repeated in an identical way from one year to another one, from one month to another one and from one day to another day.

Eco climatic sources are considerate decisive on cultivation plants, because they implicate plant development, and in consequence its production. These sources have a relation with eco climate of cultivated zone. The climate contents of an eco zone react in an interconnected way and influence by each of other revealing compensation effects. Some from more important eco climatic indicators are: Precipitations, the kinds of temperature, air relative humidity, the wind and the other atmospheric phenomena.

The case by case study of bio climate factors on time and space gave sufficient information for fruit agro ecosystem cultivation.

Plant species have definite ecologic distinction. These one are related with origin and biology. Ecology and climate determined the relationship between ecology and cultivated zones. This is verified by the presence of wild species in those climate zones. Eco climatic factors which influence on growth, yield, plants life cycles are:

a. Sun light

The sun light of an eco zone is a qualitative and quantitative factor. Light intensity during a day with solar time has a good influence on photosynthesis process. The quality of photosynthesis product is depended by intensity scale. The rhythm of this process for apples varies on whole day.

b. Temperature

The temperature has a priority influence on plants life cycle, but the influence of temperature on production and reproduction period is decisive.

It is known that temperatures $< 7^{\circ}\text{C}$ influence on flowering apples process, the sum temperatures $< 7^{\circ}\text{C}$ on over than 1070 hours indicate on flourishing and foliate differentiation report.

The presence of low temperatures under tree resistance caused frost phenomena on it. The frozen is physic and physiologic process and can damage drying of plant parts and on extreme cases can cause drying up plants.

High temperatures have a negative impact on physiologic and biologic process. A season with very highest temperatures during the vegetation influence, at first, on the reduction till blocking of plant photosynthesis rhythms, grows change-breath, increase water transpiration and, at last, plant can be wrinkled and drying up. The tolerance by temperatures different in confront of various plants.

On fruit-trees cultivation is taken in consideration another factor, change of minimal and maximal temperatures, which is temperature amplitude. This change is given in different parameters, so the plants react in different ways.

The apple is a kind of specie that caused reaction at wide changes of amplitude. This one is a considerable agro-ecologic index on dissemination of cultivated plants.

c. Precipitations

Precipitations are the chiefly source of water reserves on Earth. These reserves vary because of precipitation dissemination, which is given on temperature inverse: large amounts on winter, low temperature and small amounts on summer.

The plant has fixed reactions to precipitations amount. When the precipitations are in minimal amounts it is present air and soil drought. So, the apple will reduce metabolic activity, increase transpiration and was appeared plasmolysis and deplasmolysis. When the precipitations are present, fruit-tree reaction is positive, the metabolic process is realized normally and realized production is maximal. In a situation with abundant precipitations and on soils with swoon drainage, fruit-trees are incurred by physiologic disorder till asphyxia. By water absence the fruit-trees reacts with tardiness, while by remainder water reacts more quickly. The fruit-trees have a tolerance by presence or not presence of water on soil, but this tolerance is smaller than the presence of water is remainder.

d. Air relative humidity

Air humidity is an element of an eco zone climate. It shows that air is reach with water vapors' or not. The source of water vapors' in atmosphere is result of evaporation process and plant transpiration. The evaporation is a physic process for a plant, while the transpiration is a physic and physiologic process

for this one. The evaporation process and transpiration process are in content of plant evapotranspiration, which is part of water cycle in atmosphere.

On areas with precipitations and high temperatures the evapotranspiration values are higher, so the air relative humidity is great. The plants react to air relative humidity in different ways. The apples take part on plants group with affinity to air humidity. So, on these conditions where air relative humidity is on minimal values, the apples react on reducing metabolic process. It is realized by closing in maximum stomas. In this manner the entrance of CO₂ and O₂ is restrained and the metabolism will be reducing. When the air humidity is on high level is felt plant reaction. Air relative humidity is a climatic element with transversal impact. It takes part not in a direct way on life process but can accelerate or reduce them.

Air relative humidity determines opening and closing of stomas plants. The leaf surface with many stomas has need for refresh in conditions of a low air relative humidity, but it can happen closing process, with influence on physiologic and metabolic process.

2. MATERIAL AND METHOD

Environmental study

Albania is influenced by marine and continental presence, so it is finding Mediterranean and mountainous climate. This study belongs to cold areas, southeast area of Albania, eco zone – Korça and includes bioclimatic and agro-ecologic aspects, because this zone has a climate which is related in general by qualitative and quantitative apple production and its cultivars in particularly. Korça eco climate are determined by climatic factors and are related with them. Thermal regime, precipitations, air relative humidity, sunlight and other geographic elements give Korça eco climate panorama.

The eco zone – Korça is situated on southeast Albania, on latitude 40°27' at South of Kaltaj Mountain and Trebicka Mountain and 40°57' at Nord to Kallamas (Prespa) and on longitude 20°19'' at West Korbej Mountain (Zerec) and 20°54' at East (Cerje). By the level of sea side, it begins with Moglica micro zone on 785 m altitude and the biggest altitude is the top of Mali i Thatë (2516 m). The presence of some plains as: Korça plain, Maliq plain and Devoll plain is very important. The other parts are hilly and mountainous areas. The general surface of eco zone – Korça is 175.212 ha = 6,1 % of whole Albania surface. Mountainous relieve 59.7 % of Korça surface; Hilly relieve 22.8 % of Korça surface; Plain relieve 17.5 % of Korça surface; On Nord-South the plain relieve altitude is 35 km, on East-West it is 16 km.

Devoll river has a length by 193 km, where the part with length 107 km passed on eco zone – Korça.

The knowledge, studying and evaluation to eco climatic indexes of eco zone – Korça give a guaranty for agro-eco-systems construction and progressing on this area.

3. METODOLOGY

The bio climate study on Korça - eco zone and the bioclimatic indexes give a view about the conception and using values of bio climate classification indexes. The interpretations are result of combination of three bioclimatic models: Emberger Method (1969), Rivas Martinez Classification (1996) and Bangloul & Gaussen diagram (1960).

The Emberger Classification is known and applied, because it gives a detailed using about studied zone. Klasifikimi Rivas Martinez ka perdorim orientativ per studime nga pikepamja globale. Climatic indexes and Bangloul & Gaussen diagram (1960) are used to identify the dry and wet period during a year.

Rivas Martinez Classification is based on climatic indexes:

Ic, Temperature amplitude (1)

$$Ic = T_{max} - T_{min}$$

It, thermo index (thermo-tip) (2)

$$It = (T + m + M) * 10$$

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Io, ombro-thermic index (ort ombro-tip) (3)

$$I_o = 10 \times P_p / T_p$$

where:

T_{max} = maximal average temperatures on the hottest month;

T_{min} = lowest average temperatures on the coldest month;

P_p = average sum precipitations >0°C;

T_p = sum temperatures with values over than T>0°C;

T = average sum of annual temperatures;

m = minimal average temperatures on the coldest month;

M = average temperatures on the hottest month.

Emberger clasification is based on pluviometric indexes and gives a detailed classification.

The pluviometric index Q is result:

$$Q = \frac{2000 P}{(M - m)(M + m)} \quad (4)$$

where:

P = precipitations sum;

M = average temperatures on the hottest month of year °K;

m = average temperatures on the coldest month of year °K.

3. RESULTS

Results and Emberger interpretation.

Basing on real indexes of climate for a many-years long period from 1980 to 2015, as maximal average temperature, minimal average temperature and the precipitations on micro zones areas studied, Q values are resulting in a wide limit. The minimal value of Q results on Sheqeras micro zone with 54,1 and maximal value results on Shtylla micro zone with 124,9.

Basing on these values we give a conclusion that Sheqeras micro zone is Semiarid, while Shtylla micro zone is humid. This different is result of precipitations amount that vary from 505,6 mm on Sheqeras zone and 1129,3 mm on Shtylla zone and by the high temperatures: for Sheqeras zone is 26,3°C and for Shtylla zone is 21,3°C. In total Korça zone is considerate as a sub humid zone, with precipitations during autumns, winter and spring season and with a dry climate during the summer season.

On plain micro zones Q values is oscillated from 54,1 to 74,3 which correspond with altitude of 1000 m over the sea level. The micro zones with altitude over than 1000 m have Q values from 76,4 to 124,9. The minimal temperature is permanent and varies from altitude under 1000 m, with about 4 to 6 °C.

Table no. 1. Q Values on Emberger Clasification

Nr.	Microzone	Mmax	m min	Pm/vj	Q
1	Bilisht	25.5	-5.2	614.4	70.6
2	Dvoran	26.7	-5.5	679	74.3
3	Gurshqipe	25.5	-5.2	565.5	59.3
4	Gjonbabas	23.6	-5.9	817.7	98.3
5	Korça	25.5	-6.3	651.6	72.5
6	Korita	24.2	-4.4	847.1	104.6
7	Liqenasi	25.3	-4.3	647.7	76.4

8	Sheqeras	26.3	-6.7	505.6	54.1
9	Shtyllë	21.3	-11.2	1129.3	124.9
10	Vithkuq	23.6	-6.8	850.9	99.4
11	Voskopojë	23.2	-10.7	735.9	77.7
12	Zvirinë	25	-6.5	687	77.2

The Source: Data basing Analyzing Emberger.

Q Index Emberger Index

The micro zones are situated on three bioclimatic variants basing on Q index values.

- Micro zone with coefficient $Q < 60$ in which take parts: Sheqeras and Gurshqipe.
- Micro zone with coefficient $60 < Q < 90$ in which take parts: Dvorani, Zvirina, Bilishti, Liqenas (Korçë).
- Micro zone with coefficient $90 < Q < 150$ in which take parts: Shtylla, Korita, Gjonbabasi, Vithkuqi, Voskopoja.

Results and Rivas S. Martinez Interpretation

The Rivas S. Martinez bioclimatic evaluation is based on ecoclimatic indexes as average temperature, higher and lower month temperature during a year, annual sum precipitations without months precipitations with temperatures under 0 grade C and annual sum temperatures over 0 grade C.

Table no. 2. Bioclimatic index values by Rivass S. Martinez for some Korça- microzones

Micro zone	T	m	M	Tp	Pp	Ic	It	Io
Bilisht	14.4	-5.2	25.5	5235	563.6	30.7	347	1.07
Dvoran	10	-5.5	26.7	3633	581.3	32.2	312	1.60
Gurshqipe	10.2	-5.2	25.5	4034	498.8	30.7	305	1.23
Gjonbabas	9.1	-5.9	23.6	3261	722.3	29.5	268	2.21
Korça	9.8	-6.3	25.1	3541	568.2	31.4	286	1.60
Korita	10.6	-4.4	24.2	3846	759.6	28.6	198	1.97
Liqenasi	10.1	-4.3	25.3	3861	551.2	29.6	311	1.42
Sheqeras	9.4	-6.7	26.3	3403	414	33	290	1.21
Shtyllë	5.9	-11.2	21.3	1879	778.4	32.5	160	4.14
Vithkuq	8.8	-6.8	23.6	3139	784.7	30.4	256	2.49
Voskopoje	7	-10.7	23.2	2360	578.2	33.9	195	2.45
Zvirine	9.4	-6.5	25	3406	566.6	31.5	279	1.66

The Source: Data basing analyzing Rivas.S.M,

Korça- eco zones by Rivas Martiness has some characteristic which are related with micro zonal eco climate and are characterized by indexes values, which gave us the following information:

Ic. Index, Continental index

Basing on this index values the micro zones are divided on three micro zones with continental bio climate (mountainous).

Micro zone with continental index under 30 °C, where takes part: Gjonbabas, Liqenas and Korita (Nizhavec) micro zones.

Micro zone with continental index from 30 °C to 33 °C, where takes part: Bilisht, Dvoran, Gurshqipe, Korçë, Vithkuq and Zvirinë micro zones.

Micro zone with continental index over 33 °C, where takes part: Sheqeras, Shtyllë and Voskopoja micro zones.

It. Index, Thermo-tip Index

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Basing on this index values the micro zones are divided on three bioclimatic micro zones:

Micro zone with thermo-tip index, Supratemplado, under 180, where takes part Shtylla micro zone;

Micro zone with thermo-tip index, Mesotemplado, from 180 to 300, where takes part: Gjonbabas, Korça, Vithkuq, Zvirinë, Sheqeras, Voskopoja and Korita micro zones;

Micro zone with thermo-tip index, Termotemplado, over 300, where takes part: Liqenas, Bilisht, Dvoran and Gurshqipe micro zones.

Io. Index, Ombrotipos Index

Basing on this index values the micro zones are divided on three bioclimatic micro zones:

Micro zone with ombrotipos index, Semiarid, with coefficient under 2, where takes part: Bilisht, Dvoran, Gurshqipe, Korça, Korita, Liqenas, Sheqeras and Zvirina micro zones;

Micro zone with ombrotipos index, Seko with coefficient from 2,0 to 3,6 where takes part: Gjonbabas, Vithkuq and Voskopoja micro zones;

Micro zone with ombrotipos index, Subhumid with coefficient from 3,6 to 6,0 where takes part: Shtylla micro zone.

The evaluation of insolation indexes

Average insolation index values on three micro zones with different altitude over the sea level are resulted as follow:

Total insolation for Sheqeras (Zvirinë) micro zone, with altitude 815 m/d results as: 2220,8 hour/annual, numbers day without sun is 43;

Total insolation for Korça (Dvoran) micro zone, with altitude 894 m/d results as: 2329,3 hour/annual, numbers day without sun is 33;

Total insolation for Voskopoja micro zone, with altitude 1320 m/d results as: 2413,6 hour/annual, numbers day without sun is 33;

Maximal month insolation on July results as: for Sheqeras micro zone with 281,9 hours, for Korça micro zone with 224,3 hours and for Voskopoja micro zone with 313,8 hours.

Minimal month insolation on December results as: for Sheqeras micro zone with 63,8 hours, for Korça micro zone with 68,5 hours and for Voskopoja micro zone with 88 hours.

The evaluation of ecoclimatic micro zones indexes

Maximal month temperature values for these micro zones results 26,7 °C on July, at Dvoran micro zone; Maximal and minimal month temperature values for these micro zones results –0.3 °C on February, at Shtylla micro zone;

Maximal annual temperature values for these micro zones results 15.7 °C on July, at Dvoran micro zone; Maximal and minimal annual temperature values for these micro zones results 11.2 °C on February, at Shtylla micro zone;

Minimal month temperature values for these micro zones results –11 °C on January, at Shtylla micro zone;

Maximal and minimal month temperature values for these micro zones results 16,2 °C on July, at Nizhavec (Korita) micro zone;

Minimal annual temperature values for these micro zones results 0,6 °C on July, at Shtylla micro zone;

Maximal and minimal annual temperature values for these micro zones results 7,1 °C on July, at Nizhavec (Korita) micro zone;

Minimal average annual temperature values for these micro zones results 5,9 °C on July, at Shtylla micro zone;

Maximal average annual temperature values for these micro zones results 14.4 °C on July, at Bilisht micro zone;

Minimal average temperature values for these micro zones results 5,8 °C on July, at Shtylla micro zone;

Maximal average temperature values for these micro zones results 20,2 °C on July, at Nizhavec (Korita) micro zone;

Minimal month precipitations amount values for these micro zones results with 5 mm on August, at Sheqeras micro zone;

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Maximal month precipitations amount values for these micro zones results with 140 mm on November, at Shtylla micro zone;

Minimal annual precipitations amount values for these micro zones results with 505 mm at Sheqeras micro zone;

Maximal annual precipitations amount values for these micro zones results with 1129 mm, at Shtylla micro zone;

The characteristic of micro zones groups by altitude over the sea level are:

Temperature alteration for every 100 m altitude is from 3,5 °C to 4,5 °C.

Precipitations amount alteration for every 100 m altitude is from 40 mm to 60 mm.

4. CONCLUSIONS

Korça - eco zone is classified on three respective bio climates for period 40 years:

By Emberger classification Q index

Micro zone with semiarid bio climate with coefficient $Q < 60$ and annual precipitations 400-600 mm per year, in which take parts: Sheqeras and Gurshqipe.

Micro zone with sub humid bio climate with coefficient $60 < Q < 90$ and annual precipitations 600-700 mm per year, in which take parts: Dvorani, Zvirina, Bilishti, Liqenas (Korçë);

Micro zone with humid bio climate with coefficient $90 < Q < 150$ and annual precipitations over than 700 mm per year, in which take parts: Shtylla, Korita, Gjonbabasi, Vithkuqi, Voskopoja.

Korça - eco zone is classified on bio climates:

By Rivas S. Martiness. Classification It. index

Supertemperate with coefficient It. 20-180, where is evaluated: Shtylla micro zone.

Mesotemperate with coefficient It. 180-300, where takes part: Zvirina, Vithkuq, Sheqeras, Koritë, Korçë, Gjonbabas and Voskopoja micro zones.

Termotemperate with coefficient It. 300-410, where is evaluated: Liqenas, Gurshqipe, Dvoran and Bilisht micro zones.

By Rivas S. Martiness. Classification Io index

Semiarid with coefficient < 2 , where is valuated: Bilisht, Dvoran, Gurshqipe, Koritë, Korçë, Liqenas, Sheqeras and Zvirina micro zones;

Dry with coefficient 2-3,6 where is valuated: Gjonbabas, Shtylla, Vithkuq and Voskopoja micro zones.

By Rivas .S. Martiness. Classification Ic index

Bioclimatic index > 21 , where takes part all micro zones:

Korça-eco zone is evaluated as a continental zone with cold climate, with index $< 15^{\circ}\text{C}$;

Average humidity micro zones from 450-700 mm precipitations/year where takes part: Zvirina, Sheqeras, Liqenas, Bilisht, Gurshqipe, Dvoran and Korça micro zone;

High humidity micro zones with index 700-1100 mm precipitations/year where takes part: Voskopoja, Vithkuqi, Korita, Gjonbabasi;

A very high humidity micro zones with index > 1100 mm precipitations/year where takes part Shtylla micro zone;

Micro zones which have minimal month precipitations amount values under than twice of average month temperatures, from May to September where takes part: Sheqeras, Gurshqipe, Liqenas, Bilisht, Korça and Dvoran micro zones;

Micro zones which have minimal month precipitations amount under than twice of average month temperatures, from June to August where takes part: Voskopoja, Vithkuq, Shtylla, Korita and Gjonbabas eco zones;

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