

**Imer RUSINOVCI, Sali ALIU,
Shukri FETAHU, Salih SALIHU, Dukagjin ZEKA¹**

RELATIONS STUDY OF THE MAIN MORPHOLOGICAL FEATURES OF WILD MARJORAM (*ORIGANUM VULGARE* L.) UNDER THE CONDITIONS OF THREE ECOLOGICAL REGIONS IN KOSOVO

SUMMARY

The evaluation of genetic resources is an important step in the planning process and use of such resources. This working paper involves the study and evaluation of correlation connections in the population of oregano (*Origanum vulgare* L.) with morphological indicators for the ecological conditions of three locations (Kaçanik, Hanit të Elezit and Istog) in Kosovo. The paper presents the results of the study of links between some important features of the oregano, where various features of the surveyed plants are related to one another. In some cases, these links are positive, while they are negative in other cases. The study on the links between some surveyed features showed strong positive correlation between plant height with the trading length of the plant, plant height with leaf length with the correlation coefficient with plant height and leaf width. On the other hand, a negative relation was observed between plant height and the number of major spring. These data can be used in further studies on this plant. From the study of links between some observed features, we concluded that different features represent different connectors, and that major changes that are not visible between different features in different areas of interest are links between features of production, such as between the weight of wet and dry and other features.

Key words: Correlation coefficient, strong link, middle link, weak link

INTRODUCTION

Wild marjoram (*Origanum vulgare* L.) is used in the food industry and in popular medicine. Different shapes within the species have different values from the perspectives of production and quality. These shapes are available in nature and can be used as sources for genetic improvement programmes (Salillari A., Hysa, M., Faslia, N., Rusinovci, I., 2007). Modern agriculture is interested to find plant shapes with more ether oils that are resistant to temperature; these can then be used in pizzerias (Demiri, M. 1981). There are two kinds of wild marjoram growing in Kosovo, of which *O. vulgare* is the only one that grows spontaneously; it is well known amongst the people, as it is widely used as a

¹ Imer RUSINOVCI (corresp. author: irusinovci@hotmail.com, imer.rusinovci@uni-pr.edu, tel: +377 44 160 943), Sali ALIU, Shukri FETAHU, Salih SALIHU, Dukagjin ZEKA, University of Prishtina, Faculty of Agriculture and Veterinary, Department of Crop Science. Address: Lenini Street, Bul "Bill Clinton" N.N. 10000, Prishtina, Kosovo

spice in cooking. Furthermore, it is known as a medical plant, with leaves rich in vitamins, oily and aromatic seeds, good colour, and insecticide and honey-bearing properties (Bardeau, F. 1994). The leaves are used as a tasty spice for the aromatization of pickled vegetables, drinks and other dishes. The plant blooms during the June-September period for 40–45 days. As nectar producer flowers, 10–25% of the plants do not give nectar, especially in dry places, while a small amount of nectar is given by plants growing in locations with sufficient air humidity (Chevallier, A. 1996).

Currently, particular importance is placed on the study of relations between different features of plants. Especially significant is the study of those relations that have to do with production. For example, in medical and aromatic plants, the relations between production and amount of ether oils are of particular interest. Such study can help to identify shapes (forms) resulting not only in production, but fruitful ingredients as well, which could result in genetic improvement.

MATERIAL AND METHODS

The aim of this research was to study the relations between several important indices of the wild marjoram population in three ecological regions in Kosovo, specifically the Kacanik, Hani I Elezit and Istog regions. Samples were taken from the following locations:

- Kaçanik (Post 1, Post 2, Post 3);
- Hani i Elezit (Post 1, Post 2, Post 3);
- Istog (Post 1, Post 2, Post 3).

The study relations were based on determining the correlation coefficient for the following analysed indices:

- 1.Plant height (cm);
- 2.First branch height from the ground (cm);
- 3.Length of the stem internodal part under the first embranchment point;
- 4.Middle leaf juncture length of the leafy part;
- 5.Number of leaves;
- 6.Leaf latitude;
- 7.Leaf height;
- 8.Tradable leaf height;
- 9.Saturated tradable weight;
- 10.Dry tradable weight.

For every index mentioned above, 50 plants were randomly selected, and from these, a medium sample of ten plants remained where the measurements were completed. As a result, morphological data were collected depending on the position from which samples had been taken from, and based on biometrical data from a survey of the field site. As a measure for evaluation of the relations based on the correlation efficient, refer to Table 1.

Table 1. Evaluation of relations based on the correlation coefficient.

Correlation coefficient (r)	Relation type
0.0–0.10	No correlation
0.10–0.25	Very weak correlation
0.25–0.40	Weak
0.40–0.50	Medium
0.50–0.75	Strong
0.75–0.90	Very strong
0.90–1.00	Fully correlative

RESULTS AND DISCUSSION

Table 1 shows correlation coefficients between plant heights and other features of wild marjoram in three studied regions. From these data, it is noticeable that plant height correlates positively with the length of the middle stem internodal part, the height of the first branch from the ground, tradable leaf height, etc. It is also generally noticeable that a mass relation is nearly identical between the different features. However, there are also exceptions to this finding. These are shown graphically in Figure 1.

Table 2. Correlation coefficient related to plant height and other features grouped according to the studied regions

	Correlating feature (plant height)	<i>Kaçanik</i>	<i>Hani i Elezit</i>	<i>Istog</i>
1	Height of the first branch from the ground	0.54	0.41	0.40
2	Length of the stem internodal part under the first embranchment point	0.69	0.35	0.65
3	Middle leaf juncture length of the leafy part	0.53	0.40	0.83
4	Number of leaves	0.62	0.46	0.64
5	Leaf latitude	0.45	0.34	0.10
6	Leaf height	0.23	0.23	0.06
7	Tradable leaf height	0.67	0.66	0.85
8	Saturated tradable weight	0.48	0.56	0.55
9	Dry tradable weight	0.57	0.53	0.73

In Figure 1 gives a more concrete graphical representation of the correlation coefficient between plant height and other features in the three studied regions. It is noticeable that they generally have equal values, as in the height of the first branch from the ground in cm, saturated tradable weight, dry tradable weight, etc. This can be seen in the relations of the correlative coefficient between saturated and dry weight and other features in the three studied regions.

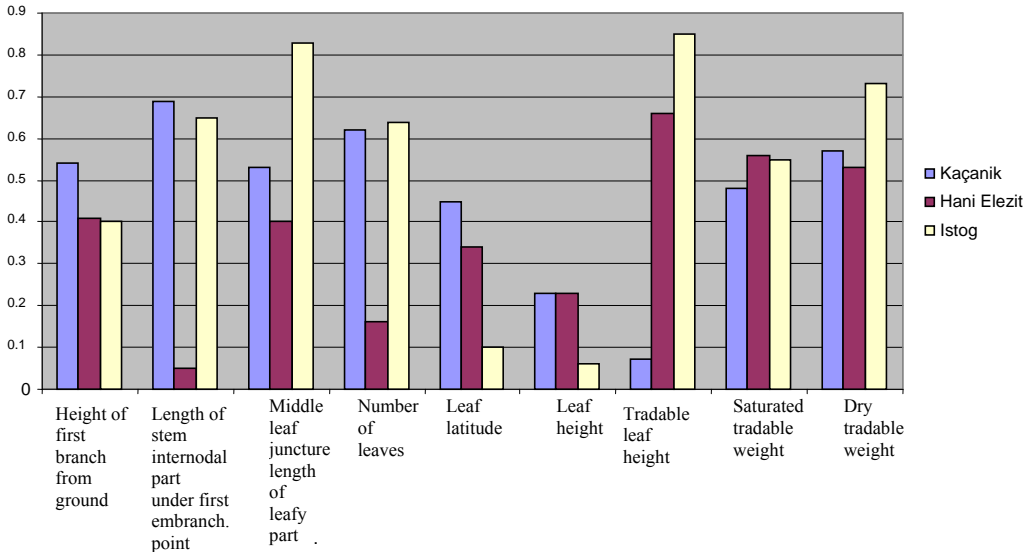


Figure 1. Graphical data display of correlation coefficient between plant height and other features in the three studied regions.

Table 2 gives the correlation coefficients between the first branch height point from the ground in cm and other features of wild marjoram in the three studied regions. From these data, it is noticeable that there are nearly identical value relations between the different features. However, there are exceptions to this trend. The results are shown graphically in Table 2.

Table 2. Correlation coefficient between the height of the first branch from the ground in cm and other features of wild marjoram in the three studied regions.

	Correlating feature (first branch height point)	<i>Kaçanik</i>	<i>Hani i Elezit</i>	<i>Istog</i>
1	Length of stem internodal part under first embranchment point	0.57	-0.03	0.55
2	Middle leaf juncture length of leafy part	0.51	0.12	0.38
3	Number of leaves	0.60	0.25	0.68

	First branch height point	Kaçanik	Hani i Elezit	Istog
4	Leaf latitude	0.16	0.29	0.30
5	Leaf height	0.33	0.48	0.14
6	Tradable leaf height	0.44	0.71	0.69
7	Saturated tradable weight	0.24	0.25	0.61
8	Dry tradable weight	0.49	0.27	0.59

From the data in the Table 3, of interest are the positive relations of this production index with other indices, e.g. plant height. Approximate data are also provided for dry tradable weight in Table 4.

Table 3. Correlation coefficient between saturated tradable weight and eight other features in the three studied regions.

Saturated tradable weight	1	2	3	4	5	6	7	8
Kaçanik	0.48	0.24	0.52	0.59	0.53	0.76	0.04	1.00
Hani Elezit	0.56	0.61	0.13	0.22	0.16	0.09	0.36	0.58
Istog	0.55	0.05	0.21	0.33	0.14	0.14	0.26	0.18

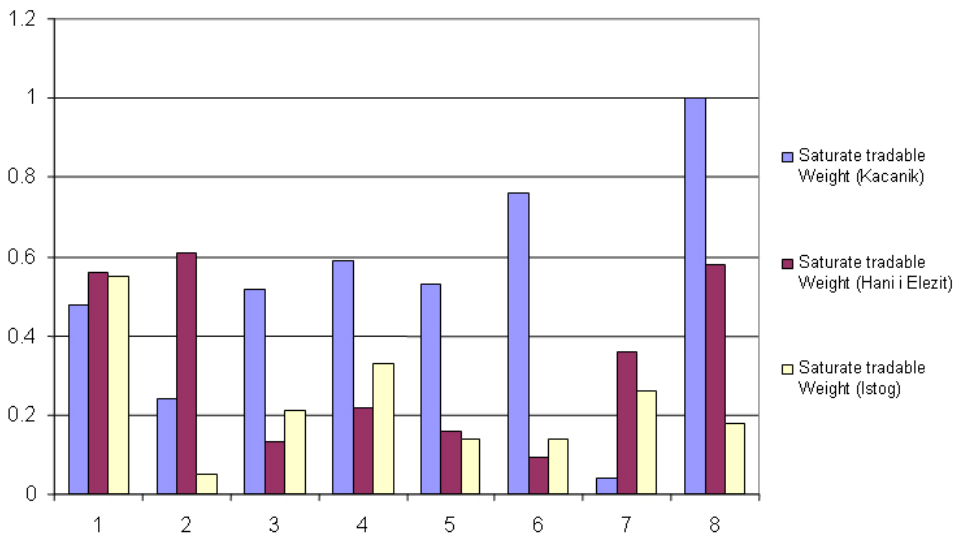


Figure 2. Graphical data display of correlation coefficient between saturated weight and other features in the three studied regions

Table 4. Correlation coefficient related to dry weight and other features in the three studied regions.

Dry tradable weight	1	2	3	4	5	6	7	8
Kaçanik	0.57	0.49	0.62	0.71	0.46	0.62	0.06	0.91
Hani Elezit	0.53	0.59	0.16	0.19	0.17	0.06	0.32	0.55
Istog	0.73	0.07	0.44	0.62	0.42	0.55	0.49	0.47

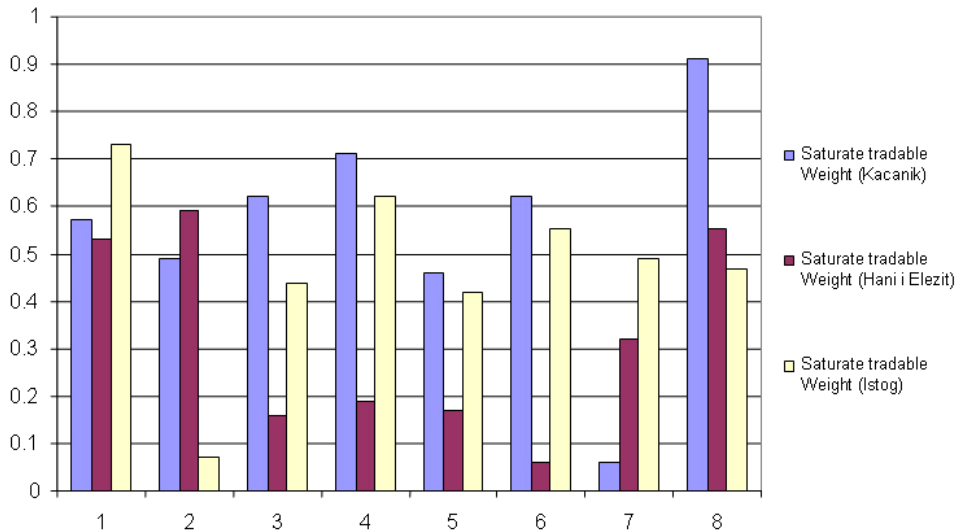


Figure 3. Graphical data display of correlation coefficient between dry weight and other features in the three studied regions

CONCLUSIONS

From this relations study between several studied features, we may conclude the following:

- Different features represent different feature relations;
- There are no extreme relational differences between different features in different regions;
- Of interest are relations between production features, e.g. between saturated and dry weights and other features.

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***Imer RUSINOVCI, Sali ALIU, Shukri FETAHU,
Salih SALIHU and Dukagjin ZEKA***

**ODNOS GLAVNIH MORFOLOŠKIH KARAKTERISTIKA DIVLJEG
ORIGANA (*Origanum vulgare* L.) U USLOVIMA TRI EKOLOŠKA
REGIONA NA KOSOVU**

Procjena genetičkih resursa je važan korak u procesu planiranja njihovih korišćenja imajući u vidu čak i unutar aromatičnih ljekovitih biljaka. Ovaj rad tretira studiju i procjenu korelacione veze populacije origana (*Origanum vulgare* L.) sa morfološkim indikatora za ekološke uslove na tri lokacije (Kačanik, Đeneral Janković i Istok) na Kosovu. U radnom dokumentu su predstavljeni rezultati istraživanja o povezanosti nekih važnih karakteristika origana. Razne karakteristike ispitanih biljaka su generalno povezane jedne sa drugima. U nekim slučajevima ove veze su pozitivne, ali i negativni u drugim slučajevima.

Ključne riječi: koeficijent korelacije, jaka veza, srednji link, slaba karika.