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Research article

Biological data of *Matricaria chamomilla* L. perspectives and promising future

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Abstract: In this paper we have been focused on biology and life cycle of *Matricaria chamomilla* L, some agronomic aspects and biochemical as well in order to recommend it and to get the scientific information for the best practice in near future. The therapeutic value of this plant depends upon its life cycle, climate change, phenotypic properties and essential oil content. Recently the trend for using herbs and home remedies necessitate developing new sources for such these scientific study to overcome therapeutic failure. We summarized the biological study with chemistry related with oil content in different cultivars in different climate. Finally, the environmental conditions friendly can be correlated with biological parameters we have been focused.

Keywords: *Matricaria chamomilla* L., *life cycle, agronomic aspects, best practice, remedies.*

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Introduction

The name chamomile is derived from two Greek words: Khamai meaning “on the ground” and melon meaning “apple”, the flowers having apple-like aroma (Hanrahan & Frey, 2005). German chamomile *(Matricaria chamomilla* L.) belongs to the Asteraceae (Compositae) family. It is an annual herbaceous plant with short roots. Plant is multi-branched, long and narrow compound leaves, leaflets slightly hairy with minute lobes, petiole externally covered by green colored leaves. Flower heads separate, diameter 15-25 mm and all are heterogamous. Tubular florets are golden yellow with 3-5 teeth, sepal white and inner petals yellow. Smell of flower sweet, continued in dry flower. Seed is small, light and elongated. Roots are thin, spindle-shaped. Stem is branched, erected, heavily ramified. Fruit is yellowish and brown ached (Singh et al., 2011).

Chamomile is known to be anti-inflammatory, anti-spasmodic, anti-bacterial, and anti-septic (Barakoti et al., 2012, Franke & Schilcher, 2007). There are hundreds of actions and uses of chamomile flower and oil. It is carminative, analgesic, vulnerary, aromatic, bitter, diaphoretic, emmenagogue, nervine, sedative, tonic, anti-allergenic, fungicidal, hepatic, nerve sedative, and stomachic (Aarya Aroma, 2019, NEHHPA, 2019, Janmejai et al., 2010).

Farnesene, bisabolone oxide, caryophyllene are also active chemical constituents (HPPCL, 2019) and used in flavor, fragrances and medicines.

Matricaria chamomilla L is used to prepare perfumes, soaps, shampoos, detergents, hair products. It also has high medicinal value (Aarya Aroma, 2019, NEHHPA, 2019). Used for curing fever in the past, now it is used as gargle for sore throats and sore eyes. Oil is used for massaging muscles and joints to reduce pain. It also helps reduce inflammation and dark shadows under the eye. Oils are also used in spa for relaxation which reduces anxiety and insomnia. It is added in baby oils for strengthening bones (Shrestha, 2016). Chamomile has great potential for Albania because of high value compared to food crops and high demand from foreign markets. The potentiality could be explored if the government endorses conducive policy in chamomile. Recently in the world *Chamomile* is used according to the rules and laws which are defined. (WHO, 2005). Use of chamomile ingredients sometime is harmful, so many countries have an international law on the use of chamomile drugs. (WHO, 2005). According to the various countries that have ratified this law, there are also

adaptations depending on the standards, but all are part of the good practices of managing the essences according to the protocols. Following such these practices Albania in the framework of aspiration being a part of European Union should follow these line in order to get a perspective and promising future.

Materials and Methods

Our experimental data in the field were recorded following standard methods of biometrics. Monitoring was started when the plants attained the flowering stage. Chamomile planting starts in May ends in August, regarding the different climate changes, we have been focused since in the beginning of the scientific job for the measurement of "biological zero" of this plant that is specific and unique. These data confess us for plant heights, number of branches, number of flower heads per plant were counted at peak flowering time. Data recording was done in randomly selected 10 plants at 10 different places. Then the mean data per plant were calculated by software Stategrafix 2004. Chamomile oil percent was determined by means of Hewlett-Packard 5890 Series II system, with capillary column HP-5, FID detector, split-split less system for injection and automatic injector HP 7673. The operating conditions were: injection temperature 150°C, detector temperature 250°C, carrier gas nitrogen.

Results and Discussions

Results have shown encouraging performance, revealing good growth and development in the experiment. The major agronomical traits of growth and development, such as plant height, number of branches, number of flower heads, essential oil content were monitored by Statistical analysis: consisted of all feature variables which were modeled with JMP software and analyzed for F-test, Dev Stand^2, Variance (Table 1).

Table 1. *Analyze of variance.*

Source Var	DF	Sum of S	$\bar{Y}$	Mean Square	F. Ratio	δ	C Tot	Cv	Prob > F
Number of Flo. Heads	89	436.6	18.2	15.022	24.96	0.60	471.7	3.17	<.0001*
Number of Flower	89	16719	98.6	576.5	5.67	2.0	22818	2.02	<.0001*
Number of leaves	289	19.056	3.44	0.635	3.319	0.35	68.6	10.17	<.0001*
Number of Branches	30	22.31	3.68	0.74	0.27	1.71	289	46	1.000
Plant Height	30	1561	47	52.04	0.57	18.7	289	39.7	0.964

Albanian climate offers a linear plant height of *Matricaria chamomilla* L, in different places when is observed, average of values analyzed resulted 47.2 cm.

The average number of branches is presented in Histogram 1 expresses significant differences verified between variants P = 0.05. NB (Number of Branches) has fluctuated from 3.5 in F Preze, Larushk, Mat and Dukas to 3.9 in Kozare and Provonik. This parameter has been strongly linked index depending on the country and the average temperature as well as the sum of the effective temperatures (Figure 1). Meanwhile, the number of branches was influenced by the characteristic weather and the percentage of soil moisture. The differences from the comparison in the pair have fluctuated from 1.8 to 3.8.

Number of leaves have a big variation around 13.08%. The number of leafs is a strong positive correlation between genotype and various environmental factors which have stimulated the growth process in different sizes. For example, the chamomile population has reach the best conditions in Karbunar, where the length has the highest value of 3.75 cm and is statistically different from the average lengths in other countries. The smallest leaf length corresponded to Mat_L, 3.19 cm. There has generally been considerable variation in the averages of this feature (Figure 2).

According to the analysis of the number of flowers per plant (NF), it was related to the genetic nature of the population 74%, and 26% to the place of cultivation or the conditions of the environment of growth and development.

The variables collected from the samples and analyzed with the decryption statistics have classified their frequency distribution typically for each Place. The number of flowers per plant was different for each place and corresponds to cv = 26.6%, which expresses great variability of variables within the sampling of each country. Summary the best conditions the chamomile population has reached in Karbunar with the average number of flowers per plant 100.5 flowers and statistically

verified different from the average number of flowers in other countries.

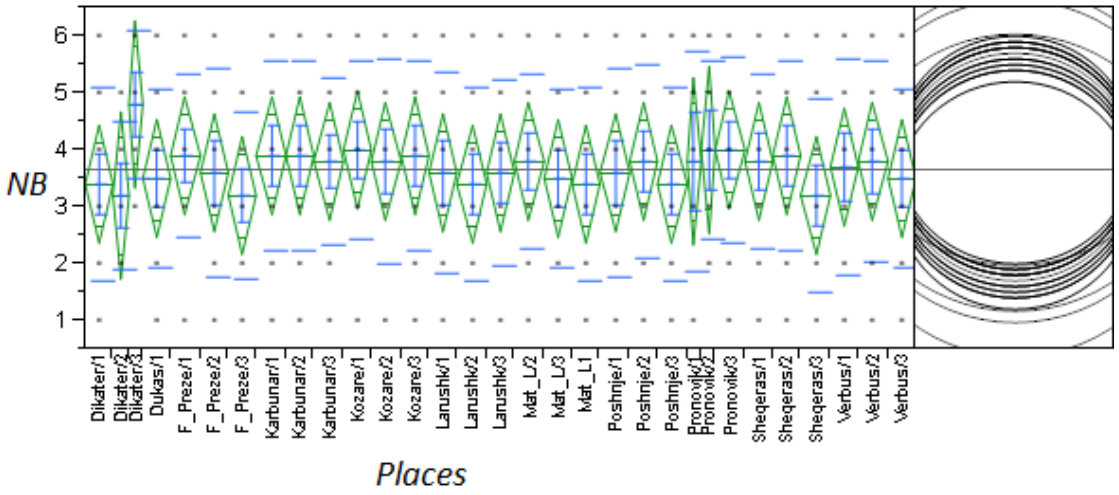

Figure 1. Number of Branches analyses

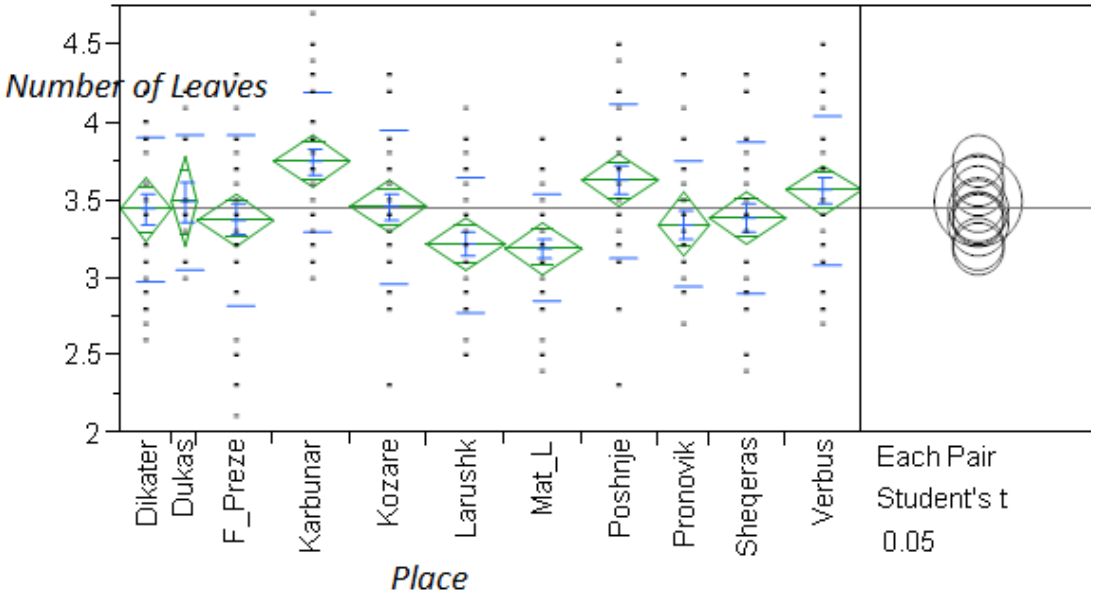

Figure 2. Number of leaves analyses

The smallest number of flowers corresponded to Mat_L, 81.8 (Figure 3). Number of flower heads (NFH), shown that the results of the chamomile population have been completed in Sheqeras, in which the average dry flask has the highest value of 22.2 grams and is statistically different from the average in other countries.

The smallest average weight corresponded to F. Preze 16.1gram (Figure 4). In general, there has been a considerable variation of the averages of this feature. Thus referring to the overall mean of PBTh in all study sites (18.9 grams) and the fluctuation to the averages according to std. dv (0.94), has corresponded to a large variation of this indicator (4.978%), compared between all countries.

Furthermore, there is a relationship between Number of flower heads (NFH) and number of flowers per plant (NF). The Number of flower heads (NFH) is the main indicator of the material expected and used by medicine. This index has been very different between populations.

All measurements and statistical analyzes through, variance, variation, amplitude and quadratic avoidance,

have expressed very well the degree of distribution of variables, within the analysis of each country and have shown that between countries the number of flowers per plant is characterized by great variation (about 5.%) (Figure 5).

Chamomile according to botanical descriptions is an herbaceous plant and contains a large amount of essential oil, and the role of the country is great for the level of content with medicinal element. There are a lot of components presents in the essential oils of *Matricaria chamomilla* L. The focus of this study is related to the amount of some component (used in the industry, pharmacology, home therapy), in essential oil of *Matricaria chamomilla* L. These first step of the results the amount of essences is different and should be discussed. Bisabolol B-oxide is found in consider amount in Korca district as well as Bisabolol A is found in consider amount in Korca. Otherwise Chamazulene (well known for antifungal effect), in population of Lezha district is considerable.

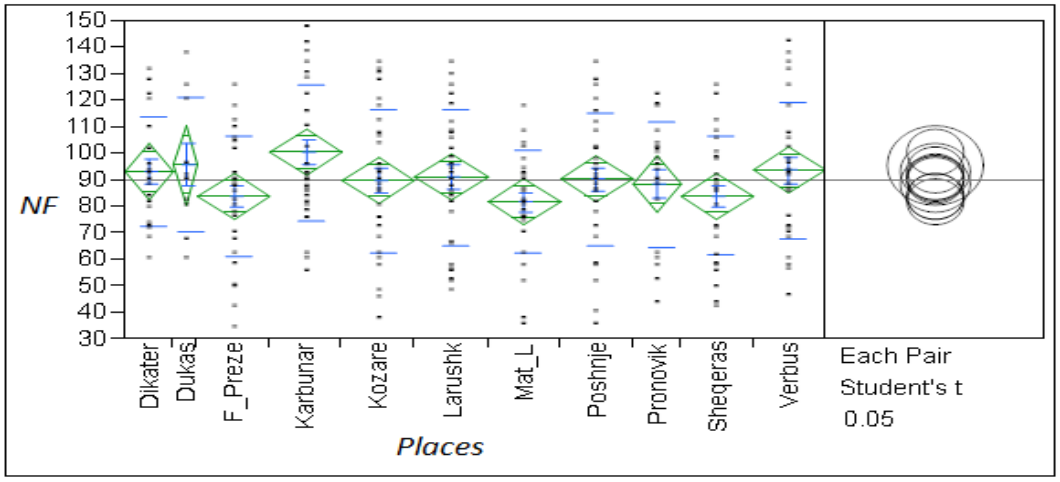

Figure 3. Number of Flowers analyses

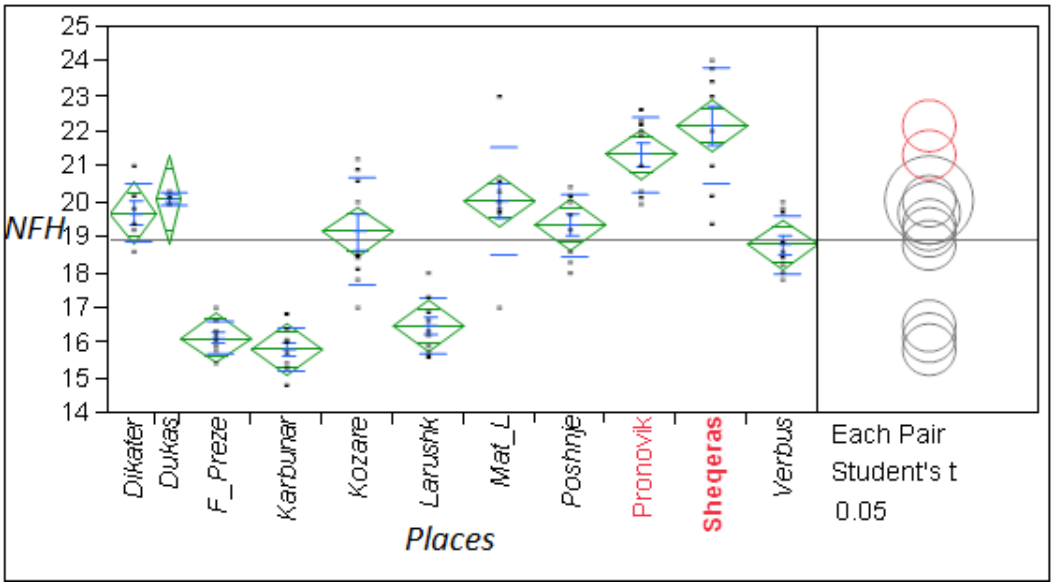

Figure 4. Number of flower heads analyses

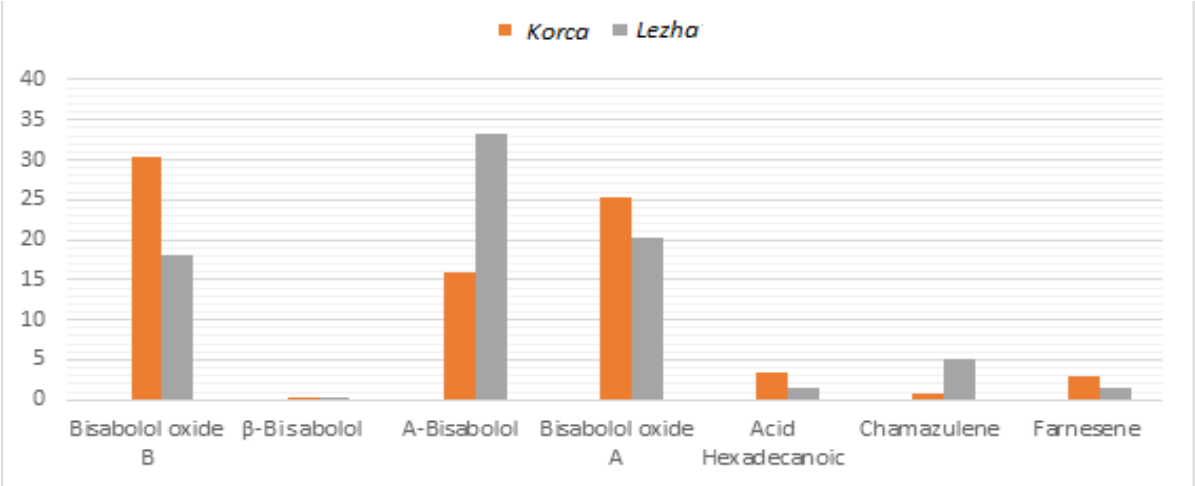

Figure 5. Chemical component of *Matricaria chamomilla* L.

Conclusions

We kindly recommend the findings and technologies to the farmers and business partners related to medicinal plants these similar agro-ecological conditions. They can collect and cultivate chamomile commercially in their suitable land for generating income. The landless also can grow in kitchen garden or as pot culture for herbal drink, medicinal and other purposes. Best cultivars and best places for the high production of flower heads should be consider according the experiment that the best place is Sheqeras because of climate conditions, land and geographic conditions. Anyway if we are interested to export *M. chamomilla* for the industrial purposes we can recommend cultivars grown in Lezha because of the amount of *chamazulene* with a history of its use in the treatment of skin problems. We strongly recommend collecting population of Korca District as the best place for the *chamomile* cultivars for all interested in *Bisabolol* terpene, its result lesser-known terpene so far there are no known health risks associated with this terpene so *Bisabolol* is always a good idea.

Ethical Approval

No need to ethial approvel for this study.

Funding Statement

The authors do not declare any fund.

Conflict of Interest

The authors declare that they have no conflict of interest.

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