

EVALUATION OF THE MORPHOLOGIC INDICATORS OF THE ABOVE-SOIL AND SUBSOIL ORGANS OF THE SANZA (*GENTIANA LUTEA L*) IN ALBANIA (PLANTING 2010 AND HARVEST 2017)

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Abstract

The sanza studies have been impossible due to the fact that it was a non-cultivated and non-high-yield natural plant. Over the years, natural production has fallen, and since it does not meet the needs of the national and international market, it has moved to its cultivation into areas where it grows naturally. It was planted for the first time in Shishtavec of Kukes on a surface of six dynym. Since it was planted for the first time, it was done the evaluation of the over-soil and sub-soil morphologic indicators. In 2010 it was planted in Shishtavec of the Kukes district to evaluate the morphological indicators according to the age of the plant, from the second to the seventh year, which is the year of harvest. The measurements were made of the number of leaves per plant, the length of the stalk, the number of stems in the stalk, the leaf surface for the plant, the leaf surface index and the production of roots.

Keywords: *Sanza, leaf, root, leaf surface, index and medicinal.*

1. Introduction

Sanza is a typical Albanian plant known and used in the period of the king of Durrës, Gent. There are some species known from the taxonomic point of view which represent morphological changes and chemical composition. The most widespread and presenting economic and scientific interest is the yellow sanza (*Gentianalutea L*). Among the many species we can mention the Albanian sanza (*Gentiana albanica*) which is spread in Albania and the Albanian lands.

Due to the harvest without respecting the technical criteria, it is included in the red list of plants, ie plants that are at risk of disappearing. After 2010, projects were undertaken for its cultivation in areas where it grows in natural conditions to increase its production to meet the ever increasing needs of the international market. One of the most suitable points is Shishtaveci in Kukës, which extends up to 1326 m and with the coordinates 41°59 'and 20°36', while the sowing of sanza was carried out at 1280 m. Sanza suits very well in serpentine lands.

In this reference will be given the data and their interpretation of the morphological indicators of the over-soil and sub-soil organs for the sowing of 2010 - 2017, so the harvest was made in 2017, at the seven years of age of the sanza.

2. Material and Methods

The purpose of the study: To study and evaluate the over-soil and sub-soil morphological indicators and the evaluation of the sanza for its performance from the second to the seventh year.

The objectives: To determine the morphologic indicators of the over-soil and sub-soil organs of the sanza: number of leaves / plants, the stalk height, the number of stems in the stalk, the leaf surface, leaf surface index and the average indicator of roots.

There are defined four repetitions of 10 (ten) plants, in which are made biometric measurements of indicators: the number of leaves / plant, stem height, number of floors in the stalk, leaf surface and leaf surface index.

For the determination of the leaf surface, the weighing method (P1) of the leaves with measured surface (S1) and weight (P2) for leaves with a non-measured surface and the formula is used:

$$S2 = \frac{P2 \times S1}{P1}$$

The leaves are picked in four hands: The first: on June 20th are taken down leaves that are yellowed. Second: on July 10, picking yellow leaves that no longer function. Third: on July 30. Fourth were picked on August 20th by taking all the leaves that have completed the photosynthetic processes. The harvest of roots was done in October by pulling them up with brooms. After harvest the roots are cleansed and dried. The thick roots are sprinkled in four parts to dry faster and qualitatively better.

3. Results and Discussion

During the cultivation of the sanza, biometric measurements of the morphologic indicators of the over-soil and sub-soil organs were made according to the methodology. Roots after harvest have been cleaned and washed and dried up to 12% moisture.



Figure 1. A. The appearance of leaves at the stage before the end of the vegetation, **B.** View of the roots in the seventh year of the sanza development a few days before harvest

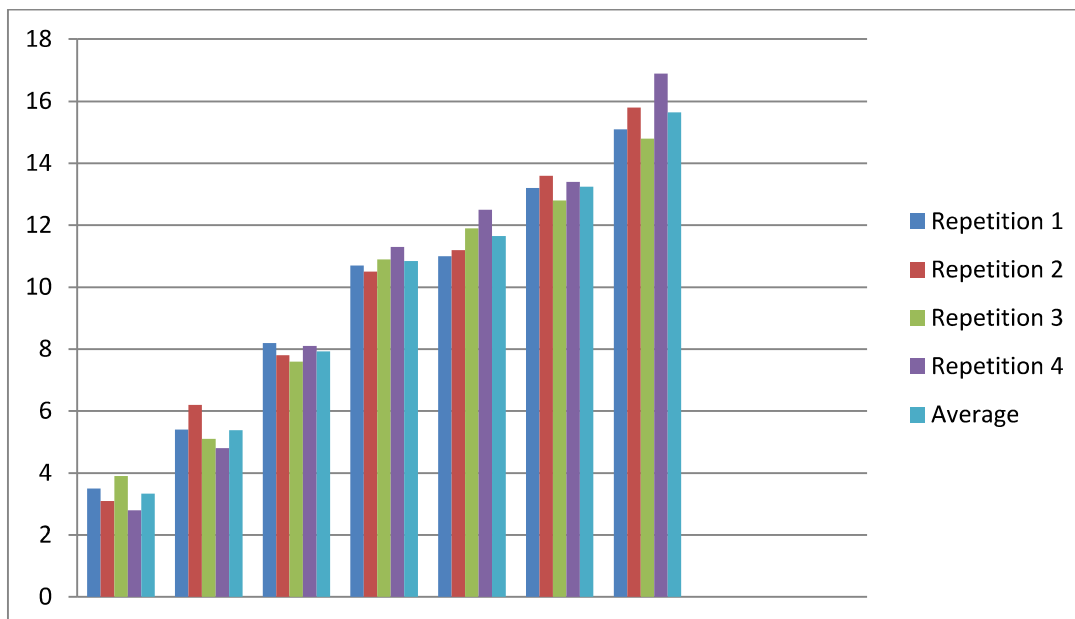


Figure 2. Number of leaves/plants by age of the plant

The sanza plant has a slower growth in the first year and forms fewer leaves. In the second and third year, it is accelerated the increase in the number of the first year for increasing the number of leaves, while in the fourth and fifth year there are no major changes in the number of leaves for plants, which coincides with the formation of fruiting organs. In the sixth and seventh year, the growth of the plant reaches the highest level and has the maximum number of leaves and leaf surface / plant.

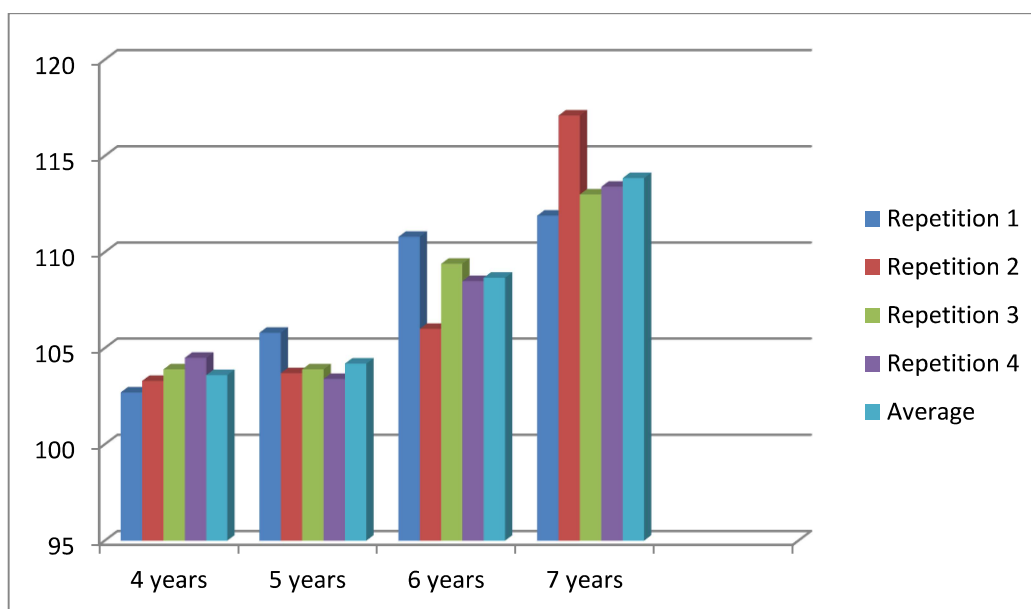


Figure 3. The height of the stalk by age of the plant

The plant of the sanza forms the flower stalk and the organs of fruiting in the fourth and fifth years of its life and rarely in the sixth and seventh year. As the age of the plant grows, the height of the stem increases, reaching the maximum in the sixth year.

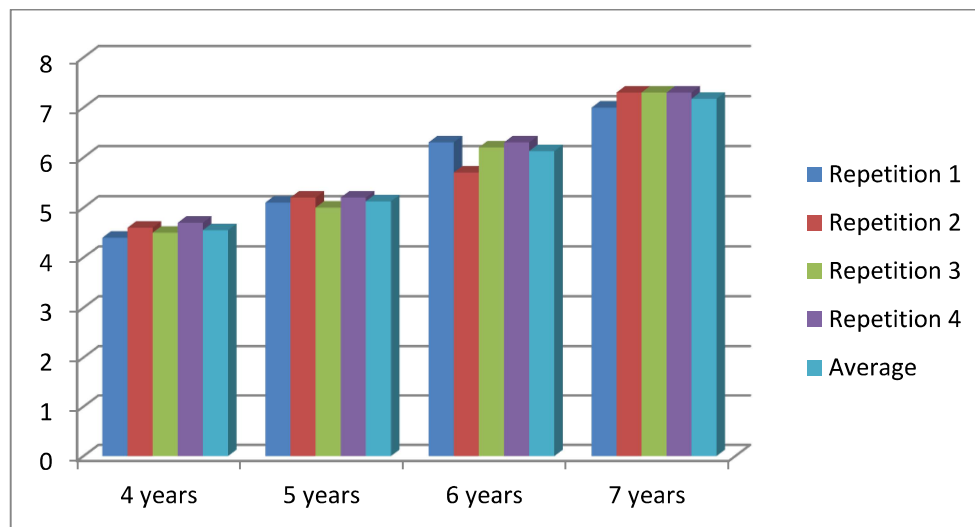


Figure 4. Number of floors of flowers on the stalk

The height of the stalk is closely related to the number of flower floors in the stalk. In the fourth and fifth year there are lower number of flower and fruit /plants, while in the sixth year there are a higher number of flowers floor and fruit in the stalk. Overloading of plant with fruit and seeds creates weak seeds, with low weight of 1000 seeds and low germination power. This requires the intervention to cut the stalk tip and purify the end of the stalk by leaving three to four floors of the stalk. In order to obtain high-power seeds, plants of the fourth and fifth year and rarely in the sixth year should be used.

Table 1. The data of foliar surface indicator by plant age for 60,000 and 80,000 plants per hectare

No	Plant age	Surface of 1 leaf (cm ²)	Number of leaves/plant	Leaf surface / plant (cm ²)	Number of plants /ha	Leaf surface /ha (m ² /ha)	Index of leaf surface
1	Annual	10.2	3.4	34.68	60 000	208.08	0.0208
					80 000	277.44	0.0277
2	Two years	28.6	5.2	148.72	60 000	888.0	0.0888
					80 000	1119.76	0.119
3	Three years	102.2	8.09	826.798	60 000	4960.384	0.496
					80 000	6614.384	0.66
4	Four years	251.5	10.8	2716.2	60 000	16297.2	1.63
					80 000	21729.6	2.173
5	Five years	274.2	11.2	3071.04	60 000	18426.24	1.843
					80 000	24568.32	2.457
6	Six years	284.8	12.9	3673.92	60 000	22043.52	2.204
					80 000	29391.36	2.939
7	Seven years	296.4	14.8	4386.72	60 000	26330.32	2.633
					80 000	35093.76	3.509

From the table it is clearly seen that the leaf and leaf indicators increase significantly with the growth of the herb plant age reaching the maximum in the sixth and seventh year. The leaf surface index should be increasing from the fourth year up to the seventh year, namely 2.633 to 3.509. The highest leaf surfaces have plants with a higher density, 80,000 plants / ha.

The main production of sanza is from the root. Its chemical composition is the main feature that gives the value of use in medicine. The roots are branched and have different lengths.

The parameters of the sanza roots cultivated in our study are: thickness 0.7 cm to 4.5 cm and length 16 cm to 123 cm. The weight of the root is different over the years. Since the chemical composition of the sanza is good in the sixth and seventh year, we have also made the weights of the roots of these years.

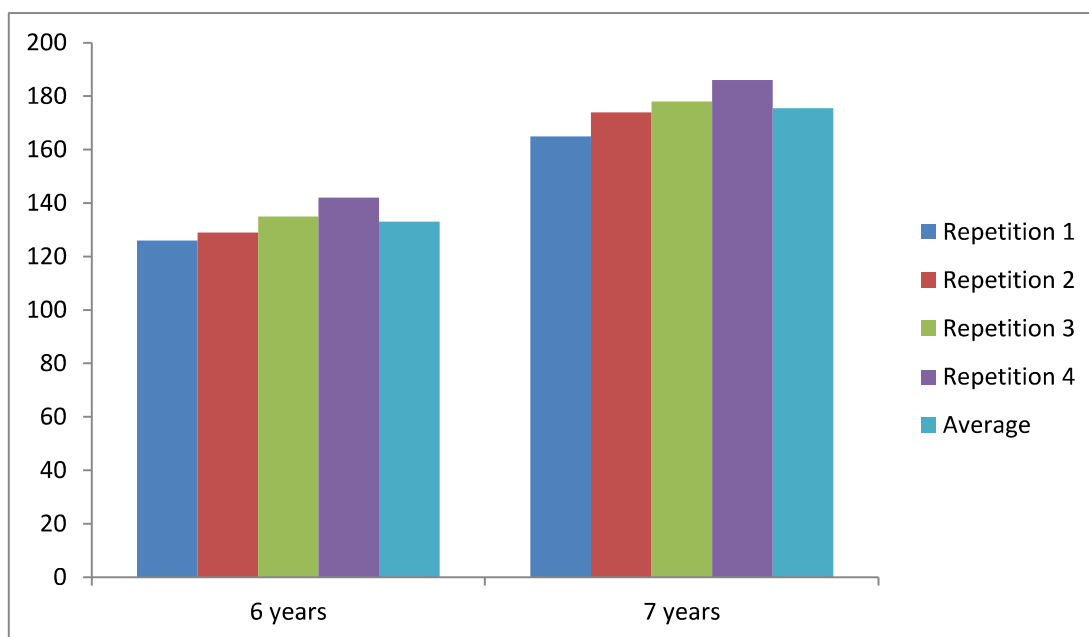


Figure 5. The weight of sanza's roots in the sixth and seventh year of cultivation

From the graphical presentation clearly shows that in the seventh year the plants produce about 20% more roots. The roots of the seventh year are larger in size and have the same chemical composition.

4. Conclusions

The dynamics of sanza growth is higher in the fourth year until the sixth and seventh year. The plant of sanza draws the flower stalk in the fourth and fifth year and rarely in the sixth and seventh year. In order to obtain good seeds and high power sprouts, plants of the sixth and seventh year should be used, with a number of plants of 60,000 plants per hectare, leaving 3 to 4 floors of fruit trees / plants. It would be good to ensure 60,000 to 80,000 plants per hectare to obtain higher roots production and better quality. The harvest is best to be done in the seventh year of the sanza's life.

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