

RESEARCH ARTICLE

(Open Access)**The results of the third year of basil subspecies study (*Ocimum basilicum* L.) for the production of dry mass by plant organs and the total yield.**NEFRUS ELIKU¹, NIKOLLAQ BARDHI², ZYDI TEQJA², ALBERT KOPALI², QATIP DODA³, DILAMAN NELAJ⁴¹Ministry of Agriculture, Forestry and Water Economy, Republic of Macedonia²Agricultural University of Tirana, Albania³Agriculture and Food Department of Dibra Prefecture, Albania⁴Agriculture and Food Department of Kukësi Prefecture, Albania

Corresponding author e-mail: bardhi.nikoll@yahoo.com

Abstract

Basil is one of the aromatic plants with wide range of use. Because of the chemical composition, it is used in perfumery, culinary, food industry, toothpastes, and in the production of soaps, shampoo and medicine [2]. It is cultivated in many countries in the open fields (in warmer climates) and in greenhouses. In Albania, it is been cultivated since 1958 in Levan, Fier for domestic use and for export. After 1990 it was cultivated by several farmers in Elbasan, Lushnje, Fier and Përmet. The production of fresh mass is processed by companies of medical aromatic plants for the production of essence and for the production of tomato sauce. Based on the values of use, the three-year study was undertaken for the five subspecies of basil. The study includes five subspecies of basil: Limonez, Napolitan, Red basil, Finoverde (greco) and Genoves. The study was set up in Toshkëz- Lushnje, according the randomized block scheme, with five variants in four repetitions. The biometric measurements were made on the plant height, the yield of floral, the leaves and herbs, the dry stalks [6]. There are observed verified differences among subspecies of basil.

Key words: Basil, matter, dry, herb, floral, leaf, stalk, yield, variant.

Introduction

The basil study is in its early stages in terms of the technology of cultivation and chemical composition analysis. As such it is a comparatively new area of experimental, laboratory and field studies and forms of usage modes. Given degree of knowledge on the way and use values was undertaken the study of basil in Albania in a doctoral program. In this paper will be presented the study of basil subspecies and evaluation for the production of dry mass per plant organs (leaves, flowers, herb, stalk and overall performance) for the third year of study. The subspecies of basil present many differences from the plant indicators, production of herb and plant organs (*La coltivazione erbe officinali*). The object of this study is to determine the dry mass yield per plant organs and overall yield.

Materials and methods

Basil is one of the aromatic and medical plants most prevalent in the world and in many European countries. In Albania is planted for pharmaceutical purposes and perfumes since 1958 in Levan, Fier [5]. After 1990, from the market demand of French companies (ALB DU CROS), was planted by individual farmers in some areas such as Fier, Lushnja, Elbasan, Permet Tirana [3].

Seeing and evaluating that the plant of basil has found wide use in many ways, as: pharmaceuticals, perfumery, cosmetic and culinary, it was reasonable to study this plant for several key aspects, by its more typical subspecies of Mediterranean climate [1, 2, 4].

The goal: To be experimented in the field several basil subspecies (five) and different use value

and the essence content. To be determine the yield of dry mass for each mowing and at the same time, the final yield for the three mowing (especially two, summer autumn) and indicators of leaves, flowers, herb, stalks, and the total yield of dry mass. In the study of basil subspecies included five subspecies of basil and, specifically:

1. Limonez basil (*Ocimum basilicum limoni*).
2. Neapolitan basil (*Ocimum basilicum fogliare*).
3. Red basil (*Ocimum basilicum Roso*).
4. Finogrecobasil (*Ocimum basilicum finogreco*).
5. Genovez basil (*Ocimum basilicum genovese*).

Basil subspecies have different morphological features and therefore the number of plants is provided by features they have. All variants are set up in four repetitions. They are done the biometric measurements, they are held morphological data and

the harvest is done on stage before flowering. The harvest is done with hook, 5-8 cm height from the soil, and the second, 5-8 cm height of ramifications. The fresh mass is dried by placing them in twinenets, firstly in the shade and later in the sun, doing alterations and mixing of mass until complete drying.

The cultivation technology is made by the well-known practice, while the seedlings are produced with the new methods [7, 8, 6, 9], with the bicerine of styrofoam, planting in greenhouses with central heating. Planting of saplings in the field is done when the sapling is fully grown (after 55-65 days after planting in seedbed).

The planting is carried out with the workforce (without mechanization), with the pins, placing the saplings about 1-1.5 cm deeper than it had been in the seedbed. During the vegetation they are done hoeing and watering as needed for moisture and the emergence of weeds.

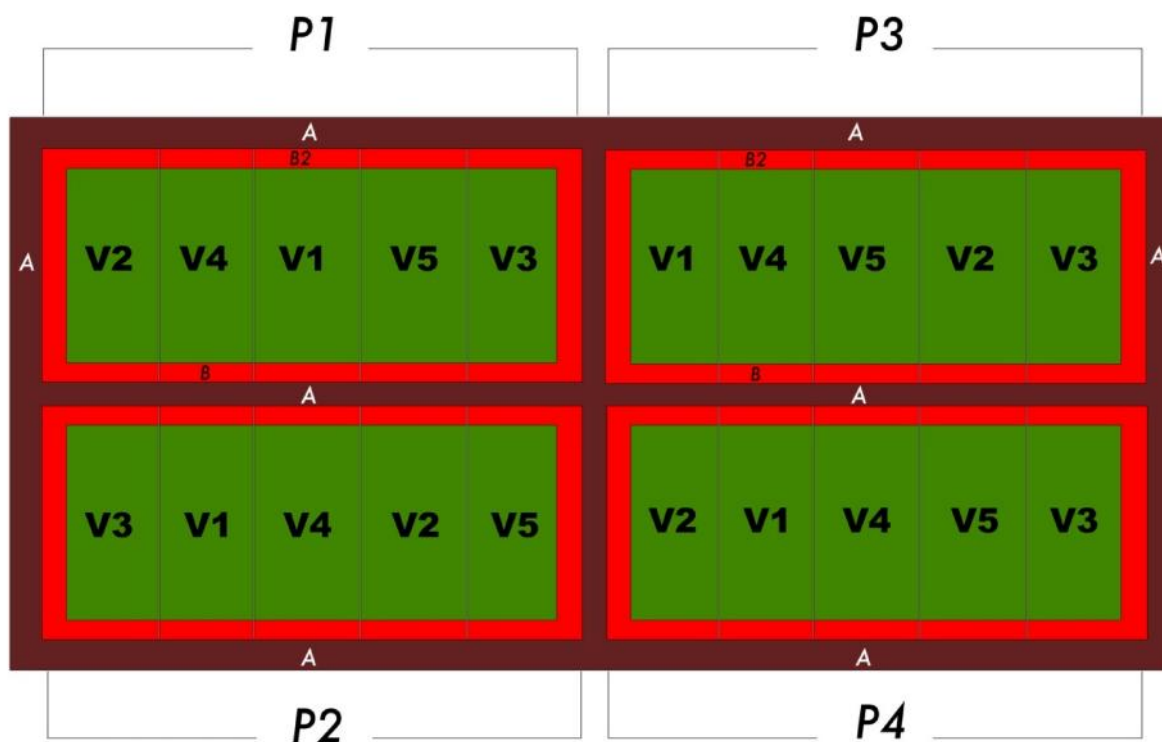


Figure 1: The method of setting up the experiment of the study of basil subspecies.

- A. The paths among the experiment.
- B. The protection area of the experiment.
- V. Variants (1 – 5). P. Repetitions (1 – 4).

The biometric measurements are focused on the following indicators:

1. The yield of dry leaves.

2. The yield of dry flowers.
3. The yield of dry herbs.
4. The yield of dry stalks.
5. Total yield(leaves, flowers, herbs, stalks) of dry mass for each mowing and for the threemowings.

Results and interpretation

In the third year, there are done the biometric measurements and computations of dry mass production for four indicators: leaves, flowers, herb

(leaves and flowers), stalks and total production for each mowing and three mowings. In the third year, they are been taken three mowings, but the third mowing has given the lower yields.

From the data,result the verified differences between the subspecies of basil andthe production of plant organs. The highest yield is achieved in the second mowing and in the first three subspecies that have the most vigorous plant growth.

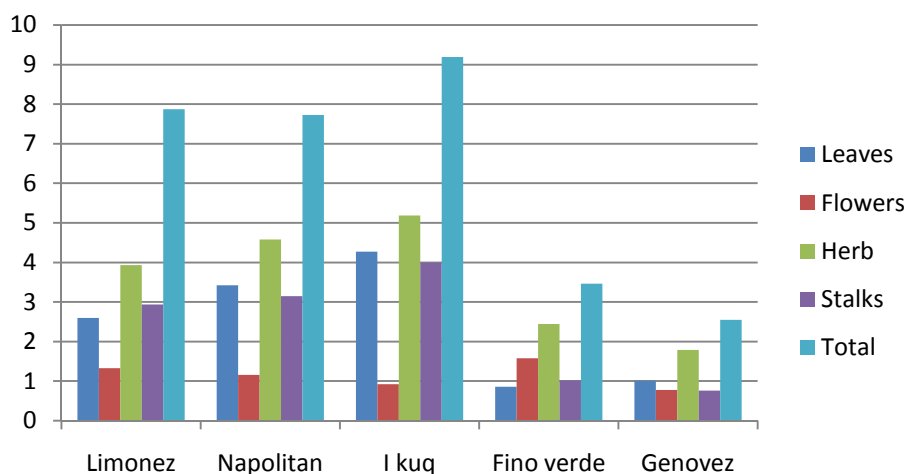


Figure 1.The yield of dry mass per plant organs and overall yield for the first mowing. The third year of study.

From graphic presentation it is clear that the dry leaf yield is higher among subspecies of Red basil and Neapolitan, and the highest yield of dry flower is in basil Fino Verde and Limonez. Consequently, the herb yield is higher among Red basil and

Napolitan. In Red basil has a high content of stalks contributing to the deterioration of plant organs ratio. The overall yield is higher among Red basil, Limonez and the Napolitan.

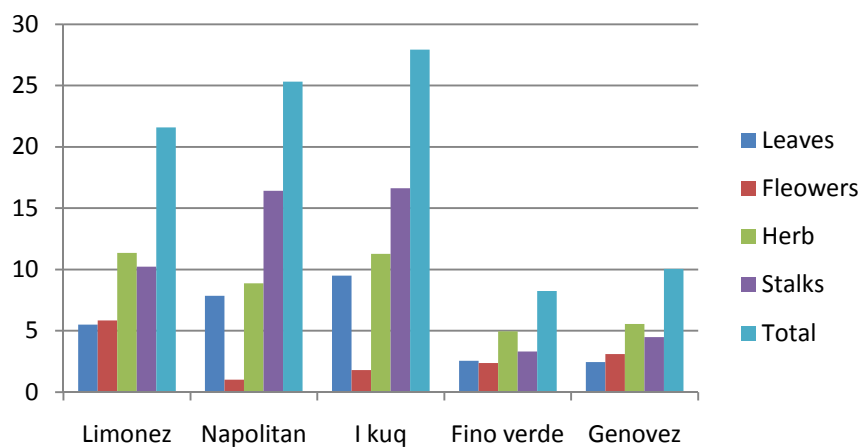


Figure 2: The yield of dry mass per plant organs and overall yield for the second mowing. The third year of study.

The yields of the second mowing for all plant organs are higher than in the first mowing. The dry leaf yield is higher among Napolitan, Red basil and Limones, while dry flower yield is higher at Limones basil. Since the yield of dry flower is higher among Limonez and Genovez basil and lower to the Red and the Napolitan, it affects the quality of essence and increases the values of use in perfumery. The herb yield

is higher in Limonez, Red basil and Napolitan where the largest weight share the leaves. Meanwhile, the lower yields give subtypes of basil: Fino verde and Genovez. The yield of herb (leaves and flowers) was higher in Limones basil, which has a much better ratio leaves : flowers. The yield of stalks and the total yield is higher in Limones basil compared to other subtypes.

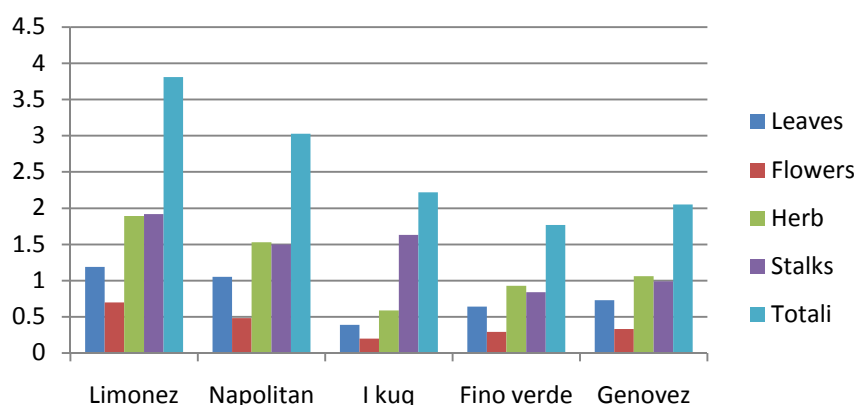


Figure 3: The yield of dry mass per plant organs and overall yield for the third mowing. The third year of study.

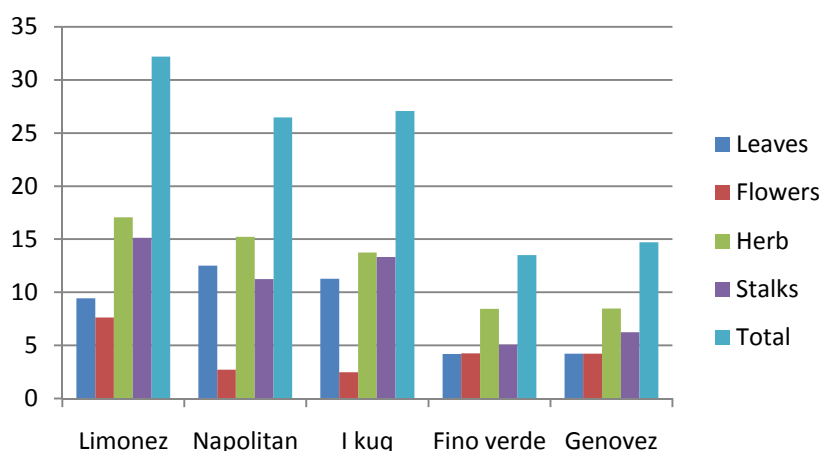


Figure 4. The yield of dry mass per plant organs and total yield for the three mowings. The third year of study.

The third mowing has lower performance than the other two mowings in all plant organs, especially the flowers yield. The highest total yield reached the Napolitan and Limonez basil.

From the graphic representation of the average yield of dry mass for three mowings for leaves, it is higher in subtypes of basil: Limonez, the Red and Napolitan. The yield of flowers is higher in subtypes of basil: Limonez, Fino verde and Genovez. While the herb yield is higher in three

subspecies of basil: Limonez, the Red basil and Napolitan. The content of the stalks is negative qualities which not only reduces the quality of the essence, but also its amount. The study shows that the highest yield of stalks is to subtypes of basil: Limonez, the Napolitan and Red basil, occupying 47% of the total yield or 70% more than the yield of leaves. This should be taken into consideration for the time of crop

harvest not to be late, which increases weight (%) of the stalks. The verified differences are in leaves, herb and stalks yield for the three mowing. The yields of flowers is with small statistically verified differences for the first and second mowing, while the third mowing has not verified differences.

Conclusions and advice

As a result of this field study we can draw some conclusions and give advice for future cultivation of basil subspecies:

Conclusions

From the overall analysis of the data of dry mass yield by plant organs and the total yield, we achieve the following conclusions

- a. Among the basil subspecies has verified differences in the yield of plant organs: leaves, herbs, stalks and the total yield.
- b. Three subspecies, as Limonez, Napolitan and Red basil, have the highest yield of dry mass.
- c. The yield of flowers has the verified differences between species and the higher yield has the subspecies of Limonez basil.
- d. Depending on the purpose of use, it may become the late harvest to get the most performance of flowers, herbs, stalks and total yield, but it increase the stalks content and significantly is reduced the essence content and there are reduced

the values of use in the food industry and perfumery

- e. The highest annual yield is achieved in the first three subtypes of basil (Limonez, Napolitan and Red basil), but with a higher percentage of stalks.

Advice:

By the study of basil subspecies, we advise that for industrial use to be cultivated the first three subtypes that have higher yields of dry mass of leaves, herb, stalks the total yield. While for use in the food industry and perfumery to be cultivated the two other subspecies that have higher yields of flowers and the better content and quality of essence.

References

1. Asllani U.: **Esencat e bimëve aromatike të Shqipërisë. Tiranë 2004.**
2. Anasi S.: **Emanuel. 176 bimë 176 mjekë. Tiranë, 2002**
3. Bardhi N.: **Bimët aromatike e mjekësore. Leksione 2014 (MSH).**
4. Bardo F, Fesneau, M. **La medicine aromatic. Paris 1994.**
5. eku K: **Kultivimi i bimëve aromatike e mjekësore. Tiranë 1984.**
6. Gjoni. Z: **Vjelja dhe grumbullimi e bimëve aromatike e mjekësore të Dibrës**
7. **Grup autor. Fitoteknia. Tiranë 1987.**
8. Kutrolli F: **Kultivimi dhe përpunimi i bimëve aromatike e mjekësore. 2010.**
9. **La coltivazione erbe officinali parte 2. Corso di formazione veneto. Agricoltura-Legnaro. Marzo 2005(venetoagricoltura.regione.veneto.it).**