STUDIES REGARDING THE BEHAVIOR OF COMMON FLAX IN SOUTH DOBRUDJA

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Abstract: *The dynamic and complex processes (exchanges of substance and energy) which occur differently for each species of cultivated plant and for each type of ecosystem are conditioned by biological requirements and by the action of vegetation factors and territorial ecological factors (climate and soil). Knowledge regarding the way in which the existing natural conditions satisfy the biological requirements of agricultural plants is of great importance for the national economy because a rational location of crops can be accomplished only starting from this scientific basis.Common flax (flaxseed or linseed) is a crop with special importance, as the seeds are used in the food and pharmaceutical industry, for the production of inks, in the soap and linoleum industry, in tannery, for the impregnation of electrical insulators etc. In the present article, the authors have tried to demonstrate that the littoral zone is suitable for the cultivation of common flax. In this regard, a flax crop was established in the didactical and experimental field of the Laboratory of Phytotechny, within "Ovidius" University of Constanta, and another crop was cultivated in the vicinity of the locality Enisala (Tulcea county).Considering that, over the recent years, common flax was cultivated in Romania on small farms (65 ha in 2005), compared to the 1980s-1990s (70-80 thousand ha), and that the average yield for our country is between 500 and 700 kg/ha (800 kg/ha at international level), but also that, in the above mentioned region, due to the fact that the surfaces cultivated with wheat, barley and sunflower increased to the detriment of other plants, a rational crop rotation can no longer be observed. Thus, this article intends to represent a starting point for the expansion of this economically valuable crop in the studied area.*

Key words**:** *common flax, territorial ecological factor.*

INTRODUCTION

Given the current climatic changes, farmers are trying to find new technological methods for the traditional crops, as well as to improve the present structure of crops by introducing new species that may me suitable for the current climatic conditions, or by reintroducing plants that were grown in the past but whose cultivation stopped for a while for economic reasons. For the Dobrudja Plateau, such a plant is common flax (*Linum usitatissimum L*). The economic importance of common flax increased over the recent years due to the use of its seeds for therapeutic purposes.

MATERIAL AND METHODS

In order to support the farmers that wish to reintroduce common flax in their crop structure, as well as for the high yield and high quality results of the cultivation technology, with adequate profit, the present article is trying to propose a framework technology for the cultivation of common flax, given the fact that for the past 23 years this crop has not been found in the cultivation structure of the Dobrudja Plateau. To this end, a common flax crop was set up (a technological version), the plants being observed over the entire vegetation period, from sowing to harvesting. At maturity, plant samples were collected and the following indexes were observed: density, number of capsules per plant, weight of capsules, weight of seeds in the capsules, but also stem length, given that stems can render profit by their exploitation as raw material for the production of short fibers.

RESULTS AND DISCUSSIONS

The cultivation technology of common flax in south Dobrudja

Crop rotation. Autumn cereals, as well as maize fertilized with manure and not sprayed with triazines, and annual legumes are the best precursory plants for common flax. Sunflower and beet are considered milder precursors sue to certain common diseases (*Botrytis*) and high potassium consumption. Sorghum, oat, hemp and crucifers are not indicated as precursors. Common flax cannot thrive in monoculture. The repeated cultivation of flax on the same field causes the phenomenon of "soil exhaustion" and favors the attack of anthracnose, Septoria-associated blotches, rusts and most often fusariosis. In the experiment that this article deals with, the flax was cultivated after green crop. The green crop was established in 2011 (in autumn), after the harvesting of autumn wheat.

Fertilization. Common flax is demanding in terms of fertilization, as it has a short vegetation period, reduced root system with poor capacity for the solubilization and absorption of nutrients, and the intervals of slow growth alternate with intervals of intense growth. In the experiment, the flax crop was fertilized with liquid foliar fertilizer, 30.10.10 (MURTONIC), applied together with the herbicide, at the stage when the plants reached a height of 10-15 cm.

Tillage. Flax is a demanding crop in terms of tillage. The slow growth during the first vegetation phases and the poor shading of the soil due to the reduced foliage are only some of the particularities that facilitate the occurrence of weeds. The plowing was done at a depth of 28 cm. A special importance was given to soil leveling, after the basic tillage, as well as to the maintenance of the plowed field, by harrowing for mincing and weed control, until the sowing of the green crop. In the spring, the last decade of March, the field was prepared for sowing after the green crop was previously minced and incorporated in the soil by repeated disc works.

Seed and sowing. The source of the flax seed was the harvest of the previous year, with 99% purity and a germination capacity of minimum 90%.

Sowing period. Common flax was sown during the first decade of April when the soil temperature was 4-5°C at a depth of 5 cm. This ensures the efficient exploitation of soil humidity, the uniform springing, growth, branching and maturation of the crop, increased resistance to the attack of aphids and drought, rendering thus increased yield.

The density was 1100 seeds capable of germination/m^2. The sowing depth for common flax was 2-3 cm.

Maintenance works. The most important maintenance works are: weed, pest and disease control. Weed control was done by the use of the herbicide Glean, when the plants reached a height of 10-15 cm, together with the foliar fertilizer. In regards to pest control, the most dangerous pests for common flax are *Aphtona euphorbiae* (flax flea beetle) and *Trips linarius* (flax thrips). No pests were observed in the experimental plot, flax being grown on the same field after a break in cultivation of over 20 years. No irrigation was accomplished as no irrigation system was functional in the area.

Harvesting. Harvesting was done at full maturity, when the stems lacked leaves almost completely, when 80 - 90% of capsules were brown and the seeds bore the color specific to the cultivar. The delaying of harvesting determines capsule losses due to the snapping and breaking of the stems.

Before the harvest, plant samples were collected and the main characteristics of the common flax plants, as well as the harvest indexes, were observed.

Results obtained in regards to the common flax stem length. The stem length ranged between 60 and 40 cm, with an average of 46.45 cm.

Results obtained in regards to the weight of common flax stems with capsules. The weight of stems with capsules ranged between 0.468 g and 0.634 g, with an average of 0.587 g.

Results obtained in regards to the weight of common flax stems without capsules. The weight of stems without capsules ranged between 0.304 g and 0.534 g, with an average of 0.375 g.

Results obtained in regards to the weight of capsules per plant. The weight of capsules per plant ranged between 0.351 g and 0.489 g, with an average of 0.387 g.

Results obtained in regards to the weight of seeds per plant. The weight of seeds per plant ranged between 0.204 g and 0.327 g, with an average of 0.249 g.

Results obtained in regards to the number of capsules per plant. The number of capsules per plant ranged between 6 and 11 g, with an average of 8 capsules/plant.

Results obtained in regards to the number of seeds per capsule. The number of seeds per capsule ranged between 5 and 10 g, with an average of 7.72 seeds per capsule.

Results obtained in regards to the weight of seeds per capsule. The average weight of seeds per capsule was 0.0495 g.

The density at harvest was 758 plants/m^2. The production obtained was 1887 kg seeds/ha.

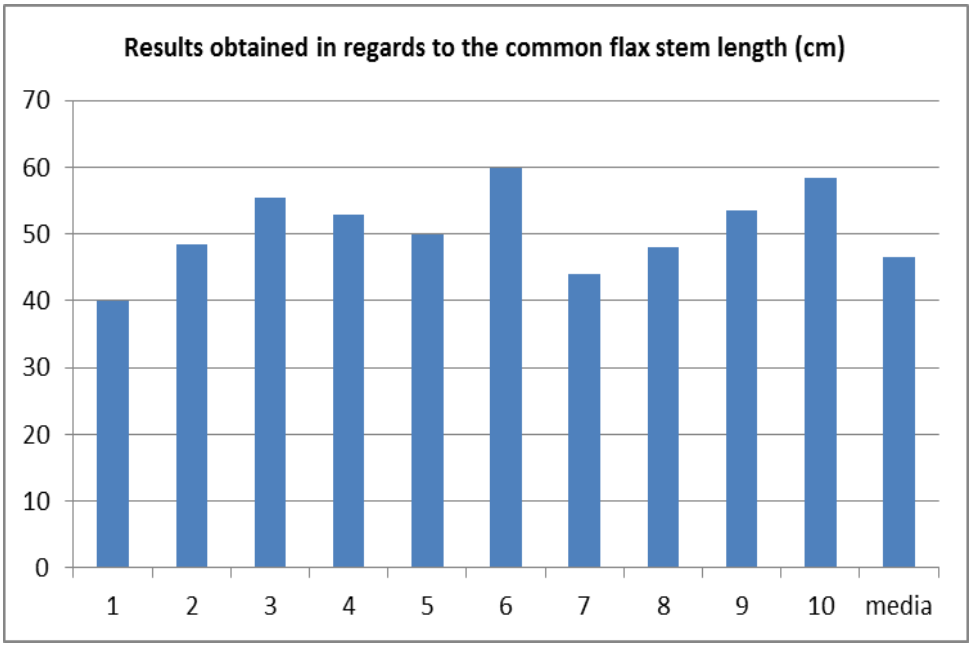

Figure 1: Results obtained in regards to the common flax stem length

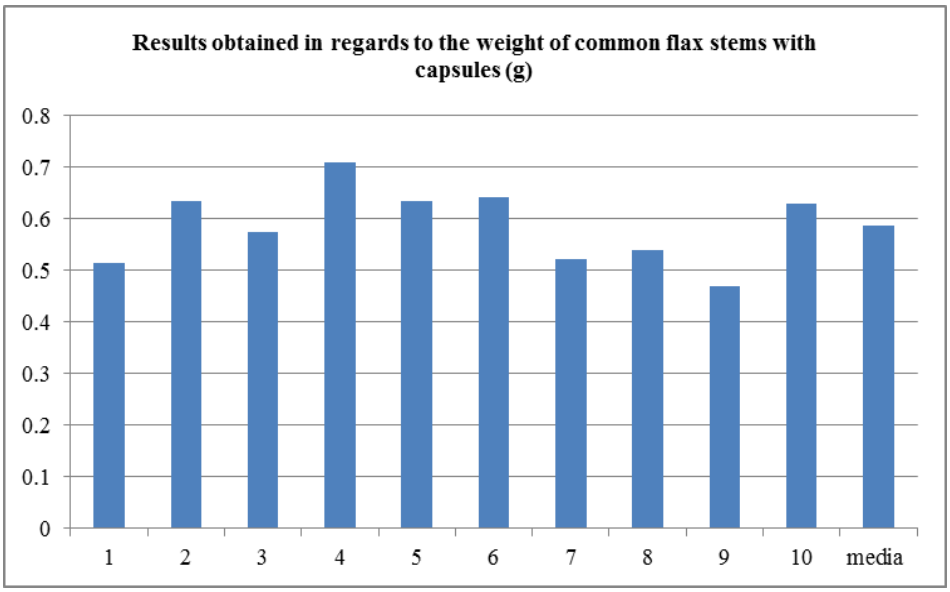

Figure 2: Results obtained in regards to the weight of common flax stems with capsules

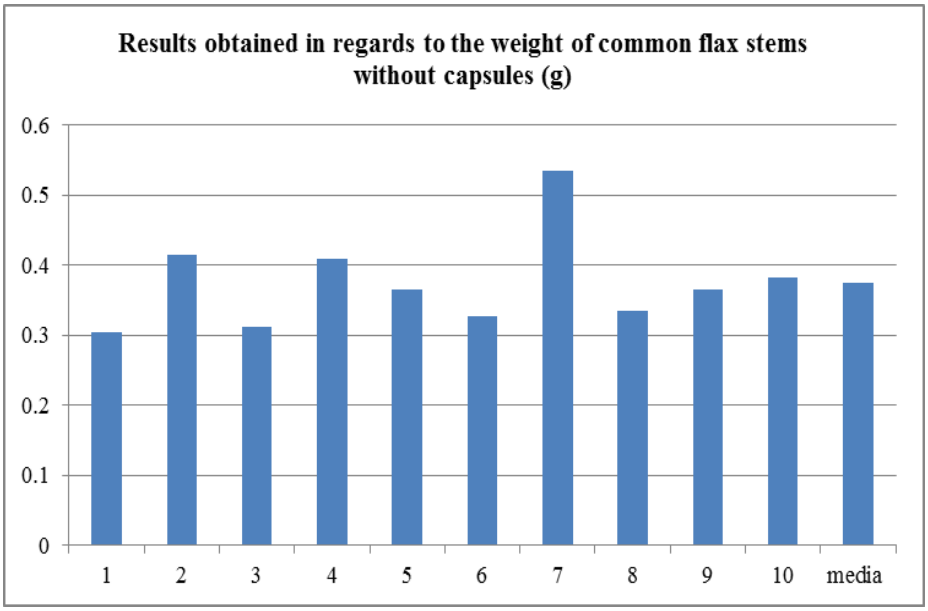

Figure 3: Results obtained in regards to the weight of common flax stems without capsules

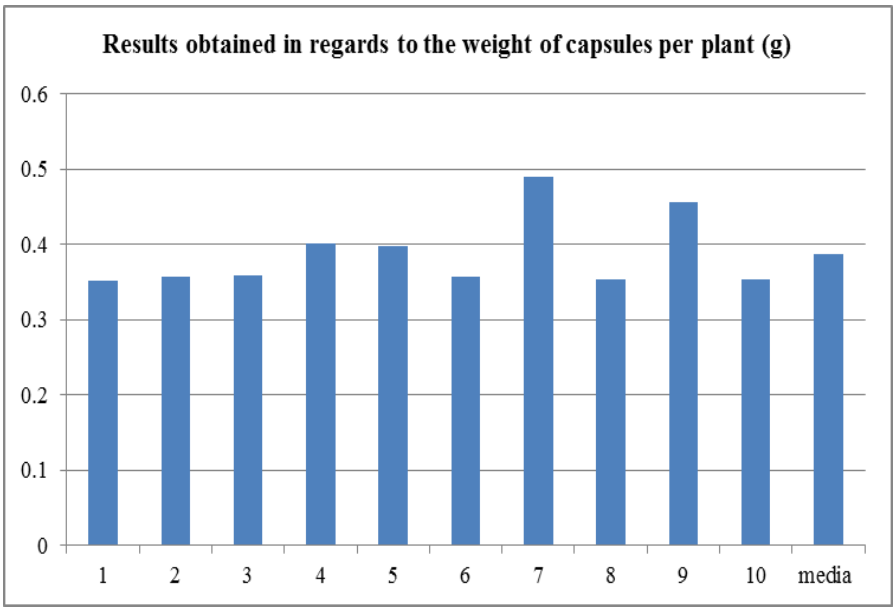

Figure 4: Results obtained in regards to the weight of capsules per plant

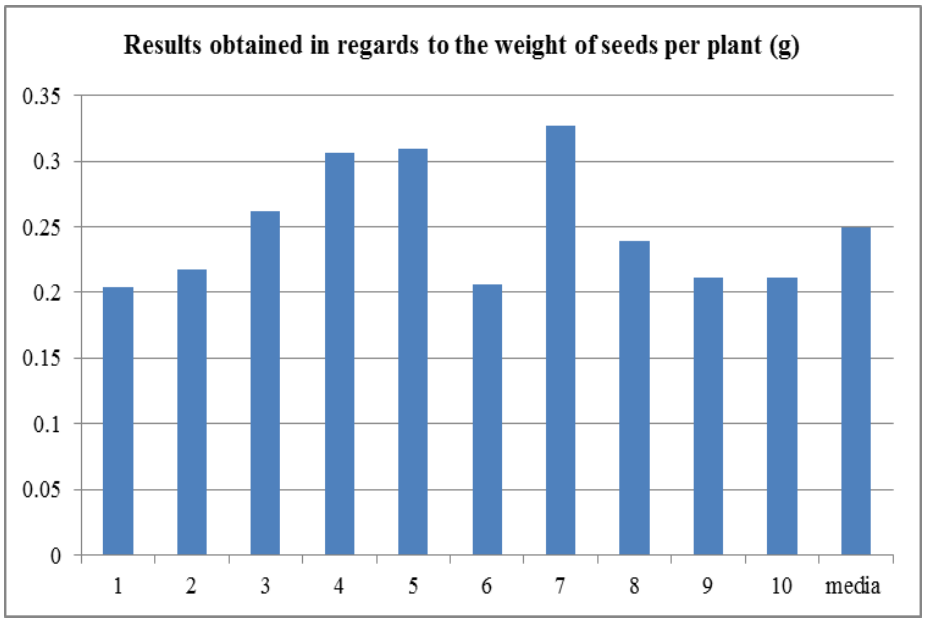

Figure 5: Results obtained in regards to the weight of seeds per plant

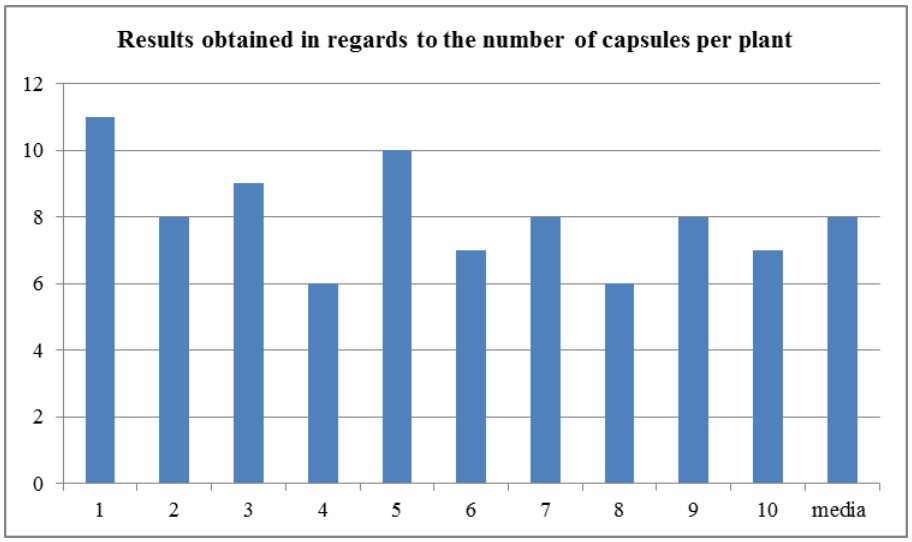

Figure 6: Results obtained in regards to the number of capsules per plant

CONCLUSIONS

Given the production results obtained in the cultivation conditions of the Dobrudja Plateau, the applied technology can be recommended to the farmers in the area thus:

- Autumn wheat as precursory plant, followed by green crop until the sowing of flax in the spring;
- Fertilization with the liquid leaf fertilizer, 30.10.10 (MURTONIC), applied together with the herbicide when the plants reach a height of 10-15 cm.
- Plowing at a depth of 28 cm, while in the spring, the last decade of March, the field is prepared for sowing after the green crop was minced and incorporated in the soil by repeated disc works.
- Sowing in the first decade of April, when the soil temperature is 4-5°C at a depth of 5 cm.
- Sowing depth: 2 - 3 cm.
- Harvesting at full maturity, when the stems lack leaves almost completely, when 80 - 90% of capsules are brown and the seeds bear the color specific to the cultivar.
- The delaying of harvesting determines capsule losses due to the snapping and breaking of the stems.

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