

The ontogenesis of some types of *Lamiaceae* family and the seed productivity

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Abstract: Medicinal plants lavender (*Lavandula officinalis* L.) and salvia (*Salvia officinalis* L.) have been introduced in the condition of Tashkent oasis, and hereby given the data about their ontogenesis, growth and development in vegetation periods during 13-14 years for *Lavandula officinalis* and 5-6 years for medicinal salvia.

Keywords: *Lavandula officinalis*, vegetation, ontogenesis, potential seed productivity, real seed productivity.

1. INTRODUCTION:

It has been always the prior issue to study cultivation and propagation ways of medicinal plants in the local condition and provide pharmaceutics with raw materials.

Considering local condition, identification of perspective medicinal plants resistant to various climatic factors; drought, salinity, disease and pests are to be fulfilled according to the results of research results.

Conducted scientific researches in Tashkent botanical garden allowed to evaluate adaptation of some introduced types of *Lamiaceae* family in our republic condition.

There exists scientific data about early life vegetation of medicinal plants with bush-formed style which were introduced in botanical garden, but under introduction their ontogenesis has not been studied yet.

2. MATERIALS AND METHODS:

Scientific data was provided about the duration of vegetation of medicinal *Salvia officinalis* and *Lavandula officinalis* that belong to *Lamiaceae* family and were introduced in Tashkent botanical garden. These plants have been introduced in many countries at present [1, 4].

For identification of seed germinability in laboratory condition the methods of M.K.Firsova (1959) [85] and Popsov (1976) [59] have been used.

Biomorphological features of *Salvia officinalis* and *Lavandula officinalis* L. has been studied by the methods of T.A.Robotnov (1950); I.G.Serebryakov (1952-1962).

3. RESULTS AND DISCUSSIONS:

As stated in literatures it is possible to produce raw materials during 10 years in the fields where medicinal lavender (*Lavandula officinalis* L.) was sown, and in the fields of medicinal salvia (*Salvia officinalis*) during 6-7 years. Ontogenesis of *Salvia officinalis* and *Lavandula officinalis* cultivated in Uzbekistan conditions was observed. In 2016-2017-2018 there was observation on growth and development vegetation of lavender in laboratory collection propagated from plant seeds.

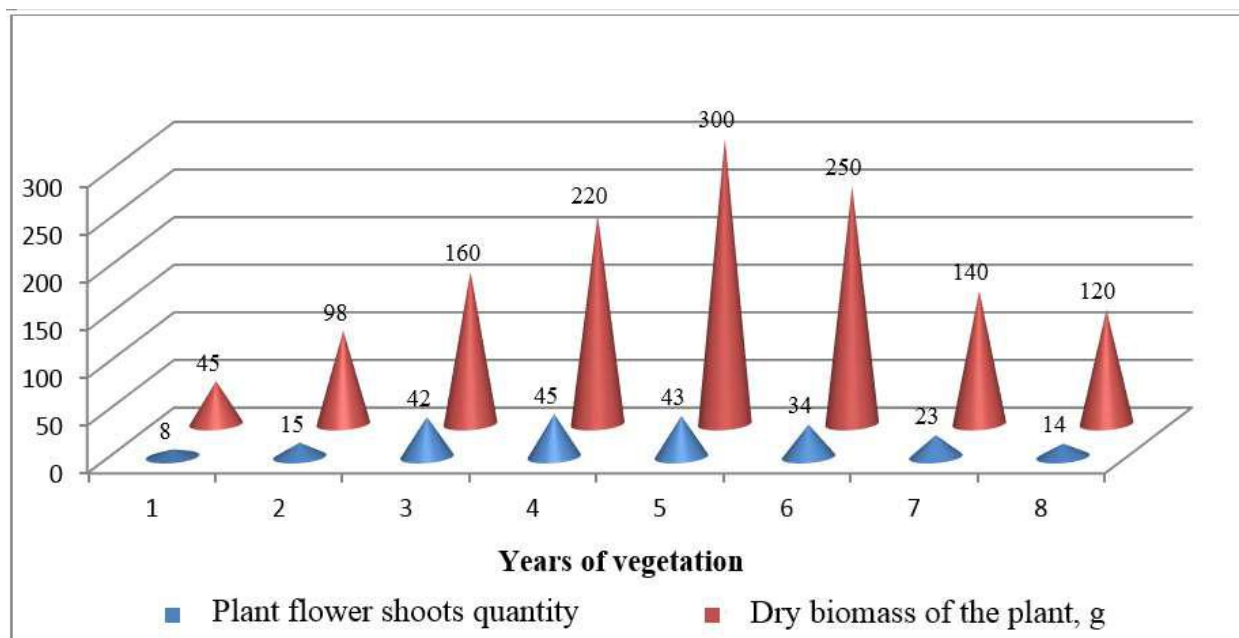
In the third decade of March in 2003 the seeds of medicinal *Salvia officinalis* and *Lavandula officinalis* were sown in well-processed plots with 70 cm interrows in 10 repetitions and in 0,5-0,7 cm depth. The seeds of *Lavandula officinalis* germinated within 12-15-days after sowing, seed germinability was 55-65%, *Salvia officinalis* seeds germinated in 7-8- days, average germinability was 80-85%. The leaves appeared in 15-17-days and seedpods of sprouts stayed for 28-35 days in both plant types. The plant sprouts started their rapid growth in May month and average height was 4-5 cm [laboratory reports]. By the end of August mean height of medicinal lavender plant sprouts consisted 12-15 cm, relatively in medicinal salvia it was 18-20 cm. Their height reached to 20-25 cm by the end of vegetation period (October). The first vegetation period of seed-grown plants continued 240-250 days with safe and well wintering.

Seed-grown *Salvia officinalis* and *Lavandula officinalis* transferred to generative period at their second vegetation year and this period continued 25-30 days in *Lavandula officinalis*, from the middle of September to the middle of October. Generative period of *Salvia officinalis* continued 18-25 days, from the beginning and to the end of August. Ground surface biomass of plants increased in the second vegetation period as *Lavandula officinalis* sprouts grew up to 35-40 cm by the end of vegetation period (October), flower shoots height was 40-45 cm. The height of *Salvia officinalis* was 40-45 cm, and the height of flower shoots was 45-50 cm. As the life form of plant is bush, circular surface of the land that covered by plant sprouts has a significance. If there is sufficient area for plant growth, high yield can be obtained relatively. Therefore plant intervals and interrows of both plants were considered, while the interval of *Lavandula officinalis* plants was 70 cm, in *Salvia officinalis* it was 50 cm.

Medicinal salvia young plants fully developed in the 13rd and 14th years of vegetation period, in one plant average 25-30 pieces of flowers shoots produced. In the 6th-7th years of vegetation it was observed that flower shoots of plant decreased, as in one plant flower shoots were 10-15 pieces. In the 8th year plant's vegetative shoots became less and small, flower shoots were 1-2 pieces. Generative period of plant continued 25-30 days in the 3rd-4th vegetation periods and flowering was noticed in the end of May. During vegetation period a dry mass of one plant made 280±1,8 gr, a dry mass of the plant in 1m² area was average 1160±2,6 gr (Diagram 1). It was observed that ontogenesis period of *Salvia officinalis* grown in Tashkent Botanical garden consisted average 6-7 years.

Diagram 1

Dry biomass derived from one plant *Salvia officinalis* in vegetation period, gr (in 2004-2009)



During the 13-14th years of vegetation period young plants of *Lavandula officinalis* did not pass to senile period. By this time spread-growing diameter of plants was mean 215±1,8 cm (Table 1). Intervals of plants were 80 cm, furrow interval 70 cm.

Table-1

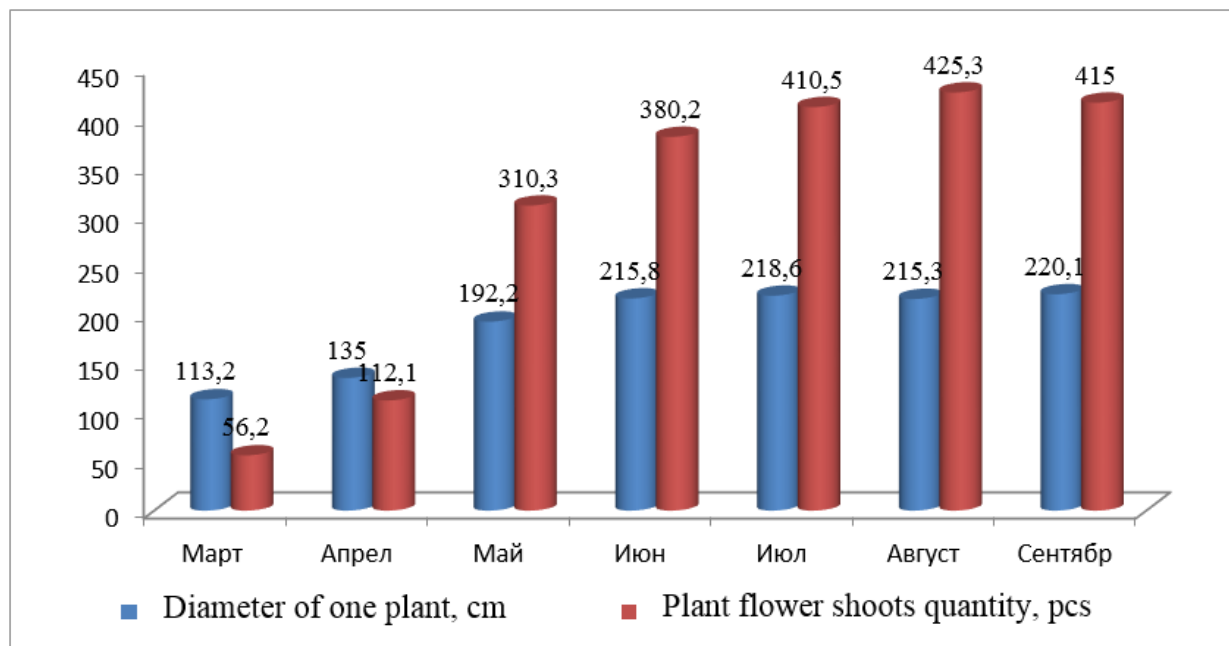
The growth and development of the 14 years plants of *Lavandula officinalis* (2016)

№	Vegetation period	Diameter of one plant, cm	Flower shoots of one plant, pcs	Shoot length, cm	The number of bunch flowers in one plant	Quantity of flowers in one flower unit
1	March	113,2±1,4	56,2±1,8	8,5±1,3	-	-
2	April	135,0±1,8	112,1±2,3	18,0±1,8	-	-
3	May	192,2±2,0	310,3±2,2	24,3±1,8	8,0±0,8	7,1±1,2
4	June	215,8±1,8	380,2±2,1	33,6±2,0	8,9±1,2	11,4±2,1
5	July	218,6±2,2	410,5±2,2	40,1±2,0	9,1±1,5	11,2±2,3
6	August	215,3±2,5	425,3±2,3	42,0±1,5	-	-
7	September	220,1±2,0	415,0±2,0	42,1±1,8	-	-

The quantity of flower shoots of one plant was average 425,3±2,3 pcs in the 13-14th years of vegetation, flower shoots gave abundant yield in June-August months as this period is considered as rapid flowering time (Diagram 2).

Diagram 2

Growth and development of *Lavandula officinalis* (in 2016-2017)



In 2016 vegetation of *Lavandula officinalis* began from the end of March and continued to the middle of October, while generative period continued from the end of May to July. Seed productivity of plants was also high, and there were identified potential seed productivity (PSP) and real seed productivity (RSP). According to experiment results of several scientists, real seed productivity is lower than potential seed productivity [2, 3].

In 2016-2017 seed productivity of perennial plants was studied and obtained the following results (Table 2). In 2016 seed productivity of one plant was average(n=10) PSP 76,5±5,9-103,2±12,1 pcs, RSP 72,3±4,2-88,3±5,9 pcs, productivity coefficient (Pc) made 84,1-87,7 %, relatively 89,2±5,5-112,4±5,3; 73,2±2,7-92,3±3,9 pcs, Pc was 78,4-86,9 %.

Table 2

Seed productivity of one plant shoot of *Lavandula officinalis* L. (n=10)

Control years	Control plant	Seed productivity, pcs		Coefficient of productivity, Pc %
		PSP	RSP	
2016	1	82,4±4,3	72,3±4,2	87,7
	2	98,2±7,5	86,1±4,9	87,6
	3	76,5±5,9	60,5±2,8	79,0
	4	103,2±12,1	88,3±5,9	85,5
	5	96,5±6,8	81,2±4,8	84,1
	mean	91,3±7,2	77,6±4,5	84,7
2017	1	112,4±5,3	88,2±3,4	78,4
	2	89,2±5,5	73,2±2,7	82,0
	3	96,5±5,4	80,5±3,5	83,4
	4	106,2±8,2	92,3±3,9	86,9
	5	98,6±6,1	78,2±3,1	79,3
	mean	100,5±6,1	82,4±3,5	82,0

P<0,05

As essential oil is extracted from flowers of plants, they are gathered during flowering period as a medicinal raw material. Flowering period of plant was observed twice during its vegetation in Tashkent oasis, the first flowering occurred from the second half of May to the third decade of June, the second flowering was observed from the beginning of August to the middle of September.

4. CONCLUSION:

1. According to conducted research results, germinability of *Lavandula officinalis* seed in the fields made 55-65%, while in medicinal salvia it was 80-85%.
2. Raw materials of both plants grown from seeds can be collected in the second vegetation years.

3. It is expedient to input *Lavandula officinalis* and *Salvia officinalis* to the state register of new medicinal plants recommended to be grown in the regions of our republic, as these plants are resistant to various climatic conditions, drought and diseases and produce abundant raw material for pharmaceuticals for many years.

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