STUDY OF THE INFLUENCE OF TIME COLLECTION OF SEEDS OF CERTAIN SPECIES OF LINDEN (*TILIA SSP.*) ON GROWTH AND VEGETATIVE BEHAVIOURS OF SEEDLINGS

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ABSTRACT

The main goal of the present study was to assess the influence of collection time on growth and vegetative behaviour of seedlings from certain species of Tilia order to established the proper tim with high adaptability and flexibility to environmental condition. The experiment carried out with three species of *Tilia - T. cordata Mill.*, T. *platyphyllos Scop*., *T. tomentosa Moench.*, and the seeds were collected in five terms -15.07.; 1.08.; 15.08.; 1.09.; 15.09. The number of leaves, leaf area, volume of root system, length of root system, number of roots, fresh and dry weight of leaves and roots were determinated. The fastest growing plants of the three species lime derived from collected seeds in August. It was found that with the highest stem in the end of the first growing season plants were obtained from the collection of 15.08 and 1.09 seeds - 3.7; 4.7 and 4.3 respectively for *T. platyphyllos, T. cordata, T. tomentosa*. Effects on the stem diameter was not observed.

INTRODUCTION

One of the most commonly used species for street and alley landscaping in Bulgaria is a genus *Tilia*. Used the 3 species - T. cordata, T. platyphyllos and T. tomentosa, which differ in the decorative behaviour and timing and duration of flowering. All three species are very well adapted to the climate and soil conditions of Bulgaria and planting material is produced mainly in the country. Propagation can be carried out on a seed or vegetative way. Vegetative propagation methods – grafting, cuttings and outlets - are not apply to nursery practice here. Mainly practiced is the seed propagation. No pre-treatment of seeds that can be quite a lengthy process, in some cases the order of 8-10-12 years. Therefore, look for ways to accelerate it. This can be done by pre-sowing treatment of the seeds (Magherini, R. Et all. 1994; Rose, RC, 1991; Pitel, YA et all., 1998) and others. The conditions of Bulgaria seeds harvested in late September and after different periods of stratification (different for different regions) are sown outdoors. Stratification is an expensive and time-consuming event, so nursery practice seek alternative methods. One of the most common is the collection of seeds before their complete ripening. In this direction have worked quite researchers. In Bulgaria there is no information in this regard. In the present study investigated the vegetative habits of seedlings of 3 types of lime T. Cordata Mill., T. Platyphyllos Scop., T. Tomentosa moench and depending on the term of collection of seeds. The survey was conducted in the experimental part of the company "Style Garden" Plovdiv. Were used seeds collected from trees in the courtyard of the Agricultural University - Plovdiv. 5 period studied were collecting seeds. It was found that the parameters studied are influenced by the duration of the collection of seeds. With the rapid growth rate are seedlings of T. Platyphyllos, T. Cordata and T. Tomentosa, grown from seeds collected respectively

01.08., 01.09. 15 and 08. The highest seedlings feature type T. Cordata - 4,7 cm, and the largest diabetar stem plants are of the species of the stem and the number of leaves are greatest in plants T. Tomentosa.

MATERIAL AND METHODS

Studies were conducted during the period 2012 - 2014, at the experimental unit ET "Style Garden" - c. Plovdiv. Were used seeds of the following species of lime: - T. cordata Mill. - Tilia cordata - T. platyphyllos Scop. - Tilia platyphyllos - T. tomentosa Moench. - Tilia tomentosa. Seeds were collected from marked trees in Agricultural University. Harvesting is done in 5 deadline: 15.07 .; 1.08 .; 15.08 .; 1.09 .; 15.09. The seeds were sown on the day of collection in seedling pots № 7 5 pcs. each. Substrate was used for sowing seeds and producing seedlings containing dark and light peat with a high degree of decay, extra rich with NPK fertilizers, trace elements and moisturizers, perlite (not more than 20%) and a pH of 5.5-6.5. The seeds were planted at a depth of 0.5 cm and inter- and Interlinear distance of 1 cm. During the vegetation period was maintained soil moisture content of 65 -70%. Were examined indicators characterizing autonomic manifestations of seedlings. The growth rate was reported in 15 days (2 weeks) to the end of vegetation. Plant height was measured from the surface of the soil and the diameter of the stem - at the level of the soil surface.

RESULTS AND DISCUSSION

The results obtained during the two years of the study show that the number of leaves of the plants are affected by the duration of the collection and sowing of the seed (Table. 1). Plants grown from seeds collected in the later periods - 1-15.09. form a larger number of leaves per plant 4,5 and 4,4 units. T. cordata; 3.9; 3.7 and 3.7 pc. for T. platyphyllos and 3.9 pc. for two terms in T. tomentosa.

Tabl.1. Number of leaves (nm)

Вариант	T. cordata	T. platyphyllos	T. tomentosa
15.07.	2,7	1,7	2,4
01.08.	2,9	2,8	2,9
15.08.	3,1	3,9	3,6
01.09.	4,5	3,7	3,9
19.09.	4,4	3,7	3,9

In Table. 2 presents the results for the size of the leaf area per leaf. The differences between the versions in T. cordata and T. platyphyllos not large, ranging from 9.1% (var.4) to 36.4% (var.1) in T. cordata and 11.1 (var.4) to 22.2% (lime. 1) in T. platyphyllos. In T. tomentosa size of leaf area in the versions with the collection of seeds of 15.08; 1:09 and 15:09. is equal - 3,0 cm3 and exceed the first two versions respectively with 43.3% and 30.0%. Indicators characterizing root sistemasa proof of the vitality and good growth and vegetative symptoms of plants.

Tabl. 2. Leaf area (cm^2)

Вариант	T. cordata	T. platyphyllos	T. tomentosa
15.07.	0,7	3,5	1,7
01.08.	0,9	3,7	2,1
15.08.	0,8	4,5	3,0
01.09.	1,0	4,0	3,0
19.09.	1,1	4,1	3,0

In Table. 3 presents data zaobema the root system. With the large amount of root system of plants are T. tomentosa from 6,2 cm3 (lime. 1) to 7,0 cm^3 (lime. 5), followed by T. platyphyllos of 3,5 cm^3 (lime. 5) to 4,9 cm^3 (lime. 3) and T. cordata than 1,4 cm^3 (lime. 1) to 3,7 cm^3 (lime. 4). With regard to the time of collection and the sowing of the seeds with the greatest volume of plant root systems were obtained from the collection of 15.08. seeds - 4,9 cm3 at T. platyphyllos and 1.09. - 3,7 cm3 in T. cordata and 7,2 cm3 in T. tomentosa. A similar trend was observed in the length of the root system (Table. 4) and the number of roots (Table. 5).

Tabl 3. Volume of root system ($cm^{3)}$

Вариант	T. cordata	T. platyphyllos	T. tomentosa
15.07.	1.4	4.1	6.2
01.08.	1.7	4.3	6.8
15.08.	2.0	4.9	6.8
01.09.	3.7	4.0	7.2
19.09.	3.5	3.5	7.0

Tabl. 4. Length of root system (cm)

Вариант	T. cordata	T. platyphyllos	T. tomentosa
15.07.	3.4	6,0	7,3
01.08.	3,7	5,9	7,0
15.08.	4,1	7,9	7,5
01.09.	6,7	6,3	8,2
19.09.	5,8	7,0	8,1

Tabl. 5. Number of roots (nm)

Вариант	T. cordata	T. platyphyllos	T. tomentosa
15.07.	13,8	15,4	21,4
01.08.	13,7	15,8	20,7
15.08.	14,5	18,9	21,3
01.09.	16,7	18,3	25,8
19.09.	16,8	18,0	24,3

Best results in these indicators are again derived from plants collected at 15:08. and 01.09. seeds. Data for the fresh mass of plants (Fig. 1 and Fig. 2) showed significant differences between individual types of lime, and between the different test options. Trend for better results in the options with a later period of collecting and sowing the seeds are found here. The results of the dry mass of leaves and roots (Figure 1 and Fig. 2) show the existence of differences in this indicator between the different types of lime. Such differences between the versions of collecting and sowing the seeds are not observed.

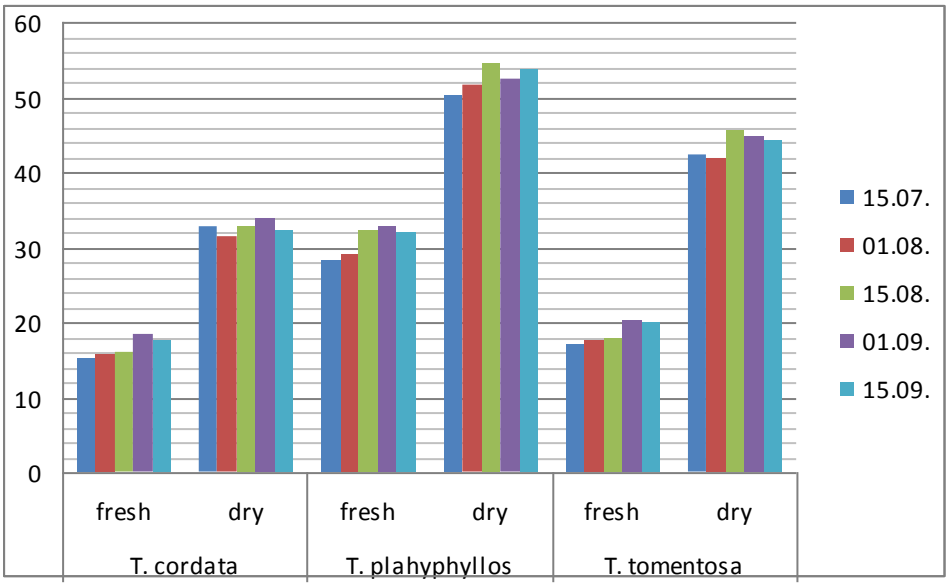

Fig. 1. Fresh (g) and dry (%) weight of leaves

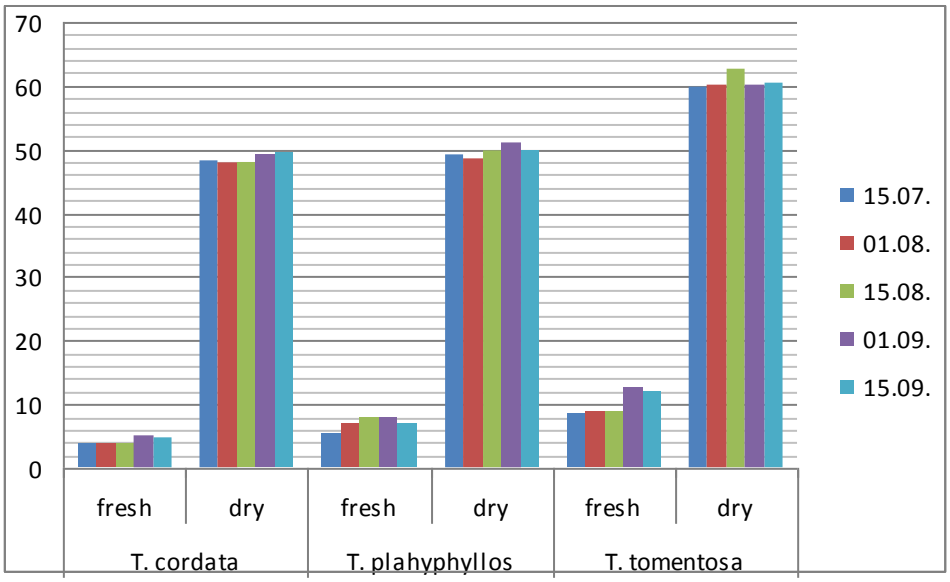

Fig. 2. Fresh(g) and dry (%) weight of roots

CONCLUSIONS AND RECOMMENDATIONS

From research done shows that the period of collection of seeds influences most vegetative seedlings showed the genus Tilia. The fastest growing plants of the three types lime derived from collected seeds in August. It was found that with the highest stem end of the first growing season plants were obtained from the collection of 15.08 and 1.09 seeds - 3.7; 4.7 and 4.3 respectively for T. platyphyllos, T. cordata, T. tomentosa. Effects on the stem diameter was not observed. We therefore recommend collecting seeds of the three most widespread types of lime in the country to be made within the month of August.

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