International Journal of Agriculture Innovations and Research
Volume 7, Issue 3, ISSN (Online) 2319-1473
Manuscript Processing Details (dd/mm/yyyy):
Received: 07/11/2018 | Accepted on: 17/11/2018 | Published: 22/11/2018

The Propagation and Morphogenesis of Sprouting of Some *Berberis* L. Species

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Abstract **– The article provides information on studied development stages of ontogenesis and morphology some species of *Berberis* L. In recent years, it is great demand for decorative plants for parks and gardens during reconstruc- - tion work carried out in the country. The decorative plants which is used in greenery are consist from different countries and local flora and their harmony in the preparation of various compositions.**

On the other side, the change of climate on biodiversity, allows is used a new cosmopolitan species aborogen. In the research work are studied propagate and morphogenesis decorative plants which is used in landscaped some species belonging to the genus *Berberis* L. and also are studied pharmaceutical meaning in Absheron.

Keywords **– Morphogenesis, Embrional, Latent, Juvenile.**

I. INTRODUCTION

Researches have shown that studying of a morphogenesis of species is the most important indicator of adaptation of specie's to soil climatic conditions (1).

Therefore, we studied in research on a scientific basis, the morphology of sown seeds of these species, and the dynamic development of the vegetative year I-III.

Materials and Methodology:

As experimental base has been chosen the area of Institute of dendrology.

One of the most important studying morphological features of trees - bushes of shoots are determination biomorphology and studying of underground organs.

The studied species of shoots morphological development I.I. Serebryakova (2), seeds sown, seedlings obtained from them, 1st year of life, dynamic development of I.T. Vasilchenko (3), annual growth Molchanov and V.V. Smirnov (4).

Pic. 1. The sowing of seeds.

The Results of Research and Discussion.

The study berberis belongs to the genus *Berberis* L.- *Berberis vulgaris* L., *B.iberica* Stev & Fisch ex DC., *B.densiflora* Boiss.et Bushse., *B.amurensis* Rupr., *B.levis* L., *B.thunbergii*, *B.juliana* C.K.Schneid, *B.coreana* Palib., *B.heteropoda* Schrenk.

Studied propagate seeds of species *Berberis heteropo--de* Schrenk. in the Absherona, it was determined phases of biological and morphological development at separate stages.

The study of sowing seeds, primary seedlings, embryo, hypocotin, the development of epicotin, the main root system, the formation of genuine leaves and it has been studied on a scientific basis the adaptation of plants to new conditions.

For this purpose in 2015-2018, were collected the seeds of species from local conditions, and at the same time from the Orto Botanica Dell Universita Botanical Garden of the University of Padova in Italy, Pilsen zoology and biology, Czech Botanical Garden Hamburg, Botanical Garden of Georgia, from the Botanical Garden from the Dagestan Botanical Garden.

Seeds in the first decade of March are prepared in advance special containers were planted open and closed conditions (pic 1).

The soil was moved in advance with peat, fertilizer and sand (1: 1: 1). When sowing the seeds were stratified for 3 months. At a temperature of from 3 to 50 ° C.

The first seedlings were observed in the conditions where the air temperature was 18-200 C and 70-80% of the soil humidity content. Growing of seeds is observed between 25-43 days, depending on the species (picture 2).

At the same time was sown the seeds faster germination was observed in *Berberis vulgaris, B.densiflora, B.thunbergii and B.juliana species (10.04.2015), late germination in B. lewis and B. coreana* (18-22.04.2015). Formation of seeds from the seeds lasted 31-43 days, depending on the species.

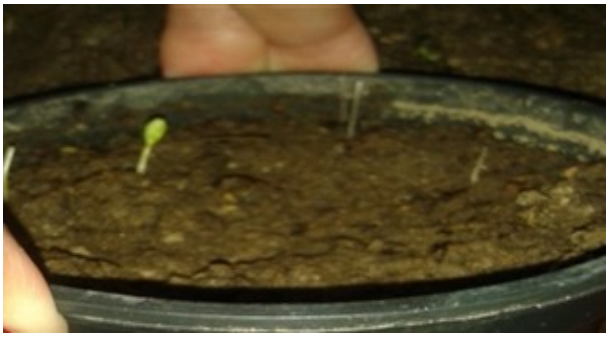
The results of our research are given in Table 1.

Table 1. Morphological indicators of the sprout.

Species	The year in which the seed is collected	Time to sow	sprouts formation	cylindrical length, sm	cylindrical in width sm	Hip. length, sm
Berberis vulgaris	2013	09.03. 2015	10.04 2015	0,8	0,4	1,5
B. iberica	2013	09.03. 2015	14.04.2015	0,7	0,3	1,3
B.densiflora	2013	09.03. 2015	10.04.2015	0,8	0,4	1,3
B.amurensis	2014	09.03. 2015	15.04.2015	0,7	0,4	1,2
B. levis	2013	09.03. 2015	18.04.2015	0,6	0,4	1,4
B.thunbergii	2014	09.03. 2015	10.04. 2015	0,6	0,4	1,2
B.juliana	2014	09.03. 2015	10.04. 2015	0,8	0,4	1,3
B. coreana	2014	09.03. 2015	22.04.2015	0,6	0,4	1,2
B. heteropoda	2013	09.03. 2015	15.04.2015	0,6	0,4	1,3

Our observations have shown that the sowing of seeds and the development of sprouts are very similar to the species it is difficult to distinguish the seeds from the morphological features. At this stage, hypocotinus, the stems of cotyledons, the leaves of juvenile differ only in the size (5) from each other below it will be informed about the stages of ontogenesis of the species belong to the genus *Berberis* L.

In the embryonic period - belonging to the genus to the species of *Berberis* L. is development the embryonic features without loss of morphophysiology of the native plant: the plants is monoecious, the flowers are big and adapted for insect pollination,the fruits of *Berberis* L. are ripening in the autumn. During this period, the latent phase the first quiet phase ripening fruits are separated from the main plant. This is observed at the end of September and October in the Absheron. There are 1-5 seeds in the fully ripe fruits.



Pic. 2. The appearance of the first seedlings of the species *Berberis coreana* L.

The growing stage-seeds of *Berberis* L. are gives sprout on the surface of the soil. During seed germination, an embryo first occurs the main root is formed from it. After is formed the root of embryo, 2 short stalked cotyledons come to the surface of the soil together with hypocotyls and soon the sprous begin to appear. The size of the cotyledons is not large.

The cotyledons carries out the process of photosynthesis for a long time (Picture 2). In the some species are appears crust of seeds on the tip of cotyledons.

As soon as the hypochotyl is gradually upward moves upwards in a vertical position, the cotyledons a developing formation is being observed. The cotyledons is located in the horizontal direction.

Hippocloth was circular it has a green or red color. The cotyledons are long or oviform of relatively thick, light green color. Epicotil almost has not developed. Epicotyl almost did not develop. During this period, the main root develops to a soil depth of some centimeters, and in about 10-15 days are formed lateral roots of the first degree.

After this period, the seedlings go to the juvenile stage. In this phase, the seedlings are not so large, is not observed branches. During the formation of the cotyledons, among them are formed 1, 2, 3 pieces of juvenile leaves and depending on the species it is differ in from each other (Pic. 3).

It has a rounded shapes oviform, longish, kidneys and its round a small cogged. It is observed the small intestine.

Pic. 3. The appearance the first seedlings of the species of *Berberis heteropada* L.

The first true leaves on species of *Berberis* L. are appear in the end of April and at the beginning of May. A leaf badge of 4-5-6 leaves are formed in the middle of May and for the morphological presage are similar to older plants.

The leaves of juvenile venation are reticulate, the main vessel is 5, lateral vessels separated from the upper end of the main vein. The length true of the leaf species is 7-13 mm, width is 6-12 mm the length of the stalk changes between are 5-23 mm.

The stages development of ontogenesis of the species *Berberis* L. during the period all life morphological structure gradually are provided to the complicated

The species of *Berberis* L. go from the juvenile stage on the main branch the formation of the second-tiered branches was observed immature stage. It is occurs speedy development of the plant, which are observed in 2-year-old in the species of *Berberis* L. at the end of the 2nd vegetative year on all species are occurs formation of the buds and the plant passes to the stage the virgin or young vegetative structure is formed.

At the virginal stage, the height of species and the diameter of the pike are observed. The number of second-tiered branches is increasing and occurs their full forming. At the end of this phase is the formation and development of the root system takes place.

Reproductive stage is the stage of flowering and fruiting, the species of *Berberis* L. are at this stage at the age of 3-4.

Senile stage is the stage of aging. During this period, in the species of *Berberis* L. from the cutting of the fruit to the natural destruction of the plant which is covers the period. These in the species of *Berberis* L. are cover a period of several decades or more.

Pic. 4. I vegetation year are formation of leaves the species of *Berberis thunbergii* L.

Below we give short description of the morphological was studied of the sprout species. The first seedlings of the Berberis vulgaris are observed 31 days after sowing. Before the first is formed the root. The embryo are consists 2 long the cotyledons. Length of Hippocotiac is 1,5 sm, the rounded, light green, thrown over the soil.

The length of the cotyledons is 0.8 sm and its width is 0.4 sm, without stumps. The Epicot appears too weak or almost impossible. From the middle of cotyledons the 1st true leaves are formation at the end of April.

After 35 days sprout species of *B. iberica* are thrown over the soil. As the root is develop hypocotyl is also observed. As soon as the hypochotyl grows, the cotyledons is fully formed.

The length of hypochotyl is 1,3 sm, round form is greenish. The average length of the cotyledons is 0,7 sm and the width is 0.3 sm. and sitting. The hypochotyl does not appear. In the third decade of April, are appear in the middle of cotyledons the 1st true leaves

During the sprout species of *B.densiflora* (31 days after sow), the first occurrence of white root growth is observed. The hypocotyl is lying down thrown over the soil.

Formed cotyledons length are 0,8 sm, and the width is 0,4 sm, in loose form, full-length, stubble and light green. The length of the hypocotyl is 1.3 sm. After 10-15 days, when the cotyledons are formed, it is observed side roots over the root. In the middle of April, the formation of true leaves is observed.

The species of *B.amurensis* are appears sprouting 36 days after sowing. With the development of the root, the hypocotyl is lying down of the cotyledons up lifting. Formed cotyledons length is 0.7 sm, width is 0.4 sm, long, light green, sitting, thin, facing. The length of the hypocotyl is 1.2 sm, the cylinder is green.

At the end of April are appears the first true leaf in the middle of the cotyledons.

The sprout species of *B. lewis* are appear to be somewhat late, 39 days after sowing, relative to other species. Together with root, hypocotyl is also developed. The length of hypocotyl is 1.4 sm, cylindrical, light green. Fully opened of cotyledons the average length is 0.6 sm and 0.4 sm in width, rounded, in green, without stem. During this period, the roots are formed by the side roots.

Epicotile does not appear. In the beginning of May, the first true leaves are appear in the middle of the cotyledons.

The first sprout begin to appear 35 days after seeds sown in species of *B. thunbergii* L. It is formed the first of embryo root. Hypocotyl is grown to length of 1.2 sm and green, is cylindrical form. Opening the cylindrical on the surface of the soil is fully formed, 0.6 sm in length, 0.4 sm in width, in circular form, in green and red color. After 12-15 days, on the embryo are appears the side roots. In the middle of April is not epicotile, the actual leaves begin to appear in the cylindrical (Pic. 4).

The first sprout the species of *B. juliana* are appear after 31 days. As the hypocotyl lying down the cylindrical are opened and formed, with a length of 1.3 sm. At this time, the length of the cylindrical is 0.8 sm and the width is 0.4 sm. It is the longish form, light green, without stem,. Together with the development of the cylindrical, the spleen extends from the embryo and the formation of lateral roots. Epicotil has developed very poorly. In the second decade of April, the first true leaves are observed.

The seeds species of B. *coreana* are sprout to be somewhat late, 43 days after sowing, relative to other species. The root is formed from the embryo, and after 14 to 16 days, the side roots are appear. The hypocotyl is full of lengthening, 1.2 sm in length, light green, rounded. The cylindrical without stem, light green, length is 0.6 sm, width is 0.4 sm. The first true leaves are appear in the third decade of April.

The seeds species of B. *heteropoda* are sprout after 36 days. The hypocotyl is lying down thrown over the soil. The length is 1.3 sm. During this period, the roots are developing and over the 12-14 days, the side roots are appear. It is formed of the cylindrical length is 0.6 sm and width is 0.4 sm. Epicotil does not seem to come true real leaves close to the end of April.

Observations have revealed that the cylindrical of the sprouting depends on the soil-climatic conditions of the environment in which it is cultivated, and also depends on the biological feature of each species individually (Table 2).

Table 2. Life time of cylindrical.

Species	The cylindrical full formation	Thecylindrical fall	The cylindrical life day
Berberis vulgaris	18.04. ± 3	30.09. ± 3	162±3
B. iberica	22.04. ± 2	15.09. ± 2	143±2
B.densiflora	17.04. ± 2	20.09. ± 2	153±2
B.amurensis	22.04. ± 4	22.09.. ± 3	150±3
B. levis	24.04. ± 3	25.09 ± 2	151±2
B.thunbergii	17.04. ± 3	25.09. ± 3	158±3
B.juliana	18.04. ± 3	25.09. ± 3	158±3
B. coreana	30.04. ± 2	28.09. ± 3	148±2
B.heteropoda	24.04. ± 2	30.09. ± 3	156±2

Pic. 5. Yellowish and falling of the cylindrical in the species of *Berberis* L.

The sprout species of *Berberis* L. we have studied are normally grown in favorable agrotechnical conditions. After the actual leaf forming, are observed the cylindrical end their life and their falling out. The falling of the cylindrica in the species of *Berberis* L. continues from August to the beginning of the autumn (Pic.5).

The maximum duration of the life of the cylindrical are observed in *Berberis juliana, B.thunbergii* and *B. vulgaris*

(158 ± 3 and 162 ± 3 days) and relatively shorter in *B. iberica* and *B. coreana* (143 ± 2 and 148 ± 2 days). The remaining species are interim position.

II. Results

Thus, species belonging genus of *Berberis* L. to the species learning sprout ontogenesis stages of development in the following period, and the stages are divided into: embryonic period (latent and sprout stage), virginil period (embryonic stages), juvenile period (seedling stage), virginil period (young tree or shrub stages), reproductive period (flowering and fruiting stage), senile period (aging stages).

Our observations have shown that the first sprouts are appear within 31-43 days after seed sowing. The process of seed growth and the sprouts of the seeds are similar in the species we have investigated. Seeds give the surface sprout. The hypocotyl has developed and the cylindrical are two. Epicotile has not developed, and juvenile leaves come out of the one-off the cylindrical. The first real leaves begin to appear in the end of April, and the latter are appear sequentially in early May. The studied species are difficult to distinguish by morphological features, but differ in the size of hypocotitis, the cylindrical and juvenile leaves.

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