

## THE EFFECT OF LIGHT AND SUBSTRATE COMPOSITION ON THE GROWTH OF INDOOR PLANTS

Soil, moisture, light, and temperature are very important factors for the growth and development of all plants. These factors also directly affect the interior plants. Although the external environment and the room environment are different, the climate in the external environment affects the room temperature and light [1, 2]. Therefore, it is important to study it and provide suitable conditions for houseplants. For good growth and development of the plant, attention should be paid to the composition of the substrate for soil environment houseplants. The substrate consists of soil and other rocks prepared in different proportions [4].

A number of studies have been conducted worldwide on the growth and development of the *ficus benjamina* plant, and its various physiological conditions have been evaluated.

Abdou, M.A., Mohamed, M.A.H. and Attia, F. A. have conducted a number of studies on the “Physiology of Ficus Benjamin Plants” and have argued that the preparation of cuttings depends on the physiological state of the plant. It was observed that the root rate of cuttings prepared in February decreased by 34%, the root rate of cuttings harvested in June decreased by 87% and in October by 27%[4].

**Table 1 – List of natural and artificial feed units**

Natural nutrient units		Artificial feed units	
<i>Name</i>	T1	Hydrogel	C1
Soil	T2	Vermicule	C2
Sand	T3	Ionite	C3
Peat	T4	Perlite	C4
Humus	T5	Zeolet	C5
Leaf rot	T6		
Bark of coniferous trees	T7		
Grain of cereals	T7		
Coconut shell	T8		

The compounds in the plant composition that provide the growth rates that affect plant growth are calculated by Mbosso and others. Siddiqui and Hussain conducted their experiments in 2002 on the effectiveness of Indole Butyric Acid (IBA) in propagating ficus species and increasing rooting rates. 1000, 2000, 3000, 4000, 5000 ppm and 0 ppm amount options were used as the control option. The 4000 ppm option was distinguished by its high performance [4].

Kayumov and Egamberdiyev studied the effects of organic fertilizers on the growth of ornamental plants as a result of experiments and provided data on growth rates [3].

Houseplants with woody stems have been observed to grow more slowly than other categories of species. Veneklass and others studied the factors influencing the growth of ficus species and the physiology of the plant. This was compared with some similar species [4].

Materials and methods. In the study of substrate effects in intergroup plants, a 1:1:1:1 ratio (peat, soil, humus, and moisture-retaining additives) was adopted as the norm, taking into account that all houseplants are light, porous, have high nutritional value and grow well on permeable substrates [1-4]. In the experiments, different ratios of substrates were tested in 3 different variants. Soil, river sand, and humus feed in a 2:1:1 ratio were selected as a control option.

**Table 2 – Properties of substrates prepared in different proportions**

Option sequence number	B1 control	B2	B3	B4	B5	B6	B7	B8
Properties								
Ratio	2:1:1	1:1:1:1	2:2	1:1:1:1	2:1:1	1:1:1:1	1:1:1:1	1:1:1:1
By names	2T1:1T2:1T4	1T1:1T3:1T6: 1C3	2T1:2C2	1T2:1T3:1T4: 1C5	2T4:1T6:1C4	1T1:1T5:1T7: 1C1	1T1:1T3:1T8: 1C1	1T1:1T3:1T6: 1C2
Nutrition	Avg.	High	Low	High	Avg.	Low	High	Avg.
Physical properties and porosity	Avg.	High	Low	High	Avg.	Low	High	Avg.
Chemical properties and pH	Avg.	High	Avg.	High	Avg.	Avg.	High	Avg.
Plant growth rates	Avg.	High	Low	High	Avg.	Low	High	Avg.
Moisture retention	Low	Avg.	Low	High	Avg.	Avg.	High	Avg.
Ease of disease development	Avg.	Avg.	Avg.	Avg.	Avg.	High	Avg.	Avg.

Light-loving	Half shade	Shadow
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Results and discussion. In the cultivation of houseplants are prepared taking into account such parameters as the composition of the substrate, its permeability, nutrient content, porosity. Substrates were tested in 8 different variants in different proportions to prepare a suitable substrate for house-

plants. Natural and artificial nutrient units were used to prepare the substrate (Tables 1 and 2).

In indoor plant growth rates, lighting is required to be a maximum of 10,000 lux and a minimum of 500 lux. Considering that the direct sunlight in summer is 50,000–100,000 in the outdoor environment and 5,000 lux on cloudy days, it was found that 6–10% of the light falls into the room depending on the location of the windows. In the ring corners of the room, this figure drops to 3–5%.

Natural light serves the course of biological processes in the plant. Under the influence of light, the growth processes in the plant decreased by 2–4 times. In conditions where there is a shortage of light, artificial lighting is carried out, using fluorescent lamps (optimal power 400 W per 1m<sup>2</sup>), ultraviolet lamps and high-pressure sodium lamps.

Artificial light sources provide 1,000–5,000 lux light, but light close to natural sunlight can only be grown using phytolamps in room corners and dark rooms where natural light does not reach, given the phytolamps only (Table 3).

**Table 3 – Natural and artificial light sources impact on ficus plants**

Plant name	Spring		Summer		Autumn		Winter	
	Natural light source. The average is 5500 lux.	Artificial light source. Average 2000 lux	Natural light source. The average is 9,000 lux	Artificial light source. Average 2000 lux	Natural light source. The average is 5,000 lux	Artificial light source. Average 2000 lux	Natural light source. The average is 3,000 lux	Artificial light source. Average 2000 lux
<i>Great kalate</i>	2.4	1.4	2.3	1.3	1.4	1.3	0.4	<b>0.2</b>
<i>Chlorophytum</i>	2.7	1.5	2.6	1.4	1.7	1.2	0.5	<b>0.4</b>
<i>Benjamin ficus</i>	2.3	1.3	2.3	1.2	1.4	1.2	0.3	<b>0.2</b>
<i>Elastic ficus</i>	2.4	1.5	2.2	1.1	1.2	1.1	0.2	<b>0.1</b>
<i>Fern</i>	2.2	1.3	2.1	1.3	1.4	1.3	0.4	<b>0.2</b>
<i>Differenbaxiya</i>	2.3	1.2	2.3	1.2	1.1	1.2	<b>0.2</b>	<b>0.1</b>
<i>Dratsena marginata</i>	2.4	1.8	2.4	1.9	1.8	1.4	<b>0.5</b>	<b>0.4</b>
<i>Spatafillium</i>	2.6	1.7	2.5	1.6	1.5	1.1	<b>0.4</b>	<b>0.2</b>

Note: 1.1-1.0 growth rate is sluggish; 1.0-2.0 extinction rates are average; and, 2.0-3.0 growth rates are accelerating.

However, this incurs a number of costs. In the experiments, we used sunlight (average 4,000 lux) from the north-east windows of the room and artificial lighting that could provide 2,000 lux. In the assessment, we re-

viewed plant growth, leaf condition and color, bud development, new leaf formation, and transition to the dormant period. The experiment was conducted sequentially in the seasons.

Conclusions. Substrate in a 1:1:1:1 ratio of soil, peat, coconut shell, and hydrogel is recommended for growing houseplants. It was found that natural light is required to be 5,000 lux for plant growth in the interior. It is recommended to use artificial lighting for plants grown in corners of the room in low sunlight. The illuminance of artificial lighting is required to be not less than 2000 lux.

A favorable temperature for the growth of houseplants is required to be in the range of + 18–24 oC. In winter it is necessary to protect from the effects of heating means. In Uzbekistan, an increase in summer temperature to + 35–40 oC causes an increase in room temperature to + 12 oC and damages plants. At this time it is necessary to keep the room cool and water 5-6 times a day.

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