GROWING AND REPRODUCTION OF LAVANDULA HYBRIDA REV.
UNDER THE CONDITIONS OF CLOSED SOIL
IN THE SOUTH OF UKRAINE

Dementieva O.I. – PhD in Agricultural Sciences,
Associate Professor at the Department of Forestry and Landscape Architecture,
Kherson State Agrarian and Economic University
Boiko T.O. – PhD in Biology,
Associate Professor at the Department of Forestry and Landscape Architecture,
Kherson State Agrarian and Economic University

The article considers the peculiarities of cultivation and reproduction of Lavandula hybrid Rev. in closed soil in the south of Ukraine for its further application in city and landscape gardening. It is widely used in medicine as an essential oil, which helps to make cosmetics, which confirms the rapid demand for it.

Studies have shown that interspecific hybrid Lavandula hybrida is the result of Lavandula angustifolia Mill. and Lavandula latifolia Medik crossbreeding.

It is noted that Lavandula hybrida displaces Lavandula angustifolia from agricultural fields for the following reasons: greater endurance to low winter temperatures, easiness to collect flowers mechanically (shrubs of more convenient shape); the most important feature of the plant is the ability to get more essential oil.

It is established that the cultivation of Lavandula hybrida takes place in private farms. Their number is insignificant; as a result, it is not possible to meet all the demand for this plant.

According to the literature sources and our own research, it has been established that lavender does not form seeds and has vegetative propagation. During the study, Lavandula hybrida cuttings were rooted in 2020–2021 in a greenhouse located on the territory of Kherson State Agrarian and Economic University. There were two stages of reproduction – in September 2020 and March 2021.

According to the results of an experiment on the rooting of Lavandula hybrida, it was found that higher percentage of rooting is observed during spring planting. Autumn rooting gave much lower percentage of survival. It is noted that woody cuttings have higher percentage of survival.

Lavandula hybrida deserves a wide introduction into agricultural production and landscaping in the Kherson region because of ecological and biological features, decorative and economic value, as well as economic efficiency of cultivation.

Key words: Lavandula hybrida Rev., vegetative propagation, rooting, cuttings.
Setting of the problem. Nowadays the design of health and decorative garden and park facilities with the use of medicinal plants is intensively developing all over the world.

The introduction of perennial medicinal plants in urban landscaping is promising, as it supports the idea of environmental friendliness, beneficial effects on the environment, as well as the aesthetic complement of garden and park construction [1–3].

Reproduction and cultivation of the medicinal plant Lavandula hybridа Rev. for further use in landscaping is relevant in the south of Ukraine. The plants are suitable for use in flower beds, green borders, and as a supplement in small groups. It is important to note its widespread use in medicine, obtaining essential oil, which is used to make cosmetics, which confirms the rapid demand for it [4]. Climate change, the use of special techniques of agricultural technology have led to the expansion of areas suitable for growing lavender in particular in southern Ukraine [5].

Further expansion of the lavender cultivation area in Ukraine requires relevant scientific knowledge, which will allow developing effective technologies for its cultivation on large areas, ensuring the tourist attractiveness of the southern region of our country.

Analysis of recent research and publications. Peculiarities of growing Lavandula L. and its ecological and biological features have been studied by domestic and foreign scientists (A.P. Merkuryev, T.M. Latushkina, I.V. Belova, L.A. Kotyuk, D.B. Rakhmetov, L.V. Svidenko, M.F. Boyko, V.M. Derevyanko and others) [5–10].

A number of scientists investigated methods of reproduction technologies and lavender growing in the open ground [12–15].

It should be noted that researches of this culture were carried out in the conditions of southern coast of Crimea and the south of Ukraine where it was grown. However, in recent years, global climate change, including increasing temperature and decreasing rainfall led researchers the opportunity to conduct research features lavender cultivation, its reproduction and its cultivation in other agro-climatic conditions of Ukraine [11].

The aim of our study was to investigate the peculiarities of cultivation and reproduction of Lavandula hybridа in the closed soil of southern Ukraine.

Problem statement. The study was conducted during 2020–2021 on the territory of Kherson State Agrarian and Economic University. The studies used conventional methods of research in agriculture.

Ecological and biological features of Lavandula hybridа, as well as features of reproduction and cultivation of the plant in the closed soil of the south of Ukraine are analyzed.

An experiment on its vegetative propagation and rooting of different types of cuttings.

Presentation of the main research material. Lavender is the leading essential oil crop in Ukraine and the world. Natural essential oil and its raw materials are used in
many branches of domestic industry and medicine. In addition, lavender is a valuable honey plant and a popular ornamental plant [11]. Distribution Lavandula hybridra in Ukraine will also contribute to increased production of cheaper essential oil. And will allow to collect more than 100 kg of lavender honey from one hectare [19].

The genus Lavandula L. belongs to the family Lamiaceae Lindl. Carl Linnaeus in the XVIII century identified four types of lavender [16]. Currently, according to various estimates and classifications, this genus includes from 25 to 39 species. Given the subspecies and interspecific hybrids, the total number of taxa within the genus Lavandula reaches 90 units [17; 18].

Due to the high xerophytic properties of the Lavandula hybridra, this plants has been successfully used in ornamental planting many Mediterranean countries (Fig. 1).

The study found that the interspecific hybrid Lavandula hybridra appeared as a result of crossbreeding of two species of Lavandula angustifolia Mill. and Lavandula latifolia Medik [5; 10].

In contrast to the parent forms, the interspecific hybrid Lavandula hybridra is an evergreen semi-shrub, a perennial plant about 90–100 cm in size. The root system is rod-shaped, woody, well-developed, branched. The stems are branched. On shoots bloom spikes of small flowers, painted in shades of deep purple to white. The leaves are 5,5–6,0 cm long, about 0,9 cm wide, gray-green, fragrant. Flowers profusely from mid to late summer [20]. The plant is not demanding to soils, grows well on light or sandy soils or black earth [21].

Lavandula hybridra is frost-resistant, can withstand temperature decrease to -25 °C. Demanding to light. In the shaded areas reduced the content of essential oil. Excess moisture reduces the density of the stem plant, as a result of this plantation liquefies [10; 21].

According to research I.I. Stetsenko [22], in the conditions of Crimea the content of essential oil in Lavandula hybridra exceeded Lavandula angustifolia in 4–5 times.
The mass of the crude substance is 3–4%. When growing *Lavandula hybridа* in the south of Ukraine, the content of essential oil was 205 kg / ha.

*Lavandula hybridа* displaces parental forms from agricultural fields due to greater endurance to low temperatures, the ability to better and easier to collect flowers mechanically (shrubs of more convenient shape). The most important feature of the plant is that it can produce more essential oil [10].

*Lavandula hybridа* also has high decorative properties. Densely leafy shrubs with a large number of peduncles look quite impressive in both single and group plantings. Borders with *Lavandula* are durable and easy to care for [23].

The most popular varieties of *Lavandula hybridа* are “Grosso”, “Seal”, “Impress Purple”.

We found that in the south of Ukraine *Lavandula hybridа* is grown in private farms. Their number is insignificant and cannot satisfy all the demand for culture. Therefore, in the Kherson, Odessa and Mykolayiv regions the volumes of cultivation of the studied plant are gradually increasing [24; 25].

For industrial cultivation of *Lavandula hybridа* in the conditions of Kherson region the adapted planting material grown in the south of Ukraine is necessary.

The greatest growth of lavender is observed in the phase of flower stalks and in the phase of buds. After flowering, the growth rate of the plant will slows down [10].

Lavender does not form seeds. It can be propagated only by vegetative means – cuttings of semi-woody shoots. During 2020–2021, we rooted *Lavandula hybridа* cuttings in the greenhouse of Kherson State Agrarian and Economic University. Reproduction was carried out in two stages in September 2020 and March 2021. In this method, the sprout is divided into parts containing lateral, apical or those and other buds. Under the created conditions additional roots will develop. Later formed separate plants [26].

In the first for propagation stage we selected woody and green cuttings up to 8–10 cm. There are 3–5 leaves left on the sprout to feed the cuttings. The cut of a sprout is made necessarily oblique. As a result, 100 green cuttings and 100 woody cuttings were planted.

For a high percentage of cuttings rooting, the soil mixture in the greenhouse is well moistened. We dug the beds deeply, fed and leveled them. Rooting of cuttings took place in the closed ground. Planting material was planted at a distance of 5–8 cm.

Rooting cuttings of *Lavandula hybridа* lasted about 1–1,5 months (4–6 weeks). A sign of rooting cuttings is the appearance of new roots and leaves.

According to the results of an experiment on the rooting of *Lavandula hybridа* in 2020, the following results were obtained: non-woody cuttings of 1st and 2nd order took root by 4–5%, woody cuttings of 5th and 6th order by 45–46%.

When rooting cuttings in 2021, the survival rate of non-woody cuttings of the 1st and 2nd order was 43–47%, woody cuttings of 5 and 6 order of 65–78%.

According to the results of an experiment on the rooting of *Lavandula hybridа*, it was found that higher percentage of rooting is observed during spring planting. Autumn rooting gave much lower percentage of survival.

**Conclusions and suggestions.** Cultivation of *Lavandula hybridа* in the south of Ukraine is relevant today. The trend of its cultivation was borrowed from Western Europe. It is widely used in medicine as an essential oil, which helps to make cosmetics, which confirms the rapid demand for it. In addition, the decorative properties of *Lavandula hybridа* allow it to be actively used by green specialists for landscaping of modern landscapes, creating long-lasting beautiful flowering compositions.

Studies have shown that interspecific hybrid *Lavandula hybridа* is the result of *Lavandula angustifolia* Mill. and *Lavandula latifolia* Medik crossbreeding.
It is noted that *Lavandula hybrida* displaces *Lavandula angustifolia* from agricultural fields for the following reasons: greater endurance to low winter temperatures, easiness to collect flowers mechanically (shrubs of more convenient shape); the most important feature of the plant is the ability to get more essential oil.

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