TECHNIQUES FOR MOLDING TOPIARY FIGURES FROM VIRGIN JUNIPER (JUNIPERUS VIRGINIANA) AND BASIC TOOLS

[1]I.G.Gorlova, [2]F.U.Rashidova
[1]Associated professor, Tashkent state agrarian university
[2]Doctoral student, Tashkent state agrarian university
https://doi.org/10.5281/zenodo.7684335

Abstract. *The article presents the data obtained during the decorative molding pruning of the Virgin juniper (Juniperus virginiana) to create topiary compositions at the experimental site in the conditions of Tashkent and the Tashkent region. In the course of the work, the features of the molding pruning process, the basic rules, methods of decorative molding pruning and the tools used to create frame topiary figures were studied.*

Keywords. *Virgin juniper (Juniperus virginiana), molding trimming, evergreen shrubs, topiary art, spring trimming, topiary figures, pruning tool used.*

The actuality of research work. The creation of framed topiary figures from trees and shrubs by molding has long been not just a way to diversify the landscape, but a real art. It is believed that trimmed trees and shrubs are an attribute of regular or architectural gardens with their strict lines, regular geometry and restrained colors. Figures-sculptures of the frame topiary will perfectly fit into any garden, with the right style, shape and method of execution. In European countries, research work on the creation of topiary figures and decorative molding is widely developed. The issue of molding pruning and creating topiary compositions is addressed by many researchers in the field of landscape art, in particular, American, Canadian, European, and Asian ones, such as J. Hobson (2007), S. Cascone (2019), R. Lerner & K. Daniel (2017), N. Badrulhisham (2016), M. Dana & Ph. Carpenter (2018), A.A. Dzyba, I.V. Zhypa (2014), B.R. Sidoryuk, S.V. Anisimova (2013). In Uzbekistan, research in the field of decorative molding pruning and the creation of topiary figures, in particular, did not take place, but the direction of gardening and landscape design was studied by such scientists as A. Kayimov (2011), E.T. Berdiev (2010), Kalandarov M.M. . (2010), N.I. Shtonda (2012), M.Z. Kholmurotov (2021), Sh.A. Kholova (2019), Dosakhmetov A.O (2001), etc. There is a common misconception that a cut plant is necessarily an element of a regular garden. However, at the present stage of development of architecture and garden art, elements of topiary art are used in gardens of different styles: in Japanese (bonsai and nivaki), in modern garden (columns and spirals), in avant-garde (cubes, balls and pyramids) [5].

The aim of research work: Development of technology for forming pruning of trees and shrubs when creating topiary figures and the use of tools in the conditions of the city of Tashkent and the Tashkent region.

The methods of work. The main work was carried out according to the method of G. Beltz “Figured cutting of trees. Forms. Methods. Care "(2008). The description and determination of the main characteristics of topiary elements was carried out according to the method of decorative pruning and plant formation developed by the famous gardener-practitioner N. Goshe "Guide to fruit growing for practitioners" (1890), according to the methodological instructions of O.S.

Zatsepin "Technology for growing ornamental trees and shrubs" (2016). The materials of the textbook by A.I. Koveshnikov and N.A. Shiryaeva “Decorative plant growing. Fundamentals of Topiary Art" (2015). When conducting research on the architectonics of shrub crowns, the method of V.S.Teodoronsky and I.O.Bogova "Landscape architecture" (2010) was used. The studies were carried out on the experimental site No. 3 - the nursery of MARDONBEK FAYZ-AGRO LLC, located in the Urtachirchik district of the Tashkent region. The objects of research are topiary figures created from virgin juniper (Juniperus virginiana) by decorative molding pruning.

Technological process of forming pruning at the experimental site. When carrying out forming pruning of crowns of trees of all types of branching, their natural shape is taken into account. You should not drastically change the natural height and shape of the crown, characteristic of each type of tree. For proper pruning, branches that give more shoots are pruned to a greater extent, and branches with fewer shoots are pruned to a lesser extent [1]. Measures for the formation of shrubs are recommended to be carried out in spring - from April to May, or in autumn - until the end of October. There are several types of juniper pruning, each of which is performed by a specific method, at a specific time of the year and has a special purpose. Forming pruning of juniper (Fig. 1) is carried out in spring, from mid-March to the end of April, or in autumn in September-October. Studies have shown that pruning too early (December to January) can result in frost damage to the resulting growths. Late pruning (in May) often results in a waste of plant energy, as new growths are pruned. Pruning is best done when the growth buds begin to swell in the middle of the strongest stems [2]. It is recommended to choose a cloudy, non-hot day, regardless of the season, beforehand the day before, it is necessary to moisten the crown of the shrub with moisture by sprinkling

Molding pruning of juniper topiary figures in experimental areas is carried out to restrain growth and evenly fill the metal frame to obtain a full-fledged figure. Juniper in a frame figure well perceives light pruning of new growth, these activities are carried out from 4-5 years of age, and subsequently correction is carried out every year. The crown is compacted and becomes more resistant to snow piles in winter. Forming pruning is carried out on the branch to the point of growth or growth cone, without stopping the cut [3]. The needles are not cut short - so the shrub does not have time to prepare for the cold. First of all, all damaged, dry branches and stems are removed, then branches that are in close contact and interfere with the growth of neighboring branches are removed, as this can cause diseases and pest attacks. To give the chosen shape, the plant is cut carefully, slowly the figure is examined from different sides, periodically retreating from the figure in order to evaluate the result of the work done. It is important to cut the branch to the point of growth or growth cone without stopping the cut.

Forming pruning is carried out to stimulate basal growths, otherwise the base of the topiary figure will be exposed, and its upper part will be thickened. There are several types of decorative molding pruning of juniper when creating frame topiary figures, each of which is performed by a certain method, at a particular time of the year and has a special purpose. Autumn or winter pruning - carried out during the dormant period, when the buds of the plants have not yet awakened. Under the soil and climatic conditions of Tashkent and the Tashkent region, pruning can be carried out throughout the winter, since there is no danger of damage to plant tissues by low temperatures. In cases where frosts are observed below -10° - -15°, forming pruning must be carried out in the early spring, when favorable conditions for pruning occur. The main purpose of spring and summer pruning is to prevent the growth of excess shoots and redistribute nutrients in the desired direction.

Increasing the durability of forest reclamation plantations is carried out by a complex of ecological, innovative, biological, technological and agrotechnical measures based on an analysis of the causes of their depression [4]. After the molding pruning, the base of the figures is mulched to restore the water-air regime of the soil and top dressing is carried out with “anti-stress” preparations.

Pruning is important to carry out sharply ground and disinfected tools. ntami. An even and neat cut “heals” faster, is less susceptible to various infections and bacteria. The most common diseases in juniper are rust, fusarium, drying of branches, shute, alternariosis. Common pests are spider mites, juniper miners, aphids, scale insects, and gall midges [8]. To destroy insects and larvae, it is recommended to use modern insecticides, when treating ticks - acaricides, and against fungal diseases - fungicides. When processing, it is always necessary to follow the attached instructions for the preparations and do not experiment with mixing and increasing the dosage on your own. It is necessary to process conifers in the early morning or evening in dry weather [7]. Coniferous trees tend to produce resin profusely, so cutting putty is not necessary, in deciduous trees, if the cut is more than 2 cm in diameter, it is necessary. There are no specific dates for pruning juniper, it is recommended to prune branches in any month of spring or in summer until mid-June. How mold pruning will affect the growth of juniper depends no longer on time, but on air temperature, it is desirable that it be at least 4 ° C.

Discussion of research results. Topiary art is the art of creating plant sculptures by molding and curly cutting of trees and shrubs, fantasy and ornamental gardening [9]. To create topiary figures of the “Dolphin” shape, metal frames and coniferous plants are used - types of juniper virgin and rocky. Topiary figures of the “Dolphin” shape have 3 types - upright, recumbent and raised. As an experiment, uncut shoots are left at the top of the figure, for further formation of the ball shape in the process of plant growth. The pruning process was carried out 2 times a y in.



Fig. 1. Technology of molding cutting of topiary figures of the “Dolphin” shape at the experimental site

To create topiary figures of the “Horse” shape, metal frames and coniferous plants are also used - types of juniper virgin and rocky. Topiary figures of the “Horse” shape are of two types – upright and raised. The difference between the figures is in size - the “Horse” figures are taller and much larger than the “Dolphin” figures. The purpose of creating figures of various sizes is the use of various technologies for decorative molding pruning, determining the dynamics of growth and development of plants in topiary figures of various sizes. The pruning process is carried out 2 times a year - in March and October 2022 (Fig. 2).

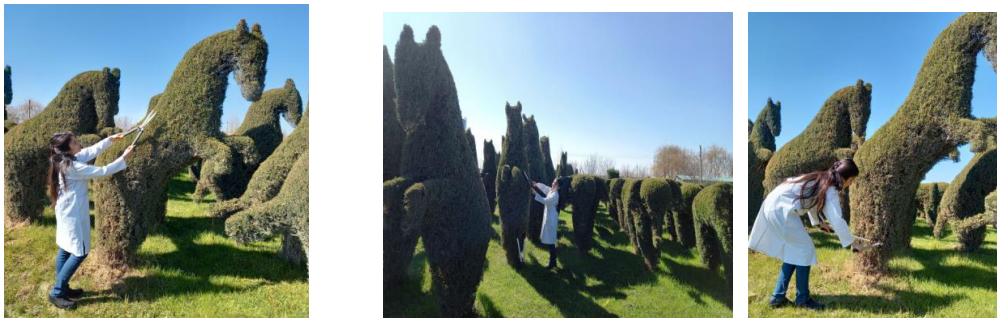


Fig.2. Technology of molding trimming of topiary figures of the "Horse" shape at the experimental site

The process of forming the crown of the created topiary figures on the experimental site must be carried out constantly - this is the main condition for obtaining a high-quality result and full-fledged figures. Using modern technology, you can create an original and stylish design for any garden area[10]. When carrying out molding pruning of trees and shrubs, a technology is used that takes into account the biological characteristics of trees and shrubs. The methods and timing of pruning trees and shrubs are determined by the type of branching of plants and their response to pruning. Ornamental trees and shrubs have three types of branching: monopodial, sympodial and pseudo-dichotomous. Monopodial branching is characterized by the fact that the main stem grows at its apex until the end of the plant's life, having an unrestricted apical growth that dominates the growth of lateral shoots. This type of branching is typical for coniferous species (juniper, pine, spruce, fir, larch, etc.), but is often observed in deciduous species (oak, maple, ash, aspen, bird cherry, mountain ash, etc.). However, monopodiality in deciduous species is not absolute. Under the influence of various reasons, the apical bud may die off, then the main axis of the tree is replaced by lateral shoots. Due to their morphological features, the patterns of formation and growth of shoots with monopodial branching determine the nature and methods of pruning trees.

Analysis of topiary figures after mold cutting. In the course of the research, morphometric data of topiary figures were recorded. In the course of the analysis, it was revealed that molding pruning in the spring stimulates the formation of strong young shoots, which is accompanied by sufficient nutrition and timely top dressing. Even if the pruning is done where there is neither a side branch nor a visible bud, shoots appear from the "sleeping buds" at the place where the forming pruning is carried out, as you approach the base of the branch, the effect of pruning gradually decreases (Fig. 3). Due to the local nature of the pruning process, it is legitimate to carry it out either on a side branch, the growth of which needs to be strengthened, or on a bud, if growth needs to be increased in this place.



Fig.3. Carrying out the analysis of wireframe topiary figures in the experimental area after molding trimming

Technology of selection and use of tools for forming pruning in the experimental area. In the process of forming pruning of ornamental trees and shrubs - juniper, the tools used are of particular importance, which, if used correctly, speed up, provide high-quality pruning and give the desired shape to plants.

The requirements for a working forming tool are as follows: maximum sharpness of the blades - for an even cut and preservation of plants, safety and ease of use, lightness and strength of the tool (tapered blades at the end; handle made of non-slip material)



Fig.4. Forming working tools used in forming pruning (a) secateurs; b) garden shears; c) hedge trimmers; d) electric or chainsaw)

Secateurs - used for trimming thin branches (up to 20 mm thick), visually similar to scissors with curved blades. There are two types of secateurs that differ in how they work. Parallel Blade Secateurs - A convex working blade runs over the surface of a concave anvil blade. This pruner is the most common and suitable for all types of pruning. One-sided cutting secateurs - a wedge-shaped working blade cuts to touch with the anvil support. Such secateurs are used for trimming shoots and clearing the crown. Using some secateurs with parallel blades, we remove individual shoots. The secateurs are especially useful for forming pruning and trimming protruding shoots of a plant, which are unbearable for ordinary scissors. When pruning, the traditional secateurs must be held with the upper blade towards the shoot being cut. The secateurs must move clockwise along the surface of the plant, since in this case the deformation is formed on the removed part of the cut shoot (Fig. 4a). In addition to the conventional secateurs, with the traditional arrangement of cutting surfaces, in decorative molding pruning, it is recommended to use the “anvil pruner” (with a fixed support heel). When forming pruning with an anvil pruner, the upper cutting surface of the tool rests on the shoot as if on an anvil, and does not slide along the lower surface, so the cut surface of the shrub shoot is less wrinkled.

Garden shears are a hand-held cutting tool for cutting shoots and thin branches, unlike pruners, both blades are cutting. Such a tool requires more effort, but at the same time it can cope with dry and thick branches up to 3 cm in diameter. A feature of such tools is that when lowered, the scissors themselves open under the influence of a spring, which facilitates the process of forming pruning (Fig. 4b).

Hedge shears are the main and important tool in the form pruning of shrubs, depending on the shape of the figure and the structure of the cut plant, scissors with shorter or longer blades are used. The flatter the forming surface of the figure is, the larger the area and the longer the blades of the scissors used. When molding sculptures and complex shapes, scissors with shorter blades are used. For pruning thick lignified shoots, scissors with wavy cutting surfaces are recommended. In order to avoid damage to the wrist, it is necessary to select a tool with elastic cushions on the stops at the swivel of the blades (Fig. 4c).

Electric or chainsaw - in gardening they are used for large volumes of work, allowing you to speed up the workflow, as well as for work that does not pursue decorative purposes. A kind of chainsaw on a rod handle is a petrol pole cutter, which allows cutting at a height of up to five meters without the additional use of stepladders, ladders and lifts. For processing large topiary figures, motor devices are most often used, and for small forms, electric ones are used. In larger areas, motor devices with a two-stroke internal combustion engine are used (Fig. 4d).

The widespread use of mechanized pruning is not often carried out, for several reasons: firstly, there are no special tree crowns that meet the requirements of machine pruning; secondly, the effect of machine pruning on the condition and productivity of evergreen plantations has been little studied; thirdly, at present there are practically no perfect technical means suitable for mechanized pruning of trees and shrubs. This technique is used primarily for contour pruning of shrubs, limiting the growth of trees in height and spacing, as well as for creating hedges. The mechanized pruning method allows you to keep the crown in the required volume, and this pruning can also act as a rejuvenating process for trees and shrubs [6].

Conclusions. Studies have shown that spring form pruning causes active awakening of dormant buds and increases the density of tree crowns. To create a beautiful oval or elliptical Dolphin-shaped crown, it is desirable that instead of one main axis, 2-3 develop, capable of carrying the bulk of the branches. In order to increase the flow of nutrition and growth substances to the lateral branches, the main lateral branches that make up the skeleton of the crown are also cut off and the development of a large number of new branches on skeletal branches is not allowed. The next year after pruning, excess side shoots growing inside the crown are removed. The shoots developing from the lateral buds grow, like the main stem, monopodially. Pruning is important to carry out sharply ground and disinfected tools. When pruning, the instruments used must be kept level, without turning, so as not to damage the shoot or the instrument and not to make a ragged cut that can take a long time to heal. It is important to keep the tool clean and working, it is unacceptable to use a rusty tool, during avoid infection and damage to the plant. After finishing work, it is recommended that the tool be thoroughly cleaned of resin, wiped dry, lubricated and stored in this form until the next use. An even and neat cut “heals” faster, is less susceptible to various infections and bacteria. And as a result of the proposed methods of molding cutting of topiary figures, a high straight trunk is formed in the studied objects. The size of the side branches decreases from the base of the trunk to its top, which gives the habitus of the pruned plant a pyramidal shape.

REFERENCES

1. Бельц Г. Фигурная стрижка деревьев. Формы, методы, уход/Пер. с нем. – М.: ЗАО «БММ», 2008. – 128с.
2. Брикелл К. Обрезка растений: Пер. с англ./ Предисл. Ф.А.Волкова. – М.: Мир, 1987. – 198с.
3. Бенгус Ю. В., Мазур В. Р. Обрезка и стрижка – важные компоненты культивирования хвойных растений. – 2015.
4. Рашидова Ф.У., Кайимов А. Подбор ассортимента засухоустойчивых кустарников. Инновационная технология выращивания и создания топиарных композиций // Сборник научно-практической конференции «Ўрмон хўжалиги илм-фан ва ишлаб

чиқариш интеграциясини ривожлантиришда ёшларнинг роли”. – Ташкет, 2021. – С. 57-64

5. Рашидова Ф.У. Использование малых архитектурных форм – топиарных композиций в архитектуре и городском озеленении // Сборник 30-ой Междисциплинарной дистанционной онлайн конференции на тему «Практические исследования в Узбекистане». – Ташкент, 2021. – Часть 13. – С. 7-9
6. Горлова И.Г. Факторы и условия повышения конкурентоспособности механизации лесного компклекса // Аграрный вестник. – Ташкент, 2015. – 25-29
7. Рашидова Ф.У., Кайимов А. Защита от болезней и вредителей декоративных кустарников в питомниках и плантациях по выращиванию культур для создания топиарных фигур // Сборник научно-практической конференции «Ўрмон хўжалиги илм-фан ва ишлаб чиқариш интеграциясини ривожлантиришда ёшларнинг роли”. – Ташкент, 2021. – С. 64-70
8. Рашидова Ф.У., Кайимов А. Применение экологически ориентированных технологий средств защиты от болезней и вредителей декоративных кустарников, выращиваемых для создания топиарных композиций // Международная научно-практическая конференция на тему: “Қишлоқ хўжалигида ўсимликлар химоясини муаммолари ва уларнинг ечимлари” Халқаро илмий-амалий анжуман. - Ташкент, 2022. – 95-98.
9. Рашидова Ф.У., Кайимов А. Технология создания топиарных фигур и применение их в ландшафтном дизайне Узбекистана в целях санитарно-гигиенического эффекта озеленяемых территорий // Международный научный форум INTERNATIONAL SCIENTIFIC FORUM. Кўп тармоқли илмий-амалий анжуман. – Ташкент, 2022. – С. 1074-1078.
10. Rashidova F.U. The Technology Of Creating Topiary Compositions With The Participation Of Ornamental Shrubs – Frame Topiary In The «Green Art» Style// The American journal of agriculture and biomedical engineering. USA 2021. Volume 03. – P. 3-44 (SJIF-5.554. DOI-10.37547/TAJABE)