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TECHNOLOGY OF HERBICIDE APPLICATION AT CULTIVATION OF SAPLINGS IN WOOD NURSERIES

At inspection of school branches of nurseries it is established that in the first year character of a contamination grassy vegetation is similar to sowing branch. The next years the share of participation of long-term weed plants, including such kinds as a *Elytrigia répens* and *Cirsium arvense* increases.

In school branches herbicides can be applied before planting, prior to the beginning of vegetation, during vegetation and in the end of vegetation. The soil herbicides possessing high efficiency and long period of validity should become a basis of chemical care. We tested soil herbicide of Terrsan in school branch of coniferous and deciduous breeds. At processing in a dose of 30 g/ha prior to the beginning of vegetation herbicide action is observed within three months. During vegetation the tank mix of herbicides of Tameron in a dose of 25 g/ha and the Skat in a dose 1 l/ha was used. In school branch of deciduous breeds processing should be spent not earlier than July. On earlier terms it is observed chlorosis of leaves and delay of growth of shoots. In school branch of coniferous breeds processing can be spent throughout all vegetative period. In the end of vegetation in school branch of a fur-tree European it is possible to apply glyphosate preparations in a dose of 2–4 l/ha.

On our researches processing by herbicides has not led to damage or oppression of saplings of coniferous and deciduous breeds. Processing by herbicides during the droughty period and at high temperatures is not recommended. On the processed objects it is desirable to apply plant growth stimulant. For removal of restriction on processing terms it is possible to use for manual sprayers the protective screen providing directed processing and possibility to apply Terrsan during all vegetation.

Key words: herbicides, coniferous breeds, deciduous breeds, school branch, processing terms, efficiency.

Introduction. Significant amounts of large planting material grow in forest nurseries. They are mostly saplings in the school offices. The greatest amount is represented by European spruce, but recently number of large-sized hardwood saplings is gradually increasing mainly for decorative purposes.

Main part. For proper development of technologies to combat weeds in the school department of forest nurseries need to evaluate the species composition of weeds, the degree of its development.

Assessing the contamination it was revealed that in the first year of school branches growing part of weeds looks like sowing department, i.e. annual grasses and dicotyledonous dominate. In the senior years school departments the share of long-term weeds grows, especially the number of such rhizome weeds as cereals and dicotyledonous ones – couch grasses, thistles, sow thistles, which are difficult to remove mechanically. With long-term cultivation of seedlings, for example, for large-sized planting material, machining treatment results in the distribution of these weeds in size and intensity of their widening. In some cases, the projective cover weeds can reach 100%.

Carrying out weeding in nurseries it is necessary to be focused on seed departments, since the seedlings of conifers and deciduous trees can not sufficiently compete with rapidly developing weeds. School departments have a secondary place, spend-

ing weedings as far as possible. However, being in the stage of seed, weeds are the source of secondary clogging, providing a flow of new portions of the seed into the soil. Failure to remove them would increase the contamination site, so an effective way to deal with them in the conditions of shortage of manpower is the use of herbicides.

Evaluating herbicide effect on unwanted vegetation its biological effectiveness is determined. It includes two indicators: the percentage of reduction of the number and percentage of reduction of crude mass of weeds, and the latter figure is more accurate, since the suppression of weeds and appearance of new ones (whatever small in size and mass they are) is considered.

In school department herbicides can be applied prior to planting, to the beginning of vegetation, the vegetation and for the end of the growing season.

The basis of the technology of application of herbicides in the school office is their introduction before the start of the growing season, or planting. Such applications, especially in the case of soil herbicides allow for a long time to restrain the growth of weeds and to ensure the best conditions for plant growth and development.

Growing seedlings of conifers and deciduous trees there are two possible patterns of use of soil herbicides: introduction to the moment of planting or immediately after planting, not vegetating plants in the processing of newly created school; applica-

tion before the start of the growing season in the senior school years.

Herbicide Terrsan was tested as a soil herbicide. At a dose of 30 g/ha it was applied before the start of the growing season in the school department of spruce, linden, Norway maple, birch. To handle the compacted school spruce tractor sprayer Egedal was used, in all other cases manual knapsack sprayer was used.

The effectiveness of the herbicide Terrsan in the school department for the first year spruce of cultivation is very high. One month after treatment only isolated plants of blood-red crabgrass were observed. The effect was observed for nearly three months. The smallest impact herbicide treatment had on St. John's wort, where the effectiveness of the drug on the 60th day was only 25%, while there was almost two-fold reduction in the mass of the aerial part. It occurred due to the growth processes stop weed, and also because of the emergence of new young plants having smaller dimensions. However, this plant does not usually occur in all nurseries in the unit number and a strong influence on the growth of planting material can not render.

At the same time plants of young blood-red crabgrass, erigeron Canadian, dandelion and field violet begin to appear. Overgrown plants did not die at the time of treatment, but they were far behind in growth, together with the emergence of the young plants affected the weight of the aerial part. Thus, the mass of red blood crabgrass, dandelion, violets field and erigeron Canadian was only about 20–25% of the benchmark, while the rest of weeds such as annual bluegrass, barnyardgrass, Tal rezushka, shepherd's purse, small schavelek, Persicaria maculosa and amaranth thrown back were completely absent.

Processing the school department of the second year cultivated spruce the Terrsan herbicide showed lower efficiency because of the presence of wintering weeds in the area. When treated they were sufficiently grown and, that is why, were not killed by the impact of the chemical.

Due to the large size of the first, as bluegrass vegetation starts earlier, the effectiveness of annual bluegrass is lower than for millet chicken on the 30th day. Also the results are worse for overwintering weeds (erigeron Canadian, daisies). The remaining weeds are severely in the weakened state. They demonstrate tops chlorosis, individual plants have started to shrink, in some plants there is death of individual parts. In addition, the treated area is observed the complete absence of fine weeds. All this leads to the fact that the projective coating on the treated area does not exceed 28 vs 94% for the control.

Damaged by herbicide plant can not be restored because the continued decline in the above-ground plant mass. It also reduces their number,

which indicates that the lethal effect of the herbicide evident, however, because of the large size of weed destruction process stretched out over time.

In the school year of the third branch of the autumn cultivation weeding was carried out, in which all overwintering weeds have been removed. Then, the early spring cultivation and further processing of herbicides were carried out. It may be noted that the removal of overwintering weeds is an effective exercise because in such way the infestation in the spring planting is reduced. The effectiveness of the herbicide Terrsan here is higher than in the second year of office. Biological efficacy (percentage reduction indicator) in the first case by the number was 95.7%, 97.4% by weight, and in the second – 90.5 and 92.1% respectively.

During the loosening of the soil in the process of growing the protective layer of the herbicide can be disrupted, resulting in reduced efficiency and validity. Therefore, loosening must be carried out after the expiry of the soil herbicide and precede the reprocessing site herbicides applied at vegetative weeds.

School department of first year cultivated linden and Norway maple was laid for the steam field after careful cultivation, so the degree of weed infestation was not high. Dominated by annual weeds: Tal rezushka, annual Diwali, barnyardgrass, annual bluegrass, shepherd's purse, chickweed field, violet field. The couch grass dominate, but it has spread by curtain character. Projective cover is not more than 20–26%. The plantings older dominated by perennial weeds: couch grass, dandelion, solidago canadensis, creeping thistle. With annuals, they create a powerful turf, projective cover than can reach 100%.

Application of soil herbicides should necessarily be carried out before the start of the growing season, because the young leaves are very sensitive to the action of these drugs.

The effectiveness of the herbicide is also very high. Weed vegetation in the area was practically absent. Biological efficiency reached 97.2 and 98% by number and weight, respectively.

In the school department of the second year of growing annual weeds are also virtually nonexistent, but the effect on perennial weeds was slightly lower. Biological effectiveness of the number of weeds was equal to 85.4%, by weight – 93%.

The herbicide treatment efficiency after 60 days is also high. Similarly to the previous period, lower values are characteristic of the perennial weeds, as well as St. John's wort, violet and sofas. Plant seed origin bluegrass and millet begin to appear.

The use of herbicides on vegetative planting materials has the most dangerous activity, because in this phase of their growth, plants are able to actively absorb the active substances that fall on the

leaf surface with the largest probability of damage observed at the initial stage of growth.

Tameron (25 g/ha) has been used during the growing contact for processing in the tank-mix herbicide. It was used against dicotyledonous weeds, and Skat (1 l/ha) for the destruction of crops.

On the 30th day after treatment the amount of weeds was decreased by 78% in number and 83% by weight. It is a very good indicator. The stunted weeds as rezushka and Tal schavelek were the most damaged and almost died. The larger plants were damaged in a lesser degree. The least effect was given to the Canadian erigeron, but weight of the remaining plants was decreased indicating that inhibition of growth was processed. The number of copies of weed plants in the accounting area was not less than the control plot on the 60th day. One manual weeding and cultivation were conducted on the controlled area during 60 days.

To maintain the area school separation in pure form up to the end of vegetation is necessary to process the tank with herbicides mixture at least once and sometimes twice.

The effectiveness of the second treatment is slightly higher. The number of weeds decreased by 85.3% and by weight decrease was 90.3%. Higher efficiency because the newly emerged weeds are smaller and therefore more susceptible to the herbicide. Surviving after the first treatment, the plants are depressed, and thus the effectiveness of herbicide towards them increases.

In the vegetating hardwoods school department, especially during the first year of cultivation,

it is not recommended the treatment with herbicides before the beginning of July. With age, the plant resistance is increased, and, therefore, the risk of phytotoxicity is reduced.

One of the most effective ways to reduce the number of weeds in school offices for the next year is to process at the end of the growing season or after its completion.

Application in early September of Glifos (4 l/ha) and Terrsan (20 g/ha) tank-mix herbicides completely destroyed the weed vegetation in the school office spruce, and helped to keep the landing net to the end of the growing season. You can only use Glifos, but its action, unlike Terrsana, does not apply to the following growing season. In the school department hardwoods such processing prior to leaf fall can not be performed.

Shields to hand sprayer for targeted treatment can be used to remove restrictions on any interval of vegetation treatment terms. It is also advisable to use the treated area stimulants. In addition, it is undesirable to use a herbicide when the plants are under stress, such as heat or drought.

Conclusion. Technology application of herbicides in the school office is handling with Terrsan herbicide at a dose of 30 g/ha before the growing season, a one- or two-time treatment tank with Tameron mixture at 25 g/ha and Skat at 1 l/ha. In the softwood school office after laying the apical bud tank-mixed herbicide Glifos (4 l/ha) and Terrsan (20 g/ha) or just Glifos can be used. The rate of the working fluid flow rate is 200–300 l/ha.

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