

Necessity of protection of willow against weeds

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The purpose. To determine features of processes of contamination of young plantings of willow and factors of negative influence of weeds on growth and development of seedlings. **Methods.** Small-plot field researches. Account and observation according to requirements of the Technique of carrying out tests and application of pesticides [10]. **Results.** The greatest mass of weeds during vegetative periods was fixed on 10.08 and made in average 3548,2 g/m². The greatest share of mass of weeds made: white goosefoot — 418,1 g/m² (11,8%), black nightshade — 404,8 (11,4), grey bristlegrass — 378,3 (10,7), chicken millet — 327,4 (9,2), field mustard — 315,2 g/m² (8,9%), etc. **Conclusions.** Application of consecutive sprayings with selective to culture herbicides or use of the combined systems which include methods of power shielding, actions of soil preparations and mechanical monitoring of sprouts of weeds during 50 – 60 days of vegetation is necessary for effective protection of plantings of willow.

Key words: willow, weeds, mass, projective covering.

Human civilization has always needed energy. If in the early stages of its history, the society has clamored for energy for cooking, heating homes, modern man requires a very large amount of energy for its existence[1]. If in the past the demand for energy is met mainly by burning plant material, mostly wood, the modern civilization is very widely uses different forms of energy materials: oil, gas, nuclear fuel, energy of rivers, wind, sea waves etc[2].

At the same time, the widespread practice of use as an energy source fossil fuels have proven their limitations and negative impact on the planet itself[3]. A partial alternative is the use of the transformed energy of the Sun, which is accumulated in the organic and the weight of the plants[4].

Analysis of the potential sources bioenergies fuel in the temperate zone of the planet convincingly proves the feasibility of using wood[5]. Among the trees, which deserve the attention of both scientists and producers is energy willow[6].

Undemanding tree species, which are able to vegetate on the whole territory of the country, surrendered to intense photosynthesis, does not accumulate in the wood undesirable for the combustion of substances that can be easily transformed into a convenient to use briquettes and pellets[7].

In the technology of growing the energy willow plantations have bottlenecks. Plants are the most efficient way to plant cuttings, which, after rooting successfully is able to grow and develop, especially in conditions of sufficient moisture, even in poor soils[8].

In the first year after planting, seedlings require adequate protection from weeds. Young plants, especially in the first year of vegetation, not capable of confronting the neighborhood of weeds[9]. Traditionally the land on which lay the plantation of energy willow are marginal and, accordingly, have a high level of potential clogging of the top layer of the soil with weed seeds and organs of vegetative propagation[10].

Plant willow cuttings after planting is still quite weak, they need to form the future root system, they need to have active photosynthesis and to synthesize organic matter. That is, young plants willow require energy for their successful growing season sufficient direct sunlight.

Square future planting of energy willow can justifiably be considered as a free ecological niche, which is almost filled with plants. The projective cover of willow cuttings energy is very small for successful filling of ecological niches required a considerable period of time during which the planted cuttings will be able to turn into a young and competitive tree[11].

Almost from the moment of planting young seedlings in the square begin the process of clogging.

The purpose held in 2013-2016 the years of field research was to determine peculiarities of processes of contamination of young plantings of willow and energy factors of the negative impact of weeds on the growth and development of seedlings.

The conditions and methods of research

Experiments were finely precinct, field. The study was carried out during 2012-2015, on the experimental field "Ksaverivka 2". The landing area of the plot 100 m², accounting – 50 m², repetition – fourfold. The experiment was laid out randomness by the method of split plots, placement of repetitions in two tiers. Energy Willow planted on the diagram: the distance between cuttings in the row and 0.6 m between rows and 0.7 m between the bands is 1.4 m stems cuttings before planting was 20-22 cm in length, planting depth of 18-20 cm. the Density of trees is 30 thousand PCs./ha.

Accounts and observations of weeds in plantings of willow energy was carried out according to the requirements methods of testing and application of pesticides (ed. prof of crops in Ukraine, 2001).[12].

The accounting value of the accumulation of mass of plants of weeds were determined by the method of cutting near the ground on experimental plots with an area of 0,25m² On each repeat variant were taken at 4 sites. with subsequent weighing by species at the scale and terms of m². Were taken in early August (the period of maximum accumulation of plant mass).

Discussion of research results

The processes of formation of debris at landings of willow for energy in the years of research had certain variations in calendar terms, but was generally similar dynamics. The nature of the debris was mixed. At the time of the first census of the population of shoots of the weeds (10.05) average number 80.7 PCs/m². Of these the most popular were *Polygonum scabrum Moench*. ,9,5s/m², *Chenopodium album L Ch.* 8,7 PCs/m², *Agropirum repens L.* 8,1 s/m², *Setaria glauca Pal.Beauv.* 7,3шт/m², *Solanum nigrum L.* 7,2 s/m², *Sinapis arvensis L.* 6,4 s/m². Table 1.

Surveys conducted after 30 days (10.06) revealed a significant increase in the presence of weeds on the planting of energy willow. Their total number was increased to 139,1 PCs/m². Changed the species composition of most mass germination of weeds. The number of plants in the first place was the steps *Setaria glauca Pal.Beauv* 27.9 PCs/m², the *Echinochloa crus -galli (L.)Pal. Beauv.* - 19,1 PCs/m², *Chenopodium album L.* – from 14,8/m², *Agropirum repens L.*is 12.8 PCs/m², *Polygonum scabrum Moench* – 11,6 PCs/m², and others.

To 10.07. free space on the landings of willow energy has been largely mastered wild vegetation. Weeds were the main component of phytocenozes formed on area planted willows. Plants in this period actively formed adventitious roots on cuttings and had a very insignificant projective cover of the soil surface. Therefore, to create a powerful competition to the germination of weeds was not possible.

The number of weeds increased accordingly and reached 170,8 PCs/m². Cereal weed species retained their leading positions, their numbers were highest. Among dicotyledonous weed species, the most widespread were plants white *Chenopodium album L.* -17,2 PCs/m², *Polygonum scabrum Moench* – 13,5 PCs/m², *Solanum nigrum L.* – 10,1 PCs/m², *Polygonum convolvulus L.* – 9,3 PCs/m², *Chenopodium hybridum L.* -9,2 PCs/m², and others.

In subsequent periods of the growing season the new shoots of weeds as a result of filling of vacant ecological niches were insignificant. By the time of the next census of the population of weeds (10.08) their average number was of 175.6 Shi/m², or 2.8% more compared to the previous census.

Emergence of weeds in plantings of willows for energy and the formation of a sheet to directly influence the formation of the projective cover of the soil surface and its shading. Almost all plants like crops (energy willow rooted cuttings), and weeds are the heliotropes, that is, plants require direct sunlight

leaves. Even partial shading of a leaf in them reduces the intensity of the processes of photosynthesis and therefore their competitive ability of plants neighbors.

At the time of the first level of weed infestation (10.05) their projective cover was low. Only young plants of field mustard had well-developed leaves, respectively, were able to actively shade the surface area of the field. Projective cover of these plants was significant and reached an average of 12.1%. Young rosette of sow Thistle pink created the projective cover of 6.7%, *Agropirum repens* L.. of 3.3%, *Thlaspi arvense* L. is 2.3%, *Chenopodium album* L. is 2.2%. At the time of conducting a survey of the weeds of the total projective cover of weeds the surface of the field was only 36,1%, i.e. almost two thirds of the area was actually free and they could learn how plants and new germination of weeds. Figure 1.

During the following months of joint vegetation of young plants, willow energy and germination of weeds (accounting for 10.06) the projective cover of the soil surface on the field was fully developed and reached 100%. The leaves of the weeds almost obscured the entire surface of the soil. The greatest share in the formation of the projective cover was leaves of *Sinapis arvense* L.– 17,6%, *Chenopodium album* L is 15.8%, *Setaria glauca* Pal.Beauv to 12.0%, – *Echinochloa crus –galli* (L.)Hal. Beauv 10.9%, *Agropirum repens* L.. – 7.8% and other.

Filling almost the entire horizontal surface area of the field proektivnom coating plants in phytocenosis were formed on plantations involved in the competition between them for free access to direct sunlight by forming the height of the stems and make its new leaves above the leaves of neighbors. For the full projective cover of the soil was the increase of leaf area and the development of the higher tiers of their placement in space. At the time of the next record (10.07) value for percent cover in the planting of energy willow in the first place was plant *Chenopodium album* L – 19,0%, *Sinapis arvense* L.– 14.0 per cent, *Agropirum repens* L and 10.3%, *Echinochloa crus –galli* (L.)Pal. Beauv – 9,0%, *Chenopodium hybridum* L. 7.2 per cent., and others.

Accounting for 10.08. fixed minor changes in the value of projective cover on the planting of energy willow. The end time of the period of active vegetation of plants many weed species led to decreases in the percent cover of the soil surface. Drying the death of old leaves and the cessation of formation of new plants of , *Sinapis arvensis* L., *Thlaspi arvense* L., *Echinochloa crus –galli* (L.)Pal. Beauv , *Setaria glauca* Pal.Beauv and other lead to partial release of ecological niches for the planting of energy willow.

Accounting for 10.09. show that the average projective cover of the soil surface weeds averaged 86.1% from. This situation provided the emergence of new seedlings over-wintering weed species: *Thlaspi arvense* L , *Galium aparine* L., *Deiscurenia Sophia* L., and others.

The role of each plant species in sinus plants is formed in a particular area more fully and comprehensively can be estimated by the proportion of its mass in the total mass of plants that can be accumulated over the growing season.

At landings of willow energy the first year of vegetation dynamics of accumulation of mass of weeds by species was determined in the same period as other accounts. On 10.05. the total mass of weeds was on average 158,3 g/m². Of these, the largest mass was formed by a sow -*Cirsium arvense* L. – 23.2 g/m², *Sinapis arvensis* L.an 17.7 g/m², *Chenopodium album* L – 12,2 g/m², *Polygonum scabrum* Moench -12,2 g/m², *Agropirum repens* L – 10,0 g/m², and others. Figure 2.

The largest weight of weeds during the vegetation periods was recorded at the time of the censuses, 10.08. and averaged 3548,2 g/m². The largest share of the mass of weeds over the years of research were: *Chenopodium album* L – 418,1 g/m², or 11.8%, *Solanum nigrum* L. 404,8 g/m² or 11.4%, *Setaria glauca* Pal.Beauv – 378,3 g/m² or 10.7%, millet cock *Echinochloa crus –galli* (L.)Pal. Beauv – 327,4 g/m² or 9.2% in *Sinapis arvensis* L – 315,2 g/m², or 8.9%, and others.

At the time of the next census through the end of the growing season, shedding partial shedding of dry leaves in plants of weeds the size of their above-ground mass plantings of willow energy decreased. The resulting materials research, it is legitimate to generalize:

Conclusions.

1. As a result of research proved that planting of energy willow in the first year of vegetation not able to resist the processes of contamination and require reliable and long-term (50-60 days) period of protection from weeds.

2. The contamination of landings of willow for energy in the Forest traditionally has a mixed character. The intensity of emergence of weeds and remains high until the first decade of June. Filling of vacant ecological niches on the planting of energy willow weeds hinders the emergence of new shoots.

3. The dynamics of the projective cover of the soil surface plants weed in the first decade of June up to 100%. Following the competition of weeds for access to the energy of light occurs in the plane of the plants conquest of space above neighbors. In the second half of August and early September, the projective cover of weeds is reduced and becomes less than 100%, freeing up niches for new weed germination.

4. The absence of control measures of weeds in plantings of willow energy leads to their intense competition with plants for the factors of life. Already before the first decade of June the weeds formed a considerable mass overhead which peaked 3548,2 g/ha in early August.

5. Effective protection of plantations of willow or energy requires the application of the system of sequential spraying to the culture of selective herbicides or the use of combined systems, combining techniques of energy shielding, actions, grant preparations and mechanically controlling weed germination.

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