

INFLUENCE OF THE PERIOD OF SOWING ON YIELD OF SILPHIUM PERFOLIATUM

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In Akmola region of Northern Kazakhstan under irrigation *Silphium perfoliatum L.* has a high yield – up to 87,2...88,4 t/ha of green mass in the amount of 2 mowing. With the years there has been a convergence in the value of the yield of green mass and harvest of dry matter for different variants of sowing of culture. In the year of sowing leaf-stem mass fees are low, and the highest yield of green mass of culture is celebrated on 3...4 years of life. The best times of *Silphium* sowing is late autumn and early spring. When sowing seeds in the summer time the mass of leaves and stems is decreased.

Keywords: *Silphium perfoliatum*, yield, fertilizer, terms of sowing

Silphium perfoliatum L. is a nonconventional culture which yet has not received a wide circulation in our country, and as a whole in the world. Therefore it is important to define optimum terms of sowing with reference to various climatic conditions, zones of cultivation and to other factors.

In the last century N.I. Ievlev found, that in the North of the country on lands of the Republic of Komi *Silphium* it is advisable to sow in the spring [3]. A.N. Makarova in her research determined that in the southern regions of Kazakhstan is optimum fall sowing date [4]. To the same conclusion on the results of the experiments N. Amirkhanov in Uzbekistan [1], N. Bakhmat and D.D. Drachuk in the Khmelnytsky region of Ukraine [2], Rata L. in Latvia [5] came.

The purpose of our researches was studying influence of term of sowing on yield of *Silphium perfoliatum L.* Experiences were spent on an irrigated site of the Akmola agrarian university of Republic Kazakhstan. Frequency of experience was 4-fold. The area of an allotment was 25 m². Crop of *Silphium* spent with distance 70 sm on depth 1...2 sm. The irrigation, entering of mineral fertilizers was spent to the next years in norm N₆₀P₆₀K₉₀ under the first and second mowing by equal dozes.

Silphium with norm of 10 kg/hectares were sowed in various terms. Early-spring crop was spent on April, 29th after corresponding preparation of ground. In 2 variant term of seeding in the beginning of summer – on June, 2nd, 3 variant – on July, 15th. In 4 variant sowing was carried out on November, 1st after steady downturn of temperature of ground with that calculation, that seeds in the autumn have not sprouted.

In the first year of a life yield of green weight is insignificant, plants of *Silphium perfoliatum* during the vegetative period in a year of sowing of seeds developed slowly. At sowing in the middle of summer because of very short vegetative period it was not possible to receive any yield. The height of plants was insufficient for mowing. At 2 variant yield of culture has made the minimal size – 2,4 ton/hectares (Table).

Early-spring crop differs the best development of plants of culture because of the long vegetative period therefore yield of green weight was essentially above, than in 2 and 3 variants and it is equaled 6,3 ton/hectares. At 4 variant seeds of *Silphium* start to sprout earlier on calendar term, than in all other variants, therefore duration of the vegetative period of plants of *Silphium* in this variant was the greatest. Accordingly gathering of green weight of

Yield of green mass of *Silphium perfoliatum*, t/ha

Variant	Term of crop	The year of living culture				In total, over 4 years	In an average 4 years	Change to control version (±)
		first	second	third	fourth			
1	early-spring (control)	6,3	71,1	88,4	81,9	247,7	61,925	–
2	early-summer	2,4	56,2	83,2	79,6	221,4	55,35	–6,575
3	mid-summer	–	36,9	65,4	74,4	176,7	44,175	–17,75
4	last-autumn	9,8	83,5	87,2	82,5	263,0	65,75	+3,825

culture also was the highest among studied variants – 9,8 ton/hectares. In the second year of a life a degree of development of plants in a year of sowing continues to affect. So, the least gathering of leaves and stalks is received in 3 variant at sowing in the middle of summer – 36,9 ton/hectares. This parameter has increased in 2 variant up to 56,2 ton/hectares. At early-spring sowing yield of green weight was 71,1 ton/hectares. And the maximal gathering of weight of leaves and stalks in 4 variant – 83,5 ton/hectares. In the third year by all variants, except for the third, the highest yield of leaves and stalks is noted. In 1 variant it is equal 88,4 ton/hectares, 2 variant of 83,2 ton/hectares and 4 variant – 87,2 ton/hectares. Only in 3 variant the maximal gathering of weight of leaves and stalks from investigated years is received for the fourth year of a life – 74,4 ton/hectares. In other embodiments, the yield was slightly lower than in the previous year.

As a whole on the sum of gathering of green weight for 4 years it is least received in 3 variant – 176,6 ton/hectares. At sowing in the beginning of summer total gathering makes already 221,4 ton/hectares or on 45,8 ton/hectares more, than in 3 variant. At early-spring sowing the given parameter is equal 247,7 ton/hectares are on 72,1 ton/hectares more, than in a variant with crop of cul-

ture in the middle of the summer period. The maximal result will reach at 4 variant – 263,0 ton/hectares.

Conclusions. At cultivation on silage in conditions of irrigation in Akmola region of Kazakhstan *Silphium* are recommended to be sowed in the late autumn for 2...3 weeks up to steady frosts or early in the spring in the end of April. If necessary, *Silphium* can be sown in early June by the stratified seeds. It is undesirable to sow in mid-summer.

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