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NEW IN WAYS OF INCREASING OF GENETIC POTENTIAL OF HEMP OF POWER TENDENCY USE

Effectiveness of breeding work in way of increasing of stems and fiber yield in modern monoecious hemp varieties of the Middle-Russian type are given. Perspectives of new breeding material, which increases variety-standard by stems on 30-40%, are determined.

Keywords: *industrial hemp, variety, biologic raw material, yield of stem and fiber, fiber content.*

Introduction. In connection with actuality of passing to resource-saving technologies of manage, application of alternative sources of fuel, charge of bowels of the earth and forests, there was a sharp problem of the use of hemp on power aims, which is able for one vegetation period to form the considerable volume of biomass. Thus, the annual increment of pine-tree makes 2,5 m³ from a 1 hectare, while at hemp, at the middle productivity 50 c/ha of straw – 5–6 m³, and at large yields – twice as much [1].

In Ukraine a “hemp boom” is only engendered, that is why, foreseeing the increase of demand on hemp raw material in the nearest future, there is a necessity for development of methods of selection of increase of biomass of plants of hemp varieties and creation of their model [2, 3].

Aim of investigation - to develop the receptions of plant-breeding work with

monoecious hemp varieties of Middle-Russian type in direction of increase of biomass of plants to 90–100 c/ha.

Material and method of investigation. Researches were conducted in obedience to the existent method of monoecious hemp breeding with the following the biometrical and statistical analyses of experimental material. As a perspective feedstock such varieties as Hlukhivski 51 on high fiber content and Hlukhivskiy 46 on the increase of biomass of plants were taken.

Results of investigation. Application of breeding methods on absence of drug content with developed “Method of estimation of individual plants of monoecious hemp varieties by the content of fiber before flowering” was influenced on the increase of group of plants of Hlukhivski 51 variety with content of fiber more then 38,5 %. In population 7 plants (6,6 %) with content of fibred 39,0–42,3 % (plant-breeding nursery, in 2010) were found out [5]. Confirmation of gradual displacement of populyacii in the side of expansion of genetic potential of content of fibre is a comparative analysis of this index between the probed variety and variety-standard. For 2007–2010 a difference by content of fibre changed from 8,7 to 17,3 % in behalf of Hlukhivski 51 variety.

As a result of plant-breeding variety tests on the bilateral using for the practically identical periods of vegetation Hlukhivski 51 variety exceeded the variety-standard of Hlyana by the productivity of stems on 19,9 % in 2009 and on 11,6 % at 2010 (not at reliable level) and content of fibred on 8,8 and 21,3 % accordingly in 2009 and 2010, confirming perspective of subsequent expansion of range of high fiber content in stems of this plant-breeding material the same.

As a result of evaluation nursery in 2012 it is discovered 32,7 % and 44,2 % of families which by height and technical length of plants (accordingly) exceed the variety-standard. Perspective of subsequent increase of fiber content is determined of presence of 44,2 % families with content of fibre from 33,6 to 35,5 %, 25,0 % of plants – 35,6–37,5 % and 7,7 % of plants with content of fiber over 37,5 %. Middle content of fiber was set at the level of 34,6 %

**Distributing of families of sort Hlukhivski 51 variety by the content of fiber
(evaluation nursery, area of feed of plants 15 x 5sm, 2012)**

| Quality of families | Quality of families with fiber content, % | | | | | | Middle index, % |
|---------------------|---|-----------|-----------|-----------|-----------|-------|-----------------|
| | <29,5 | 29,6–31,5 | 31,6–33,5 | 33,6–35,5 | 35,6–37,5 | >37,5 | |
| 52 | 3,9 | 7,7 | 11,5 | 44,2 | 25,0 | 7,7 | 34,6 |

Note. The middle index of fiber content of plants of Hliana variety is 30,0%.

Pre-conditions of development of other direction were become by actuality of increase of biomass in connection with the searches of new raw material for the production of biopropellant. In 1998–2000 Hlukhivskiy 46 variety differed stably the high harvest of stems, and in 2000 the productivity of straw exceeded 10 t. At application in 2008 of preliminary estimate of halves of seed of families by content of fibre and in high plants at the area of feed of plants 15x5 cm and selection in plant-breeding and evaluation nurseries displacement in the side of increase of duration of period of vegetation (on 13 days latter repining then standard), height of plants (on 22 cm), took place the selection of the best families increase of fiber content on 4,3 % (in 2010 in the plant-breeding nursery of plants with content of fiber higher 33,6 % increased on 24,4 % from 2008), as a certificate of high potential possibility of variety, that it is confirmed the high coefficient of variation of technical length, diameter and mass of cutting-off (39,3, 23,9 and 52,5 % accordingly) (table 2).

In 2012 a difference by the height of plants of evaluation nursery between a standard and Hlukhivskiy 46 variety was 24 sm, by technical length 30 sm, content of fiber was higher on 4,2% (table 3). With the purpose of exposure of potential possibilities of subsequent increase of biomass of Hlukhivskiy 46 variety the reaction of genotypes was probed on the increase of area of feed (inter 15x5 see and thinning out 30x5, 50x5 and 50x10 sm) and dose of mineral fertilizers of N₁₂₀P₉₀K₉₀ (control) and N₁₅₀P₁₂₀K₁₂₀).

Table 2

Main indexes of Hkukhivski 46 variety which characterizes high genetic possibilities of increasing of biomass of plants (plant-breeding nursery)

| Sign | Index | Middle index of sign | |
|-----------------------|------------------------|----------------------|--------------|
| | | 2010, n = 92 | 2011, n = 64 |
| Height of plant, cm | $\bar{x} \pm S\bar{x}$ | 308,6 ± 3,14 | 356,1 ± 6,23 |
| | V,% | 9,7 | 14,0 |
| Technical length, cm | $\bar{x} \pm S\bar{x}$ | 142,1 ± 3,03 | 124,0 ± 6,09 |
| | V,% | 20,4 | 39,3 |
| Diameter of stem, mm | $\bar{x} \pm S\bar{x}$ | 16,20 ± 0,27 | 18,21 ± 0,54 |
| | V,% | 16,0 | 23,9 |
| Mass of the sample, g | $\bar{x} \pm S\bar{x}$ | 156,54 ± 5,63 | 77,03 ± 5,01 |
| | V,% | 34,5 | 52,1 |

At this stage of researches it is discovered that potential possibilities in relation to the harvest of straw of Hlukhivskiy 46 variety exceed 140 c/ha.

Table 3

Indexes of productivity of Hlukhivskiy 46 variety (evaluation nursery)

| Etar | Variety | Height of plant, cm | Fiber content, % | Mass of seeds, g | Vegetation period, days |
|------|----------------|---------------------|------------------|------------------|-------------------------|
| 2008 | USO-31, st. | 202 | 30,1 | 4,1 | 120 |
| | Hlukhivskiy 46 | 226 | 30,5 | 4,9 | 127 |
| 2011 | Hliana, st. | 275 | 27,0 | 6,5 | 120 |
| | Hlukhivskiy 46 | 297* | 31,3* | 8,1* | 133 |
| 2012 | Hliana, st. | 262 | 29,4 | 3,1 | 119 |
| | Hlukhivskiy 46 | 286* | 33,6* | 4,2 | 130 |

Notes: 1. In 2008, 2011 area of feed of plants was– 15 x 5 cm, 2012 –30 x 5 cm.

2. * – $P < 0,5$.

Economic the optimum terms of receipt of harvest of stems at 122 c/ha is out put of N₁₂₀P₉₀K₉₀ at the area of feed 30x5 sm, that provides the high indexes of the seeds productivity and fiber content also.

Conclusions.

1. Perspective of subsequent increase of fiber content of Hlukhivski 51 variety confirmed a presence of 76,9 % of families with fiber content from 33,6 to 37,5 % and higher. Middle content of fiber was set at the level of 34,6 %.

2. It is discovered that potential possibilities of biomass of Hlukhivskiy 46 variety in 2012 make 14 t/ga.

3. The model of variety with biomass of plants of more than 10 t consists of the followings parameters: high height (300 sm), high fiber content (33–35%) and late repining (on 14 days greater duration of vegetation from the variety-standard of Middle-Russian type).

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Анотація

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Нове в прийомах розширення генетичного потенціалу конопель енергетичного напрямку використання.

Описано ефективність селекційної роботи у напрямку збільшення урожаю стебел та волокна у сучасних сортів однодомних конопель середньоросійського типу. Визначено перспективність нового селекційного матеріалу, що на 30-40% за урожаєм стебел перевищує сорт-стандарт.

Ключові слова: коноплі посівні, сорт, біологічна сировина, урожай соломи і волокна, вміст волокна.

Аннотация

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Новое в приёмах расширения генетического потенциала конопля энергетического направления использования.

Показана эффективность селекционной работы в направлении повышения урожаев стеблей и волокна в современных сортах среднерусского типа. Определена перспективность нового селекционного материала, который на 30-40% превышает сорт-стандарт по урожаю стеблей.

Ключевые слова: конопля посевная, сорт, биологическое сырье, урожай соломы и волокна, содержание волокна.