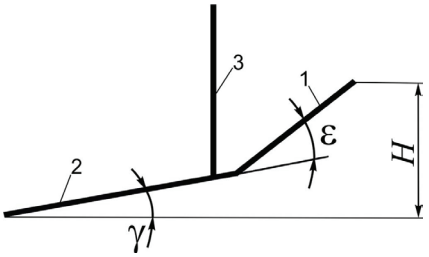

Figure 1. Scheme and parameters of compacting-equalizing operating element of the combined machine

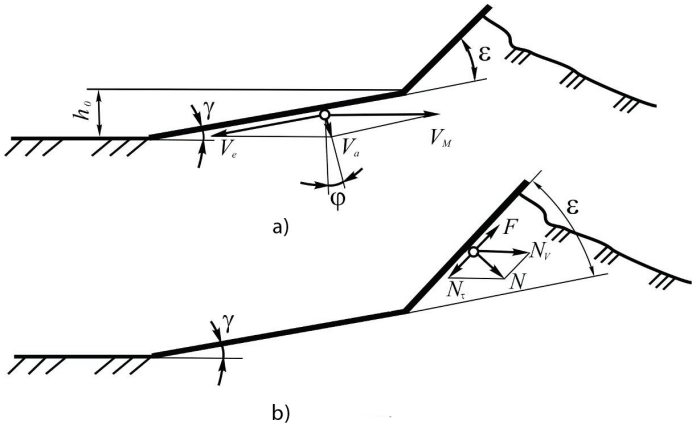

Figure 2. Scheme for determining the installation angle of compacting part (*a*) and bending angle of equalizing part (*b*) of equalizing-compacting operating element of the combined machine

$$H \geq \sqrt{\frac{4Z_н l_н}{\pi\left[ctg\mu - ctg(\beta - \varepsilon)\right]}}, \qquad (7)$$

where $Z_н$, $l_н$ — average height and length longitudinal unevenness of the field surface; μ — soil slope of the drawing prism, formed ahead of the equalizing part of operating element.

Calculations implemented base on the formulas (2), (6) and (7) in terms of $\phi = 30°$, $\mu = 30°$, $Z_н = 0{,}05$ m and $l_н = 0{,}40$ m [2], show that the installation angle to horizon of the operating element must be 30°; bending angle of its equalizing part relatively compacting part — at least 30°; height of equalizing device– at least 16 cm.

Conclusions: Thus in effort to ensure the required quality of soil tillage at minimum energy (power) costs the installation angle to compacting part of the equalizing-compacting operating element must be 30°, bending angle of its equalizing part — at least 30°, height of equalizing device — at least 16 cm.

References:

1. Vygodskiy M.Ya. Reference book on higher mathematics. – M: AST: Astrel, – 2006. – P. 991.
2. Sineokov G. N., Panov I. M. Theory and calculation of soil tillage machines. – Moscow: Machinery, – 1977. – P. 328.

DOI: http://dx.doi.org/10.20534/ESR-17-1.2-242-244

Xudoyberdiyev Tolibjon Soliyevich,
doctor of technical sciences, professor of the Department.
Igamberdiyev Asqar Kimsanovich,
Candidate of the technical sciences, assistant professor.
"Tashkent Institute of Irrigation and Melioration"
Muradov Rahimjon Xakimjonovich,
senior scientific employee-researcher, PhD in Technique.
Agricultural Institute of Andijan, the Republic of Uzbekistan.
E-mail: mrahimjon@bk.ru

Substantiation of parameters of knife spade of the seeder

Abstract: the design of a seeder with knife-type opener (spade) type of a basic runner for autumnal wheat crops in cotton row-spacing is offered. Raises efficiency of technology of cultivation in comparison with traditional the maximum use of a profile of a furrow.

Keywords: requirements, spade, crops, seeder, cultivation, technology, efficiency, knife-type opener, seed funnel, crumple, form of a wedge.

The analyses of researches directed on creation spade for crops of grain crops in row-spacing of cotton have shown about necessity of preliminary studying of a profile of surfaces. Processing of experimental data have shown that depth of a furrow in row-spacing fluctuates from 12,5 to 17,0 sm. This data has allowed choosing the form and parameters of spade (fig. 1).

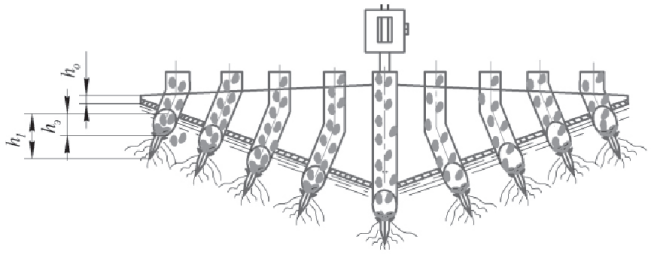

Figure 1. The scheme of spade and a cross-section of a row-spacing of cotton

Technological process of crops proceeds as follows: At movement spade the left and right wings should lean, and slides on a row-spacing profile, copying roughness after preceding processing. Flat knives are similar to a wedge form in groove soil where the seeds submitted a seed funnel keep within. Uniformity and depth of seal are thus maintained. Because the bottom edge seed funnel are located above (at height h) the bottom edge of knifes at seal of seeds, seed funnels are not hammered by the vegetative rests, leaves of cotton and seeds go on till the bottom of a sowing groove without hashing with soil, providing uniform seal on the set identical depth. Thus grooves and a friable zone, from knifes are simultaneously formed slightly condensed seed funnel. Wings, nestling from the vertical loading, sections created from weight about a furrow bottom, limit depth of immersing of knife and form slightly condensed bed of a row-spacing. Knives plunging into soil, cut and move apart it at angle edges, create a friable zone, and seed funnels form small grooves with the condensed bottom where seeds which are fallen asleep by wings keep within. Conditions for a capillary rising of moisture to seeds from the bottom layers of earth are thus created. Such scheme of placing of seeds allows using as much as possible planes of a furrow of row-spacing, providing crops directly and in a protective zone of cotton. If to consider cutting wedge as vertically established rectangular plate, the basic requirement to it — maintenance of a pure cut of soil with the minimum moving of particles on vertical and across. It is possible to reach a correct choice of thickness of a knife and an edge angle of slope to horizon (an occurrence corner). At movement of a direct plate in soil the size of lateral deformation is influenced considerably by a corner of occurrence of its cutting edge in soil. Such deformation occurs at a wedge to an occurrence corner in soil (γ> 900). In this case soil particles are pressed downwards and squeezed out then in sides by a cut plate of a crack. Thus with increase in a corner of occurrence of plate compressing force increases, cave-in downwards increases, and lateral deformation decreases to the limits caused only in the thickness of a plate [1, 158–160]. Affirms [1, 194–197] that spade with an occurrence obtuse angle it is expedient to apply only at work on the soil littered with the vegetative rests.

The made observations prove to be true results of tests of the experimental sowing car, spent in 2008 in an educational a pilot farm of the Tashkent institute of irrigation and melioration (ТИИМ) have been thus tested spade with an input acute angle in soil.

In experiences accumulation weed plant and cotton leaves before spade seeders was observed. It has once again proved about expediency of application of working bodies with an occurrence obtuse angle at autumn wheat crops in cotton row-spacing. The carried out analyses have shown that a question on deformation of soil by a wedge which is of the basic part spade of seeders at crops winter in row-spacing of cotton, till now are studied insufficiently.

Considering are similar to a knife wedge without a runner as bilateral symmetric, it is possible to reduce its influence on soil to crumple soils lateral sides in a horizontal direction. Supervision have shown that as a result of wedge interaction there is a replacement by it from soil of some volume limited to planes of shift, both in a movement direction, and in a cross-section direction to wedge sides.

Clearly to present, influence process spade similar to a knife wedge on soil, we will consider soil deformation under influence similar to a knife wedge with an occurrence obtuse angle.

Formation of a groove in width to 7,5 sm, caused in the narrow-rowed way of crops of autumn wheat in row-spacing, is based on interaction of a wedge with soil. Thus, it is considered that the wedge is established with cutting loud at an obtuse angle occurrence that is γ> 900.

Researches [2, 65–69] affirm that the corner of a point of a wedge (fig. 2) will differ in this case from its constructive corner of a point, that is

$$tg\iota' = tg\iota \cdot \sin\gamma \qquad (1)$$

The formula for definition of a constructive corner of a point is recommended

$$i = arctg\frac{tg(\frac{\pi}{2} - \phi_c)}{\sin\gamma} \qquad (2)$$

At groove formation in row-spacing, the occipital facet of a wedge condenses a layer of earth in size 0,5 δ therefore there is jet force $R_з$.

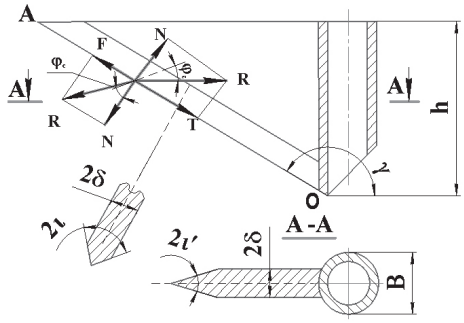

Figure 2. The scheme to definition of the corner of a point of a knife in the form of a wedge

If it is accepted that resistance of soil crumple is proportional to deformation size distribution normal pressure of soil upon an occipital facet of a wedge will have the triangle form. The maximum value p pressure of soil in points in and with equal

$$\rho = q \cdot \delta \qquad (3)$$

Where: q — proportionality factor (factor volume crumple soils);

δ — half thickness of a wedge.

Equally effective $N_з$ elementary normal pressure of soil upon napes of an edge of a two-sided wedge, obviously, it is equal

$$N_з = \frac{A\bar{B} \cdot \rho b}{2} \qquad (4)$$

Where: b — length of an edge of a two-sided wedge with an occurrence obtuse angle.

Substituting in expression (4) values $A\bar{B} = \frac{\delta}{\sin\iota}$ and considering expression (3), we receive

$$N_з = \frac{q \cdot \delta^2 \cdot b}{2\sin\iota} \quad (5)$$

As $b = \frac{h}{\sin\alpha}$ let's receive $N_з = \frac{q \cdot \delta^2 \cdot h}{2\sin\iota \cdot \sin\alpha}$ (6)

Force $R_з$ forms with equally effective $N_з$ a friction corner ϕ_c, therefore its size can be defined according to dependence

$$R_з = \frac{q \cdot \delta^2 \cdot h}{2\sin\iota \cdot \sin\alpha \cdot \cos\phi_c} \quad (7)$$

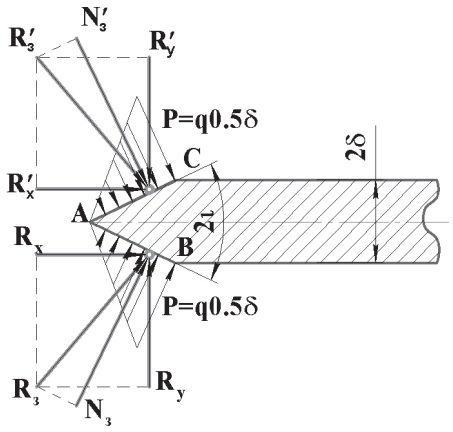

Figure 3. The scheme to definition of pressure of soil on a nape of a knife in the form of a wedge

The lateral component of this force is equal

$$R_{зу} = q \cdot \delta^2 h \frac{\cos(\iota + \phi_c)}{2\sin\iota \cdot \sin\alpha \cdot \cos\phi_c} \quad (8)$$

Or $R_{зу} = 0{,}5 \cdot q \cdot \delta^2 h \cdot \sin\alpha \cdot (ctg\iota - tg\phi_c)$ (9)

The horizontal component of this force is equal

$$R_{зх} = 0{,}5 \cdot q \cdot \delta^2 h \cdot \sin\alpha \cdot (tg\phi_c \cdot ctg\iota + 1) \quad (10)$$

From the expression (8) follows that on size of force $R_{зх}$, aspiring it is pushed out soils an occipital facet of a wedge, the greatest influence is rendered by thickness of an occipital facet of a wedge.

Analyses showed [3, 328–330] that the greatest widths of an occipital facet, admissible at work of ploughs at soil plough were in limits 6…11 mm.

Being based on this data, it is possible to define a limiting thickness of a wedge 2δ

$$\delta = e \cdot \sin\iota \quad (11)$$

Where: e — length of a facet, mm.

Slope, $\overline{e} = 8мм, \iota = 22{,}5^o$ wehave $\delta_1 = 8 \cdot \sin 22{,}5^o = 3{,}06мм$.

Being based on these calculations it is possible to believe that stability of a course is similar a knife wedge is provided, if its thickness 2δ is in limits of 6,12 mm.

Then $\sin\iota = \frac{\delta}{e} = \frac{3{,}06}{8} = 0{,}3825$

$$\iota = \arcsin 0{,}3825 = 22{,}5^0 \quad (12)$$

It is considered [3, 324–326] that the corner γ should be such that at knife movement cutting with sliding along cutting edges was carried out AO (fig. 2).

That the soil did not gather in a heap, it is necessary to meet condition $T > F$, after statement of value of forces leads to a following inequality

$$\gamma > 90^0 + \varphi_c \quad (13)$$

Where: T — force of resistance to shift; F- force of a friction.

Analyses have shown that at $2\iota = 45^o$ for various values of a corner of a friction of soil on steels, a corner γ is in limits 135°–152°.

As a conclusion, at movement of a knife with an occurrence obtuse angle in soil that cutting with the sliding was carried out, the necessary corner of occurrence of a wedge should be within 1350–1520, thickness of a wedge of within 6 sm and the corner of its point 2ι within 44° … 46°.

References:

1. Rudakov G. M. Osnovi mehanizaci seva hlopchatnika. – T. "Fan", – 1974.
2. Nurabaev B. U. Vibor tipa i obosnovanie osnovnih parametrov rabochega organa kultivatora dlya mejduryadnoy obrabotki. dis. kand. teh.nauk. Yangiyul, – 2006.
3. Sineokov G. N., Panov I. M. Teoriya i raschet pochvoobrabativayushih mashin. – M.: Mashinostroenie, – 1977.

DOI: http://dx.doi.org/10.20534/ESR-17-1.2-244-247

Shamsieva Makhbuba Badrievna,
Senior scientific employee-researcher,
Tashkent institute of textile and light industry, Republic of Uzbekistan
E-mail: maxbuba-29@mail.ru

Kodirov Tulkin Jumaevich,
Technical sciences associate, professor,
Tashkent institute of textile and light industry,
Republic of Uzbekistan

Chromatographic identification of esters on the basis of fatty acids with alcohols

Abstract: The conducted chromatographic identification of the ester. It identifies the main physic-chemical properties of the ester. Included in the ester are secondary products of local industries, and are available raw materials.

Keywords: Greasing, ester, fat, gas-liquid chromatography, distilled fatty acid, fusel oil.

Currently, significantly increased the use of synthetic fatliquoring substances for the fattening of the various kinds of skins. This is due to change and reduction the raw material base of natural fats. However, synthetic fatliquoring cannot fully replace natural fats,