

TECHNICAL SOLUTIONS FOR CREATING A MECHANISM FOR ISOLATION OF ERGOT FROM RYE GRAIN

¹Saitov V.E., ²Gataullin R.G., ³Saitov A.V.

^{1,2} Federal Agrarian Scientific Center of the North-East n.a. N.V. Rudnitsky,
Kirov, Russia, (610007, Kirov, Lenin Str., 166 a);
³Vyatka State Agricultural Academy,
Kirov, Russia, (610017, Kirov, October avenue, 133);
E-mail: vicsait-valita@ e-kirov.ru

In the structure of the gross harvest of grain crops, winter rye occupies a special place. It is the traditional and most common grain crop outside the chernozem zone in agricultural production due to its unpretentiousness to the growing conditions, the ability to produce fairly high and guaranteed yields on soils with low fertility. However, rye is often affected by ergot, which is a poisonous impurity [1, 2].

The use of various sieve, air and trimeric separators does not give positive results when cleaning grain material from ergot due to the proximity of their properties and the properties of the culture to be purified [3, 4, 5].

Ergot horns, which are poisonous impurities in the grain material, have a lower density than that of rye and other cereal crops. Therefore, to isolate the horns of ergot from rye seeds, you can use solutions of sodium chloride or potassium salt [6].

The simplest way to isolate the ergot horns from rye seeds is a bath with an aqueous solution of salt with a sieve placed in it, the external dimensions of which correspond to the internal dimensions of the bath. When feeding rye grain, full-weighted seeds sink to the bottom of the bath, and the ergot horns appear on the surface of the solution, which are removed by a net, and then the sieve from which the solution will drain is taken from the bath with full-weighted seeds. In this case, the issue of mechanization of separation of ergot horns from grain material is topical.

For the mechanization of the separation of the horns of ergot from a grain material, a machine has been developed, which consists of a bath, transporters of rye seeds and ergot horns, a bunker with a feeder. Conveyors of rye seeds and ergot horns across the width of the bath are made in the form of belt screens with transverse strips installed at regular intervals along their length. The feeder wall is immersed in a salt

solution and separates the cavity of the bath with a rye seed transporter from an ergot conveyor [7].

Another technical solution is that, in a well-known car, the transporters of rye seeds and ergot horns consist of scrapers installed at regular intervals along their length, which are fixed to closed traction chains, drive envelopes and driven sprockets. The bottom of the bath under the scrapers of the rye seed conveyor at its downstream end is made in the form of a sieve, under which the waste tank is located. A sieve is installed under the scrapers of the ergot conveyor horns, the output part of which is located above the level of the solution in the bath, and the lower end, immersed in the solution, is connected to the reflective plane [8].

The presented technical solutions ensure, due to their constructive execution, a reduction in the specific energy intensity of the technological process, a decrease in metal consumption and unit costs for the maintenance and repair of the machine, and an improvement in the quality of cleaning rye seeds.

References

1. Ocnin B.S., Gorbachev I.V., Terekhin A.A., Soloviev V.M. *Mashiny dlya posleuborochnoj obrabotki zerna* [Machines for post-harvest processing of grain]. Moscow, Agropromizdat Publ., 1987, 238 p.
2. Sysuev V.A., Kedrova L.I., Lapteva N.K., Utkina E.I., Vaananen M., Nikulina T.N. *Ehnergiya rzhi dlya zdorov'ya cheloveka* [Rye energy for human health]. Kirov, Agricultural Research Institute of the North-East Publ., 2010, 103 p.
3. Drincha V.M., Borisenko I.B. Application and functionality of pneumatic sorting tables. *Nauchno-agronomicheskii zhurnal*. 2008, No 3 (83), pp. 33-36 (in Russ.).
4. Sysuev V.A., Saitov V.E., Savinykh P.A., Saitov A.V. Cleaning grain of ergot. *Sovremennye naukoemkie tekhnologii*. 2015, No 6, pp. 46-49 (in Russ.).
5. Saitov A.V. Features of the operation of photoseparators for cleaning grain and seeds from impurities. *Metody i tekhnologii v selektsii rastenij i rastenievodstve: monografiya* [Methods and technologies in plant breeding and crop production: mon-

ograph]. Kirov, Agricultural Research Institute of the North-East Publ., 2016, pp. 352-355 (in Russ.).

6. Pavlovsky G.T., Ptitsyn S.D. *Ochistka, sushka i aktivnoe ventilirovanie zerna* [Cleaning, drying and active ventilation of grain]. Moscow, High school Publ., 1972, 256 p.

7. Sysuev V.A., Saitov V.E., Savinykh P.A., Saitov A.V. *Mashina dlia otdeleniia sporyn'i ot semian rzhi* [Machine for separating ergot from rye seeds]. Patent RF, no. 2616037, 2017.

8. Sysuev V.A., Saitov V.E., Gataullin R.G., Saitov A.V., Utkina E.I., Sheshegova T.K. *Mashina dlia otdeleniia sporyn'i ot semian rzhi* [Machine for separating ergot from rye seeds]. Patent RF, no. 2667066, 2018.