

Collateral Profit

How to Make Straw Work for You, Not Against the Harvest

This season experts are predicting more straw on the fields—thanks to abundant rain in April the greenery grew vigorously. Winter crops reached to a man’s height in some places. After the harvest everyone faces the question of what to do with this “richness.”

Burn It?

The mild winter benefited not only the crops but also many pests and diseases. As a result the percent of winter wheat fields infected with powdery mildew and various other diseases in Krasnodar and Stavropol kraies reaches and even exceeds 50% according to the latest data from the Russian Agricultural Center. The situation is no better in Rostov oblast. As we know, crop diseases remain and are transmitted to the next season’s crops through crop residues. When there is limited crop rotation and insufficient measures for crop disinfection, the temptation to burn the straw is great for many agrarians. But this is not a solution in the opinion of Alexander Rodin, president of the Rostov ACCOR farmers’ association.



Swedish guest Josef Appell (left) is sure Russian farmers can make money quickly if they stop burning crops residues.

By the way

In spite of the stereotype, stubble burning does not help in the battle against crop pests and diseases, say the scientists of the Federal State Institution State Center for Agrochemical Services “Rostovskii.”

Most insects hide in the soil and are not killed by burning. Cereal chafers and beetles return to the burned field after agrochemical processing, and the number of greenbugs even increases on such fields.

The Russian agrarian triangle has suffered successive droughts in recent years as a result of climate change. What at first seems a global problem –climate change—is directly connected to local landscape fires and burning, he explains, and very high penalties, sometimes up to 500,000 rubles, do not stop it. Burning is secret and out of control, easily blamed on the casually discarded cigarette butt or vandalism. But old-timers say that the result of such uncontrolled fires is a lot more dangerous. They have seen many burned forest belts, continues Alexander Rodin.

Ecological problems can seem abstract, and straw produced by agriculture seems like surplus production. When tossing a match into a pile of straw, few people stop to think they are burning their own money, says Elena Kobets, project director of the Environmental Rights Center “Bellona.” How to extract profit from this surplus production was the topic of the Field Day in Matveevo-Kurganskii region, organized by Rostov ACCOR and international ecologists on the fields of the farm “Olimp.”

The Root Feeds the Root

In today’s world straw is the only available way of adding organic material to the soil. The only requirement is that it be properly distributed on the soil, says Doctor of Agricultural Sciences and Professor Alexander Labyntsev.

The way to use straw can differ depending on how much there is on the field and on planting and soil management techniques. With low-till soil technology, 1.5 tons per hectare is sufficient for mineralization, with tillage—up to 8 tons/hectare, and with plow technology with fallow soil and crop rotation where there is a lack of multi-year grasses and a 30-40% share of cultivated crops—more than 10 tons/hectare. The amount of dry organic material in one ton of straw equals 3.5 tons of manure.

Today the so-called “medium” soil management technology is the most common. The straw is chopped and lacerated to 5 cm., the soil is loosed with no moldboard and the straw incorporated. Compensatory nitrogen is added to speed mineralization. But here a few problems arise. First, the cost of the operation (1,500 – 3,000 rubles per hectare). Second, with little rain and more than 5 tons of straw per hectare, if winter wheat is sown after winter wheat, it will most likely die.

You may have noticed more than once that some winter wheat plantings turn yellow in the fall, says Alexander Labyntsev. Farmers often think this is due to a nitrogen deficit and they try to add more fertilizer, but this is not the case. In the dry months of July and August the straw does not decay because of lack of moisture. In September, the first month of decomposition, phenolic compounds are produced, which are absorbed by the winter wheat growth. As a result, the crops start to “wilt”, turn yellow, and they may die.

Alexander Labyntsev’s recommendation in this case when there is a lot of straw and little rain is that the best thing to do is direct seeding, not plowing the straw under but chopping it evenly and spreading it on the surface of the field. In this case, if the farmer does not have enough resources to add compensatory nitrogen, it is better not to sow winter wheat on winter wheat but plant peas instead. This crop is better suited to prolific straw in the soil and is a good precursor to winter wheat. There are also nuances with fertilizer use. For example, with spring barley, the best kind of fertilizer to speed mineralization of crop residues is ammonia sulfate or calurea.

In general, the Don expert supported the use of straw to improve soil fertility—it retains moisture and activates microbiological populations. In Rostov oblast there are farmers that have incorporated straw, not burned it, for more than 20 years.

Fertilizer from the Air

Doctor of Agricultural Sciences and Professor at Don State Agricultural University Nicolai Andreyevich Zelinskii explained his view on the possible uses of crop residues. For many years he has both researched zero technology and binary planting and successfully implemented them on his own farm.

“I have always been interested in how biological systems work in nature and used this to inform my research. Crop residues are a store of plant nutrition that must be used,” says the scientist.

In answer to farmers’ questions about where to get money for compensatory nitrogen, the Don scientist explained completed seriously, “from the air.” The atmosphere consists of 78% nitrogen, so why not use it in agricultural production. Legumes such as medick, sainfoin, vetch, peas and soya do this very well, extracting nitrogen from the air and transferring it to the soil. Even without animals, you can productively grow these plants as cover or green manure crops, and it is also useful to use the seeds,” Nicolai Zelenskii affirms.

The words of the Don scientist resonated not only with many Russian and Rostov farmers, but also three thousand kilometers away in southern Sweden. Gustav Ramel, the owner of a large farm by local standards (950 ha.), and manager Josef Appell shared their experience with the Don farmers in the use of zero technology and binary crop planting.

“If I had to account to the Swedish Minister of Agriculture, I would say that I do not burn for ecological reasons, which are very popular with us,” said Gustav Ramel to the audience. “But I can admit to you in secret that the only reason I adopted this technology is because it is advantageous.”

Land is very expensive in Sweden and would be 10 million rubles a hectare recalculated in our currency. It cannot be inherited by Swedish law but must be purchased at market rates. In order to buy land from his father, Gustav took out a bank loan and now has to repay the interest. When he calculated the sum necessary to pay the bank, Gustav looked at what he could do to lower his expenses and improve soil fertility. In 2005 the farm moved to minimal technology, and to zero technology since 2010.

The results the Swedes are getting on their land (taking into account its quality with more than 50% clay, loam and sandy soil), were slightly shocking to the southern Russian farmers: spring barley—68 tons/hectare, winter barley (triticale)—85 tons/hectare, winter rapeseed—41 tons/hectare, sugar beets—100 tons/hectare (calculated as sugar output). And this is not excessive. “This year we will beat the national record for sugar beet production,” he promises.

He listed the main advantages of moving to the new technology as lower fuel costs (saving at least 5 liters/hectare, moving away from a lot of heavy and powerful machinery, and lower labor costs. “Our main workers are now earthworms, which ideally loosen the soil for free, or at least for a little food in the form of crop residues—hay and straw,” jokes Gustav. They gather the extra hay and straw from the field, press it into briquettes and use it to heat both the home where the farmer’s family lives as well as all the outbuildings, as well as to dry the grain. This way they save some money on heating—three kilos of straw saves 1 liter of heating fuel.

Translated by Gail Stevenson, ICCI Russia Program Director

Good Uses of Straw in Russia

Inexpensive Insulation

Rostov'er Ilya Guk built a wooden home and insulated it with straw. We talked about his experience in Krestianin N^o. 27 from June 6, 2011. This insulation is ten times cheaper than even the most economical foam, and it is also ecologically sound and reasonable effective. Last winter the proponent of ecological technology was not disappointed—it was warm at home and the temperature is easy to regulate with the heated floors.

Blocks for Pet Stores

Victor Filin of Novocherkassk in Rostov oblast gathered materials for the production of blocks from hay and straw. The equipment is in demand by entrepreneurs, who buy raw materials from farmers and sell ready-made blocks to pet stores for 80 rubles for 300 grams.

Autonomous Energy Supply

In the town of Millerovo in Rostov oblast is a boiler that runs on residue from an oil extraction factory (sunflower husks). This boiler supplies heat and hot water not only to the factory but to some nearby homes as well. However, there have also been less successful attempts to use straw for home heating. In 2011 in Zavetinskii region a factory was built to make briquettes from straw but they produced lots of waste and smoke so people refused to use them. In Stavropol the idea to use straw as fuel for boilers was also unsuccessful after the experience of the village SNIISK in Shpakovskii region. There they rebuilt a boiler for 24 million rubles but the new equipment quickly went out of service so the boiler continued to use gas. Specialists explain that this misfortune was caused by improperly assembled equipment.