

Fewer Passes, More Soil Moisture

Mistelbach, Austria

In Lower Austria, Simon Pernold runs 160 hectares of arable land with his parents. The farm uses minimum tillage, cover crops and targeted technology to protect the soil and reduce water loss.

by Gabriele Dell'Orto



Simon Pernold with John Deere 6155R in the background

Simon Pernold with John Deere 6155R in the background. **Simon Pernold** welcomes us with the confident look of someone who, at 24, has already chosen his career path. He works on the family farm with his parents and has clear ideas about farming. «We are a family farm: my parents and I manage 160 hectares of arable land, with wheat, barley, maize, sunflower and sugar beet as our main crops».

The Pernold family has farmed this land for generations. We are near Mistelbach, in Lower Austria, north of Vienna and not far from the Czech border. The capital is only about half an hour away, but the landscape is already typical of Central European farming: wide fields, gentle hills and constant wind. It is not a mountain area, but it is not completely flat either. Water is not always available, and every field operation must also be planned with soil moisture in mind.

A Family Farm Between Continuity and Change

The history of the farm goes back to 1830. Almost two centuries of family continuity have led to today, with a very different way of farming. Over the last twenty years, for example, the Pernolds have moved towards minimum tillage systems, where crop rotation is the first tool for keeping the farm in balance. The rotation follows a simple logic: one year cereals, the following year a break crop such as maize, sunflower or sugar beet. This year, the land is divided into about 60 hectares of cereals, 30 hectares of maize, 37 hectares of sunflower, 12 hectares of sugar beet and a small area of permanent grassland. Sunflower has gained more space in recent years, as Simon explains: «This year we have more than usual. The price is interesting and it grows well in our area, especially because it does not need large amounts of water».

Sunflower is well suited to the dry conditions of Lower Austria, where rain is never guaranteed and the wind dries out the soil. Maize also copes quite well, although it suffers when the season becomes too dry. Sugar beet, on the other hand, is more demanding. «It is the most difficult crop», Simon admits. «You have to go into the field six or seven times for crop protection treatments. If you make one mistake, you risk compromising everything. We also always have to hope for rain, because irrigation is not possible in this area». The sugar beet is delivered to Agrana, the main reference point for the Austrian sugar beet sector. Many farmers in the area are reducing their sugar beet acreage and looking for crops better suited to today's conditions. Sunflower is one of them: it fits well into the rotation and currently offers interesting market prospects.

Minimum Tillage and Water Management



Six-row Monosem precision planter paired with the John Deere 6155R



Sugar beet harvesting with a Ropa Tiger 6 harvester

The Pernolds have been practising minimum tillage for a long time, and the plough is now only a past memory. «We no longer use it. For about twenty years we have been working with minimum tillage systems. Reducing field passes and keeping moisture in the soil are essential in our area».

Before sowing cereals, they generally make just one shallow pass, around five to ten centimetres deep, with a disc cultivator. For row crops such as maize, sunflower and sugar beet, the soil is worked even more shallowly, at around three to five centimetres, using a spring-tine cultivator.

In Austria, this technique is known as *Mulchsaat*: sowing into soil that is partly covered with crop residues, which helps reduce erosion and moisture loss. «We try it on all crops: maize, sunflower, sugar beet and cereals. If conditions allow, we work shallowly. If needed, we go a bit deeper, but always without turning the soil

layers and while limiting the number of passes».

The main reason for these choices is the limited availability of water. «It is often very dry here. We have no irrigation, so we can only hope for rain». Wind is another factor, and it is very common in Lower Austria. «Sometimes it rains in nearby regions, but the rain does not reach us. The wind carries it away to other areas and also makes the land even drier».

In these conditions, every unnecessary pass has a double cost: it uses fuel and makes the soil lose moisture. This is why Simon is also interested in no-till, which could play a bigger role in the coming years. «In the near future we will have to move more in this direction: fewer field passes, less work and more efficiency. We need to cover more hectares in less time, with lower costs, while keeping good yields and healthy soils».

Cover crops – a strategic investment



Rauch Axis EMC fertiliser spreader working on wheat

Cover crops are another key part of the system. They are normally sown in August, after the cereal harvest. Winter frost kills the crop naturally, so in spring usually only one pass is needed before sowing. «With cover crops we have a lot of organic material on the soil and no problems with autumn erosion». Maize also helps maintain organic matter. Simon harvests the grain and leaves much of the crop residues in the field. «When we harvest maize, we only take away the grain. The residue stays in the field, and that is good for humus and soil structure.» Since the farm has no livestock, it does not have its own manure or slurry. Once a year, digestate is bought from a nearby biogas plant and spread on the fields. Together with crop residues, cover crops and shallow tillage, this helps increase organic matter. Maize is sown in April, when the soil is warm enough. Sugar beet comes first, between early and mid-March, followed by sunflower and then maize. The same planter is adapted to the different crops by changing the discs. It is a practical solution that helps the farm make the most of the machines it already has and keep

costs under control.

In spring, work quickly becomes hectic. First comes fertilisation, then soil preparation, then sowing. After that come crop treatments and, when needed, further fertiliser applications. Sugar beet remains the most demanding crop, because it requires more passes and leaves less room for error. Sunflower, by contrast, is proving better suited to recent conditions. «Many farmers used to grow sugar beet. With prices getting lower and lower, several are stopping and looking for alternatives. In our climate, sunflower works well both agronomically and economically».

The maize cycle is managed entirely by the Pernold family, using their own dryer and silos. «We dry the maize, store it in the silos and then sell it when we think the time is right. The market is mainly regional, within Lower Austria, but storage gives us more flexibility than selling immediately after harvest». As often happens, good product handling and logistics give the farm more freedom on the market, with the chance to earn a little more.

Reliable Machines and Technology Without Excess

The machinery fleet reflects the Pernold farm's approach: a few trusted brands and investments without excess. For tractors, the choice is John Deere. The farm runs a 6410, a 6800 and a 6155R, with power ranging from 100 to 190 horsepower. The 6410 has a special value for Simon, and not only for sentimental reasons. «In my opinion, it is one of the best John Deere tractors ever. I don't want to sell it, it is a kind of farm memory». The American brand has been on the farm for around thirty years. The relationship with the local dealer is important. «We have a good relationship with the local dealer, but that is not the only reason. The machines work well, they are reliable and we are satisfied. We see no reason to change, because we have never had any major faults or long periods of downtime. Just small issues, as with any other brand». Alongside John Deere, there is also an old classic: a Massey Ferguson 165, now more linked to passion than to daily work.

For harvesting, the family relies on Claas. The latest arrival is a Tucano 580, bought used in Germany. The 2021 machine came to the farm last year to replace a Claas Medion 310, which had become too small for the area to be harvested. «The previous machine no longer had enough capacity and productivity to serve both customers and our own land. With the Tucano, things are much better».

The cereal header is 7.7 metres wide, while maize is harvested with a six-row Drago header. The combine could also handle an eight-row header, an option Simon does not rule out for the future. In addition to harvesting the farm's own crops, «the productivity of the Tucano has allowed us to increase our contracting work in summer and autumn. It is a good way to help cover the cost of the machine in a short time». Simon has few doubts about the brand. «I believe that, for combines, Claas is the best reference on the market. We already had experience with Claas and it has never let us down, both in terms of productivity and reliability».

The soil cultivation equipment fits the choice of minimum tillage. Many implements work at around three metres, a width suited to the farm structure and to the tractors available. Before sowing, they



Cover crop sowing in autumn. Simon uses a pneumatic seeder mounted on the Lemken Rubin disc harrow

normally use a Lemken Rubin disc harrow, while for the other crops they use an AgriFarm spring-tine cultivator. The planter is also adapted to the different crops by changing the discs, so maize, sunflower and sugar beet can be sown with the same machine.



Claas Tucano 580 equipped with a six-row Olimac Drago maize header



Claas Tucano 580 harvesting common wheat

The main equipment also includes a Rauch Axis fertiliser spreader and an Amazone UG 3000 Super sprayer with a 21-metre boom. The sprayer has automatic section control every three metres. «It is not single-nozzle control, but section control is there and it is very useful, especially on irregular fields or where headlands are complex».

The farm also uses GPS systems and is testing prescription maps for fertilisation, based on satellite images. The maps show where more or less fertiliser should be applied, and the tractor adjusts the rate in the field. «For now, we are still testing. I like it, but you cannot judge a technology after just one year. It takes time to understand whether it really works».

For sugar beet, the choice is different. The crop requires several passes during the season, but for harvesting Simon relies on a nearby contractor with Ropa machines. Investing in a specialised beet harvester would not be justified by the current workload.

The same attention to costs also guides future investments. «At the moment it is quite difficult to ensure good profitability for farmers. Product prices are not very good, while machines are extremely expensive. I hope things improve, but in the meantime we always have to keep improving

and work as well as possible». The decision on a new tractor has been postponed for now, but Simon knows that every purchase will have to be considered carefully.

Balance Without Excess

The Pernold family follows a balanced approach: open to innovation, but without excess. «Technology has to prove its value in the farm's own fields. Machines and inputs have become very expensive, so that every investment has to be justified».

For Simon, the future will come through gradual improvements. More efficiency, greater attention to the soil, targeted use of technology, a gradual move towards no-till and more careful management of cover crops are the next challenges. «Our goal is to produce more efficiently, keep good yields, have healthy soils and build organic matter», Simon sums up. «Especially in Lower Austria, where the wind can carry the rain away and water cannot be taken for granted».

The farm looks ahead without losing its link with its own history. Since 1830, much has changed, but not the bond with the land and the values passed down through the family farm business. With one clear belief: the future of the farm starts first of all with the soil.



John Deere 6410 working in sugar beet with an Amazone UG 3000 Super sprayer equipped with a 21-metre boom