THE “YIELD BOOST” PROGRAM IS REVOLUTIONIZING EURALIS WINTER OILSEED RAPE PORTFOLIO

With more than 7 million hectares in Europe, the winter oilseed rape is an important crop combining high profitability for farmers and agronomic interest for the farm rotation. In 2007, EURALIS decided to review entirely its winter oilseed rape breeding strategy in order to fit better the farmer’s needs. The first products coming from this new Yield Boost program are demonstrating outstanding results. Those products are destined to guaranty to the farmers Performance, Protection and Profitability.

After the successful registration in 2014 of open-pollinated line ES MAMBO in the French official catalogue, the new Euralis hybrid ES IMPERIO has obtained the best official registration results in French, Polish and Slovakian official trials in 2015, due to its potential and good adaptation capacity. In addition to these successes, several new hybrids are expected to be registered in 2016. Those innovative products are on the final stages of the registration in different European countries.

“Yes, Euralis is back as one of the most important seeds company in winter oilseed rape. We can really talk about a new product flow” explains Thomas FOUBERT, head of the WOSR breeding program. “The achievements of this success are based on a completely new breeding strategy implemented in 2007. The strategy is aimed to obtain a maximal heterosis effect. Inspired by the corn selection process, high technological tools have been developed to help the breeders in screening new genetic sources. Four main driver axes have brought the revolution to the Euralis’ research program.”

Focus on HERETORIS benefits

Every year, 10,000 rapeseed parental lines are studied in the nurseries. The goal is not to screen them for their agronomic interest as open pollinated lines but really to select them for their combining ability and their capacity to deliver a maximal heterosis effect on parental lines in a hybrid. Every year, Euralis creates 4,000 new hybrids, among which only 2-5 will be launched on the market. The selection process is very severe to insure a real added value to farmers with elite genetics.

Wide usage of di-haploidization and molecular marking technologies

The usage of cutting-edge technologies has really fastened the genetic progress. Dihaploidization (DH – lines) allows creating new inbred lines in only few months. The selection and hybridization decisions are managed by the molecular marking technology allowing to characterize the genetic back-ground of the inbred lines, and to better predict the heterosis benefits.

Research investments multiplied by 3 in 5 years at European level

Euralis invests every year 17% of its turnover in the research. For the winter oilseed rape, the program tripled in the last 5 years. Every year, the new varieties are tested on a broad, integrated, trials network all over Europe to measure the yield potential, the agronomical behavior and climatic adaptation. Six main research stations are concentrating its efforts of the rapeseed breeding.

Clear selection targets

Four main selection targets are clear priorities for our breeders in everyday workflow:
- **Yield**: A maximal and stable yield to guaranty the best profit to the farmers
- **Phoma resistance**: The combination of genes delivering vertical resistance placed on a highly tolerant genetics which allows obtaining a very safe Phoma protection system for the rapeseed hybrids, even for the regions with harsh attacks of the disease. In addition to Phoma, the accent is put on Venturia, Club Rot and Light Leaf Spot tolerances improvements.
- **Winterhardiness**: An extensive screening program has been developed in the Continental Europe in very hard winter conditions to breed specifically for this important criterion. Numerous development stages are observed to get an effective mechanism of the winterhardiness: autumn development, winter entering, factors of the vegetation restart, temperature resistance, etc.
- **Oil content and quality**: The analyses of the oil quality are realized with the NIRS automats in the laboratory for all our rapeseed products after the harvest. Global oil content, protein level, Omega 3 and Omega 6 content are on focus. However recent investments for the improvement of the harvesting machines let us do the same analyses directly during the harvest time. So the selection by oil quality has been accelerated.

As a conclusion, the “YIELD BOOST” winter oilseed rape generation, with ES IMPERIO as first hybrid followed by ES CESARIO, will allow farmers to benefit from a really boosted performance. Euralis Semences strongly invites you to try newly coming hybrids so that you can feel that performance!
The development of the winter oilseed rape is considered to have two main periods:

1. Sowing, Objective: Quick and Homogeneous Emergence

- To ensure the plant implantation means to get a quick and homogeneous emergence, strong and covering rape plants which express their needs. It is essential to reach the 8-10 leaf stage before winter comes.

- Foster the rooting by soil preparation: the main root is in the compacted soil zones. In this case the objective is to create a good soil structure on 30 cm depth in order to foster the rooting phase and root development. It will also limit the impact of frost and drought before the harvest. For the continental zone it is recommended to prepare the soil just after the harvest to preserve the humidity level and to get the excellent overall condition.

- Saw at the “right date” — The optimum period of sowing is between 15th of August and 15th of September depending on the geographical zone. The capon seed could be contained in a soil with a risk of germination quality loss, which means that it is possible to sow in a dry soil and wait the precipitation to observe the germination. Optimal sowing depth is around 2 cm.

- And sow with a “good density” — PHB nowadays hybrid it is highly important to sow the seed with low density to optimize the yield target to be born. All plants* after winter.

This process is simple with lower powers in the field, the hybrids are able to reveal their maximal branching capacity. Moreover it decreases the competition between the plants and increases the frost resistance.

2. Autumn and Preparation for the Winter

The fall stage of the development is very important in terms of the development of the main root.

- Literally, the root is the heart of the rapeseed. A healthy main root ensures a good plant behavior, frost and drought resistances, yield optimization.

- It is also important to have good productivity of the plant and its normal development, without stem elongation.

Check-in point: before the winter a good sowed plant has to have from 3 to 8 leaves and a main root from 15 to 25 cm long, with a diameter of 3 to 5 mm.

ES Darke is best hybrid in our range regarding stem elongation resistance.

3. Winter Entrance and Frost Tolerance

The varieties are more or less tolerant to low temperatures during the winter. However this tolerance is strongly correlated with the stage of development of the plant before the winter. In order to get a good appearance the rapeseed plant have to be well rooted, with strong shoot elongation, with a long main root of 15 cm in diameter and on the stage of 8-9 leaves.

ES MERCURE, Optimal frost resistance

4. Rest of vegetable: building the yield

After winter, the rest of vegetation is another important period on the lifecycle of the rapeseed. At this moment, the branching capacity is determined. The hybrid technology offers a high branching capacity that assure the yield.

So it is important to create favorable conditions for branching by changing the light density (45-60 plants/ha in general) and to bring good nitrogen nutrition just before the restart of vegetation. The nitrogen input should be fractioned (total need divided in 2-3 applications).

Solutions proposed by Eurofloras: Eurofloras breeds hybrids varieties with a high branching capacity. This ensures a high and stable yield.

ES MERCURE has an excellent branching capacity.
Phoma (Leptosphaeria maculans) is one of the main diseases of the rapeseed. A strong and early Phoma attack can cause yield losses up to 5 q/ha. The best way to control this disease is to choose varieties with a good resistance and to combine them with right agronomical practices.

**SPECIFIC RESISTANCE**

Specific resistance is a control of the fungus by few main genes, called gene RLM (Resistance to Leptosphaeria Maculans). This specific resistance protects the plant from the early stages of development. To be effective, the RLM gene of the plant has to recognize the same specific avirulence gene of the fungus. It means the RLM gene has to be specific to each type of the Phoma form. If the RLM gene matches the Phoma form there would be no macules observed on the leaves. Otherwise the resistance doesn't exist.

A specific resistance can be circumvented by two violent Phoma strains which have different avirulence gene. In few regions, the RLM 7 gene has been observed already bypassed in 2010. Later, in 2013 a very fast evolution of the Phoma population has started and as a consequence the risk of resistance failure had been increasing.

So, for the better protection of the yield, more secure solution is to combine specific and quantitative resistances to Phoma.

**QUANTITATIVE RESISTANCE**

Quantitative resistances are controlled by several genes with partial effects on the fungus of Phoma. In order to have the best quantitative resistance level, a variety should have as much as possible the accumulation of the resistance genes. On the opposite of specific resistance, quantitative resistance limits the development of the fungus inside the plant, but didn't block the entrance of the fungus. So in that case some macula can be observed during autumn period. This resistance is partial and variable between years but can control a large panel of strains.

The number of gene involved in that resistance is very important, it's more difficult for the Phoma to get in, means this kind of resistance is more stable during the time.

A selection for the quantitative resistance of a variety is determined in the field with the G2 scoring method. While specific resistance is checked in the laboratory conditions.

Specific resistance laboratory test is rather simple. A sample of the hybrid is sown. When the plants achieve a cotyledon stage the injuries on the leaves are provoked and an inoculum with known types of specific fungus is dropped. Several weeks after, a visual check can be done on the plants sensible or tolerant to a specific Phoma strain.

G2 scoring is done during the flowering time in the field. First of all, it is necessary to cut the plant at the collar to observe the size of the necrosis. Notations for the necrosis presence are done 2 to 8 weeks before the harvest, with a sample of 40 plants by plots. The plants are separated into different classes in function of the level of necrosis. Plants with insects (baris, fleas, etc.) or affected with sclerotinia are not taken into account. Observed data are used to calculate an index calls G2. It corresponds to the level of varietal susceptibility to phoma.

In a summary, you have to remember that with specific resistance there no Phoma spots on the leaf if the RLM gene controls a specific type of the fungus. With quantitative resistance you can observe presence of Phoma spots, but there would be no impact on the yield.

**EURALIS SEMENCES AXES OF THE BREEDING TO FIGHT PHOMA**

Due to the importance of the development of Phoma fungus, as well as the potential and real yield losses caused to the farmers, Euralis put a strong selective accent on this subject. In a priority breeders concentrate their efforts on the more effective quantitative resistance to accumulate the specific resistances. All the parental lines are systematically screened by G2 method in order to have a strong genetic background of our hybrids. Moreover, wide sources conversion is made in the greenhouses to introduce specific genes with the objective to get optimized hybrids combination.

So you should try newly coming hybrids so that you can feel a new performance of Euralis Semences' portfolio!