



HySEED HYBRID WHEAT

Your efficiency package.

www.saaten-union.com

**SAATEN
UNION**
Züchtung ist Zukunft





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SU Hybrid Wheat. Looking Towards the Future.

Wheat is grown on more land area than any other food crop. It is unrivalled in its range of cultivation, from 67° N in Scandinavia and Russia to 45° S in Argentina, including elevated regions in the tropics and subtropics.

It ranks among the 'big three' cereal crops, with over 600 million tons being harvested annually. Therefore, wheat is the second most-produced cereal after maize worldwide. The many species of wheat together make

up the genus *Triticum*. The most widely grown is common wheat (*T. aestivum*). The archaeological record suggests that wheat was first cultivated in the regions of the Fertile Crescent around 9600 BC.

Since 1985, breeders and researchers of SAATEN-UNION put a lot of effort into the development of high potential hybrid winter wheat varieties. This intensive breeding and production expertise makes SAATEN-UNION the

leading hybrid wheat supplier until now. Hybrid wheat is a key element for a highly competitive and sustainable crop production. Due to heterosis hybrids are more vigorous. It leads to enhanced tillering aboveground and to a better root development underground. Both together result in:

- **Higher yield stability**
- **More vigorous & healthy plants**
- **Better nutrient as well as water efficiency**

Heterosis - Your Advantages



Hybrid wheat demands an adapted cultivation system in terms of sowing time, seed rate, fertilisation and crop protection. The more efficient plants can easily compensate the reduced sowing rate. Hybrid wheat achieves

the necessary yield-forming parameters: ears per sq, grains per ears as well as thousand kernel weight resulting in higher yields compared to conventional varieties. Furthermore hybrid wheat is able to cope

better with less favourable growing conditions. The resilient plants have a superior rate even under difficult growing conditions.

Year by year farmers have to face several challenges: Environmental changes, restrictions in pesticide usage as well as nitrogen applications. Agriculture is continuously changing. Combining highly efficient hybrid plants with sophisticated crop production management is already a solution for many farmers.

By growing hybrid wheat, farmers are able to reduce costs and to ensure their income.

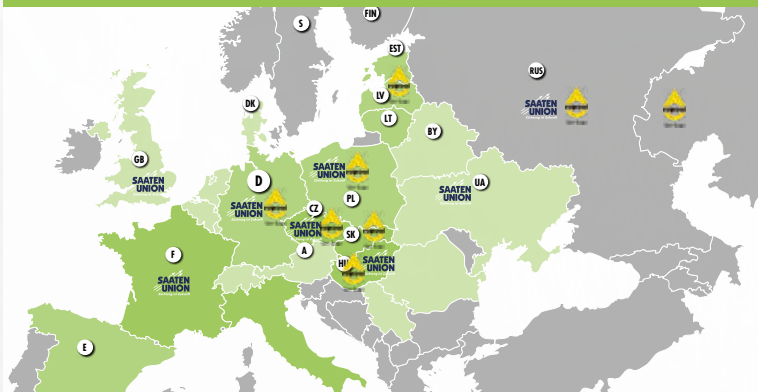
Markets and Market Development.

The first market developed in the mid-90s while the first variety was registered in France. At the end of the 90s HYBNOS 1 was the first hybrid wheat variety listed in Germany.


Step by step hybrid wheat has been conquering the market. Up to now, hybrid wheat has been successfully cultivated on several million hectares throughout Europe.

SAATEN-UNION is the only supplier of commercial hybrid wheat varieties in the world. All hybrid wheat varieties

Hybrid Wheat - An International Crop



Hybrid wheat markets



on offer are based on the production technology of SAATEN-UNION. The technology is based on the chemical hybridizing agent (CHA; Croisor® 100) which is used for chemical sterilisation in the hybrid seed wheat production.

The European winter wheat market requires well adapted high-performing varieties. The hybrid wheat varieties of the SAATEN-UNION meet this challenge.

Two plant breeding stations, one in France and another one in Germany, are providing varieties which can fulfil the market demands. The resulting versatile portfolio of varieties enables

Europe-wide marketing. Varieties are available ranging from very early to late maturity as well as in different quality groups. Marketing and sales activities are mainly coordinated by SAATEN-UNION and Rapool subsidiaries. Furthermore, SAATEN-UNION cooperates with strong partners like Elsoms Seeds in the United Kingdom, Rv Venturoli in Italy or Semillas Fitó in Spain.

Core markets at the moment are France, Hungary, Italy, Czech Republic, Slovakia and Germany. In these countries hybrid wheat is an established product. Expertise in the cultivation of hybrid wheat was enhanced

by customer-oriented support. The result speaks for itself: An innovative and successful crop production system based on hybrid wheat. In other countries such as the Baltics or Romania or CIS-countries like Belarus or Ukraine winter wheat is under development. Hybrid wheat is an innovative product. SAATEN-UNION will use this potential to expand potential markets.

SAATEN-UNION is convinced that hybrid cereals are of major interest. Equipped with its current technological edge, it deploys all of its know-how to explore the paths leading to the hybrid wheat of tomorrow.

Usage and Benefits.

The range of applications for hybrid wheat is not fundamentally different from that of regular wheat.

Human nutrition:

- Bakery products like bread and biscuits
- Malt production

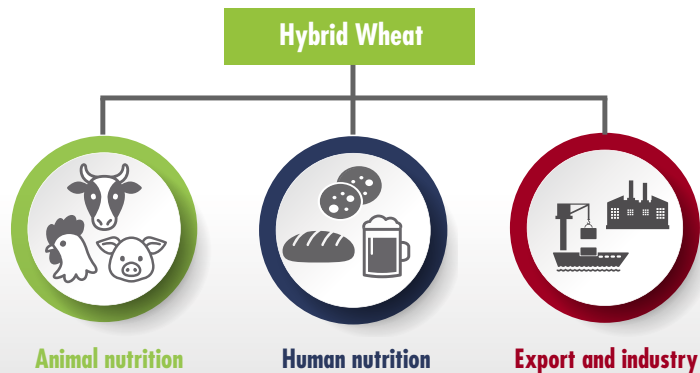
Animal nutrition:

- Grain

Commodity for export and industry:

- Straw production

Possible uses of Hybrid Wheat



However, hybrid wheat cultivation benefits from the effect of heterosis. Heterosis is the increased performance of a cross between two homozygous genotypes compared to the average of the two parents.

This increased performance contributes to yield increase, improved yield stability and increased stress tolerance. Heterosis is also noticeable in the external appearance of hybrid wheat plants.

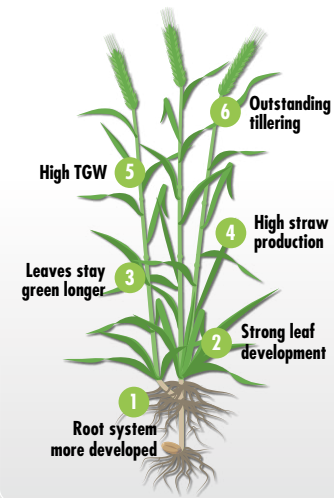
- **Better ear fertility**
- **Higher thousand grain weight**
- **High biomass due to dense foliage and thick stems**

- **Stay Green Effect**
- **Very good tillering capacity**
- **High root mass**
- **Very well developed root system**

The effect has been proven by numerous scientific studies. However, the heterosis in self-pollinators (wheat, barley) is smaller than in cross-pollinators (corn, rye).

At this point it is very important to emphasize that the effect of heterosis can be supported by an adapted technology to exploit the enormous potential of wheat hybrids (see chapter "General Growing Recommendation").

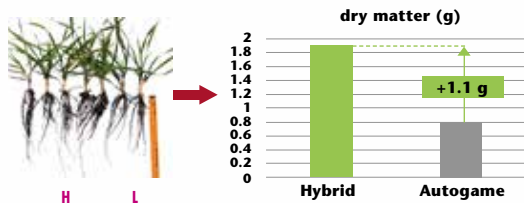
Heterosis Effect: Enhanced Hybrid Vigor



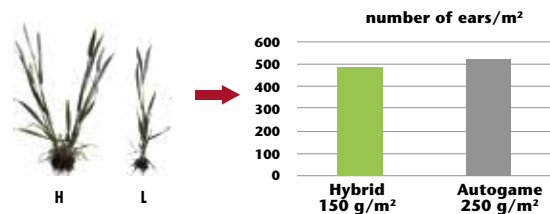


HySeed Hybrid Wheat is an Efficient Crop

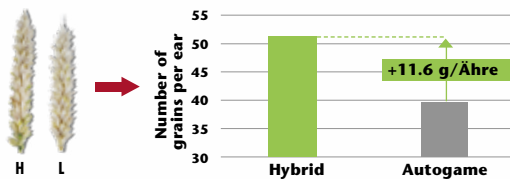
Powerful root growth



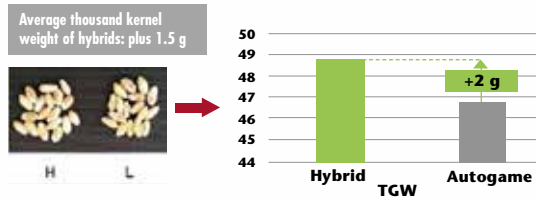
Higher tillering capacity



Increased ear fertility



Higher thousand kernel weight




Hybrid wheat convinces through both yield and quality.

In practice the quality of the crop can be influenced by the choice of site (environmental conditions) and variety as well as cultivation methods. Therefore, breeding and variety selection are important prerequisites for successful arable farming.

The protein content, which is still an important quality requirement in many countries, is not only influenced by environmental factors



Harvest Time



but also by the negative correlation between protein content and grain yield: the higher the yield, the lower the protein content ("dilution effect").

Keeping this negative correlation as low as possible is a major challenge for breeding. Therefore, hybrid wheat breeders from ASUR and NORDSAAT analyse the breeding material for appropriate quality parameters at a very early stage in order to select the best varieties.

The aim is to combine the high yield potential of hybrids with a high level of quality.

Due to their high nitrogen efficiency, in particular, the newer hybrid wheat achieves high grain yields at comparatively high protein level.

Thus, breeding is gradually succeeding in overcoming the negative correlation between protein and grain yield.

For this reason SAATEN-UNION has a broad portfolio: Hybrid wheat varieties are currently available on the European market for various wheat classifications. In addition, some of the hybrid wheat varieties are suitable for both biscuit production and malt processing. Farmers know: The wheat protein content can be

significantly influenced through the fertiliser management strategy. Fertilisation with nitrate-containing nitrogen fertilisers as late application has a positive effect on the protein content. The nitrogen can be directly used by the plant and stored in the grain for protein formation.

Apart from the protein content, hybrid wheat also achieves a very balanced processing and baking quality for example in regard to sedimentation value and Hagberg falling number as well as good to very good yields. This makes hybrid wheat particularly interesting for the processing industry such as mills.



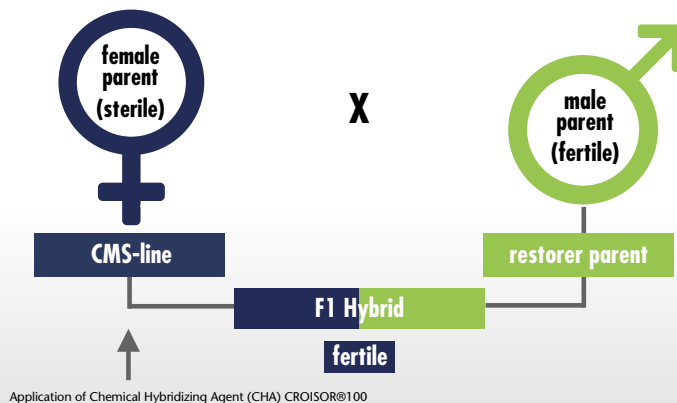
Breeding **Progress** and Research.

Advanced Technology of Hybridisation in Hybrid Wheat.

Basically, hybrid wheat results from crossing a female parent (male sterile) and a male parent. Winter wheat belongs to the self-pollinating species. In order to avoid self-pollination of the female parent breeders use a chemical hybridizing agent (CHA) to produce F1 Hybrids.

Female plants are treated with CHA. After the application of CHA, plants are not able to produce fertile pollen anymore. Female plants become male

Breeding CHA Hybrid Varieties

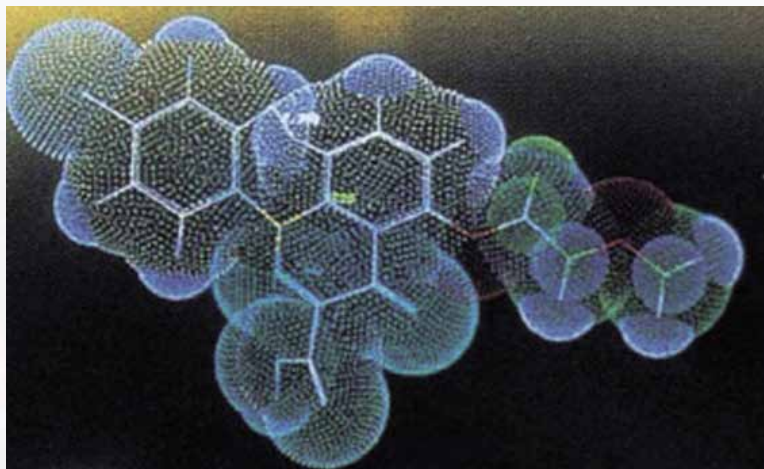


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(pollen) sterile. This guarantees that fertilisation is carried out by the pollen of the fertile male parent plant. The seeds harvested from the female parent after the crossing are fertile F1 hybrid seeds. Almost 30 years ago our breeders have established this hybridisation system now allowing SAATEN-UNION to provide farmers with high potential hybrid wheat varieties.

Chemical Hybridizing Agent (CHA) CROISOR® 100 (active matter: Sintofen).

So far, the only hybrid wheat seed marketed in Europe is produced with the CHA (chemical hybridizing



Sintofen molecule, active ingredient of CROISOR® - CHA.

agent) CROISOR® which is exclusively owned by ASUR PB. More than

40 CROISOR® hybrids that were bred by ASUR or by its main shareholder

NORDSAAT are listed in catalogues from various European countries.

Commercial production has started in 1995 and SAATEN-UNION now markets the seed in more than 20 countries. The advantage of this hybridisation technique is that very fertile, high performing new hybrids can be produced quite easily and speedily. Applying CHA speeds up the breeding process and allows a wide range of trait combinations to meet the different customer demands. The disadvantage is that the seed production demands very specific know how and has to be carried out in alternating strips of

female and male parents. In addition, the treatment efficacy of CROISOR® also depends on the weather conditions causing in some years a significant failure rate despite of the continuously improved application technique.

Benefits for the customer:

- **Fast breeding progress leads to new high performing varieties**
- **F1 seed with high level of hybridisation rate**
- **Secured seed availability**

ASUR plant breeding keeps improving their seed production and CROISOR® 100 application technology.



In the nursery of hybrid wheat, application of CHA

Challenges of Hybrid Wheat Breeding.

Unlike cross-pollinating species such as maize, hybrid breeding is still in its infancy in regard to wheat. But why is it so tricky with wheat? First of all, the wheat's genome is incredibly big. While the genome of arabidopsis – the first plant to be sequenced – contains 135 million DNA letters and the human genome 3 billion, common wheat (also known as bread wheat) has 16 billion.

Furthermore, the common wheat genome is really three genomes in one. About 500,000 years ago, before humans had even existed, natural hyb-

ridisation between two species of wild grass was taking place producing the progenitor, now known as emmer wheat, of our modern wheat. After humans started to domesticate those plants by cultivating them on their fields, a third grass species was inadvertently crossbred. This convoluted history has left modern bread wheat with three pairs of every chromosome, one pair from each of the three ancestral grasses. In technical terms it is called a hexaploid (AABBDD) genome. While the maize genome was already sequenced in 2009, the genome sequence of com-

mon wheat was only published almost 9 years later in the year 2018. This huge and complex genome is one of the reasons why the establishment of hybrid wheat breeding is much slower. In addition, wheat is an autogamous (self-pollinating) species. It is also cleistogamous, which means that self-pollination and fertilisation take mainly place within the closed flower so that only a small amount of pollen is released to the outside. However, a high pollen release of the male parent line is essential. In order to produce hybrids successfully it is essential to choose a male parent

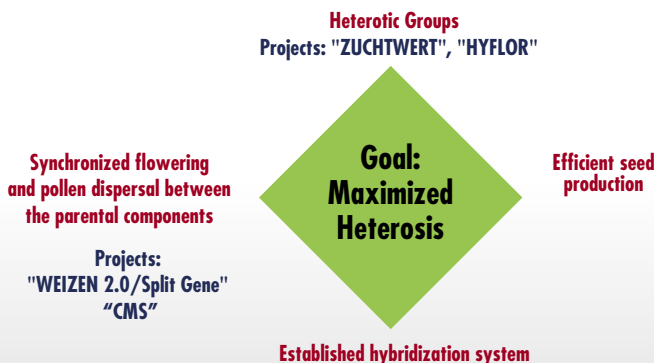
line with high pollen shed and a female parent which is male sterile so that it does not produce pollen itself. To avoid unwanted self-pollination, a controlled pollination system is required - a so-called hybridisation system.

Major challenges are:

- 1. Achieving a reliable hybridisation system (sterile female parent, fertile hybrids).**
- 2. Synchronising flowering and pollen dispersal between the parents.**
- 3. Obtaining heterotic groups.**
- 4. Developing an efficient seed production.**

Researchers and breeders from

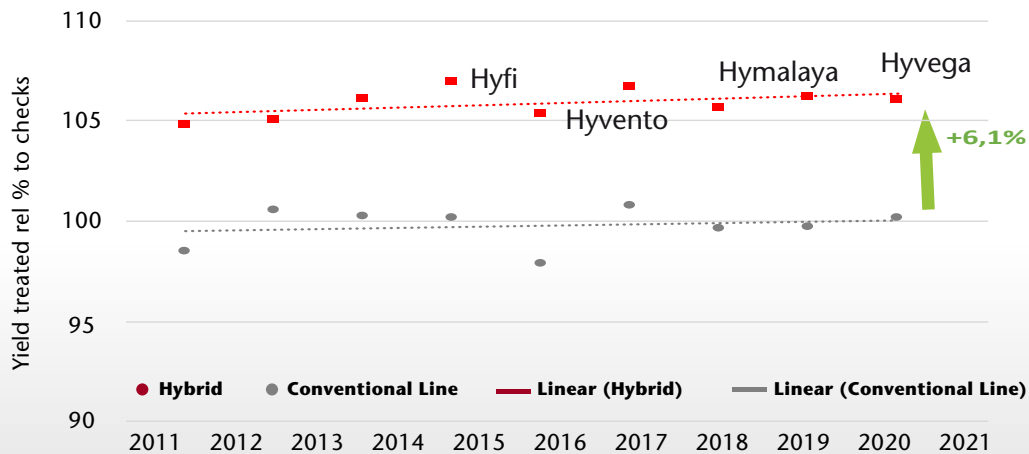
Challenges of Hybrid Wheat Breeding



NORDSAAT and ASUR are working together on the development of efficient high yielding hybrid wheat varieties.

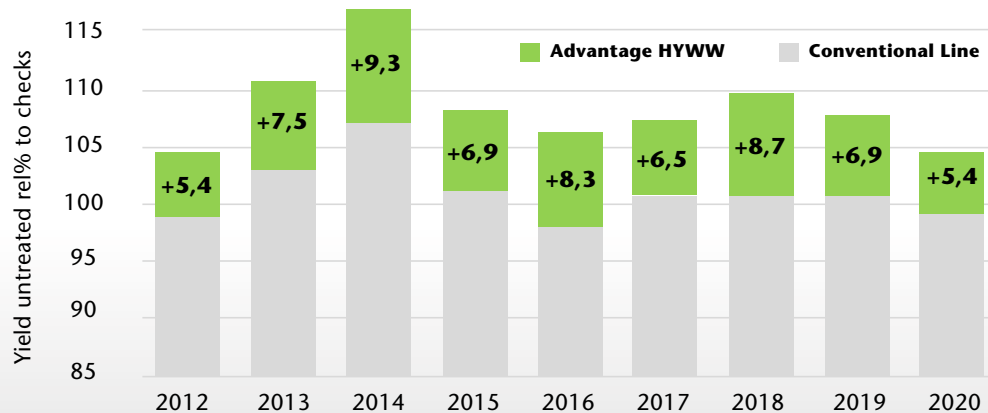
The overall goal is to maximise the heterosis and to increase the producibility of the varieties. Several innovative scientific projects are running.

Yield advantage of hybrid wheat is ensured by ongoing breeding progress



Source: Official Registration Trials Results Germany 2012-2020

Thanks to their better resistance, hybrid wheat proves its yield advantage even without growth regulator and fungicide application.



Source: Official Registration Trials Results Germany 2012-2020



Innovative Breeding Projects:

ZUCHTWERT (engl. Breeding Value)

The ZUCHTWERT (english: Breeding Value) project brings together partners from science and industry with globally unique know-how, genetic material and technology in hybrid breeding. The aim of the project is to carry out fundamental research for the systematic use of heterosis in hybrid wheat breeding.

In particular, there is a focus on:

- **The formation of heterotic**

groups with a high combining ability

- **Development of prediction models for hybrid performance**
- **Use of recurrent genomic selection**
- **Benefits for the farmer and the consumer: Efficient hybrid wheat varieties with a high yield and quality performance**

Some breeders and shareholders of

SAATEN-UNION are significantly involved in the ZUCHTWERT project. These include in particular NORDSAAT SAATZUCHT GmbH, which has been breeding hybrid wheat since 1999 and has already developed successful varieties such as HYBNOS 1 and HYMALAYA.

The project aims to lay the foundation for using the heterosis effect in hybrid wheat breeding systematically. This involves the formation of hete-

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rotic groups with a high combining ability, prediction models for hybrid performance and the use of recurrent genomic selection.

Hybrid breeding uses the phenomenon of heterosis to increase crop yields. Hybrid breeding has already been successfully established in cross-pollinated crops like maize and rye applying other breeding methods. Considering the constantly increasing world population and the climate change, it is also essential to be able to use the heterosis effect in wheat breeding so that it is possible for hybrid varieties to achieve an improvement in value



ZUCHTWERT experimental hybrids plots



Nursery of Hybrid Wheat

for cultivation and use, especially in terms of yield. In order to succeed substantial innovations are necessary to develop a sound methodological basis for hybrid wheat breeding. This primarily concerns the formation of genetically diverse heterotic groups with a high combining ability. A main

goal in ZUCHTWERT is the search for heterotic groups in adapted and exotic material using phenotypic and genomic information. Genomic selection in hybrid wheat breeding is applied and further developed as a tool for the identification of superior hybrids and for the search and selection of

heterotic groups. More than 2,000 hybrids from 240 adapted parental lines will be produced and tested with their parental lines in two-year field trials on several sites in Germany. In addition, approx. 250 hybrids are produced from crosses between exotic material and elite testers and then tested in two-year multi-environment field trials. High-density marker data (SNP markers and exome capture technology) of parental lines are used for genomic selection and for the search for heterotic groups.

You can find out more about the project in the following video.

Video: <https://www.youtube.com/watch?v=gG6cMmZq0Ss>



Seed Production and Seed Quality.

Seed production knowhow is crucial to successful commercial development of hybrids. Hybrid wheat seeds are not just "seeds". They are high tech products. Following the harvest the seeds are tested in certified seed quality labs. Only the best seed lots are chosen. Finally, the seeds are sorted, treated and bagged at the seed processing plant, ready to be sown. Year by year we are increasing our knowledge and optimising our seed processing chains to provide the best quality hybrid wheat seed to our customers all over Europe.

Seed Production

Both breeding and seed production of hybrid varieties is significantly more complex in comparison with conventional varieties. For that reason, seed processing is only carried out by well experienced multipliers and selected production companies in France. In addition, the seed production fields are monitored by production engineers of ASUR throughout the whole season. To avoid seed losses, seed production fields are spread all over France. Our partners are using an innovative storage technology

TAMIA PACK® which facilitates stock management and prevents losses in seed quality. These factors guarantee a high level of seed quality and ensure seed availability to the farmers.

As hybrid seed is produced by cross-pollinated plants it has to be produced anew every year. Seed production is split in 2 major parts:

1. Parental line seed production

Each hybrid wheat variety consists of 2 hereditary components, 1 female and 1 male, which need to be main-

HY SEED HYBRID WHEAT

tained. In case of hybrid wheat, which is produced with CHA (Chemical Hybridizing Agent) technology both parental components the female line (seed parent) as well as the male line (pollen parent) are fertile. No maintainer needed.



2. Certified F1 hybrid seed production

Certified F1 hybrid seed is produced by crossing a male sterile female line (no pollen production) with the fertile male parent (pollen production).

Unique Production Technique

The floral biology of wheat has to be modified to produce hybrid wheat

seed. Wheat is naturally self-pollinating and fertilisation takes place in a self-contained environment made up of husks enclosing the pistils and stamens. In order to enable a large-scale seed production, ASUR Plant breeding has established a unique seed production system based on the hybridisation technique with the Chemical Hybridisation Agent (CROISOR®). This substance prevents pollen production causing male-sterile wheat plants: the female line. The male parent and the female parent are sown in alternating strips between three to eight metres wide in the seed grower's field. The female parent is treated with CHA at an early growth stage. The size of the

	Oct.	Apr. - May	Jun.	Jul.- Aug.
	Sowing	Chemical Hybridisation Agent (CHA)	Fertilisation	Harvest
Polinator	Male Line POLLEN			
Seed Parent	Female Line  Male Sterile female line F1 Hybrid Wheat seeds			
Polinator	Male Line POLLEN			
Seed Parent	Female Line  Male Sterile female line F1 Hybrid Wheat seeds			

ear is an important characteristic for an optimal timing of the CHA application.

After the successful CHA application, the female parent is fertilised from pollen produced by the untreated male strips. The hybrid seed is the grain which is harvested from these female strips. SAATEN-UNION produces all of its hybrid wheat seed using the hybridisation agent CROISOR®.

Quality control in the field

To ensure that the grain-bearing plants have been properly sterilised and therefore the grain really derives from cross-fertilisation by the pollinator, isolation cages are placed in



Plant development stage for CHA application

the female strips after treatment and before flowering. The cages are removed shortly before harvesting and the ears under the cages are controlled for any presence of grains (a sign of self-fertilisation): the ears must be

free of grains (5 % tolerance, a threshold regarded necessary to ensure a minimum of 95 % hybrid grains, which is the marketing standard). Otherwise, the production is refused and sold as feed wheat. If in doubt,

the genetic identity is checked by electrophoresis on a sample of harvested grains.

Seed Quality

In order to ensure our customers high yields SAATEN-UNION places great emphasis on seed quality testing. Therefore, hybrid wheat seed has to pass numerous laboratory tests before it goes on sale.

1. Germination rate

Germination rate describes the percentage of seed that produce a normal seedling under regulated laboratory conditions. SAATEN-UNION hybrid wheat seed is tested

according to the official seed testing rules. All commercial hybrid wheat lots should have a minimum germination rate of 92 %. Due to the great experience and high standards of our partners in regard to seed production, germination rates of 95 % and higher are achievable.

2. Hybridisation rate

Hybridisation rate shows the percentage of hybrid seed from the total harvested seed.

F1 seed is produced by using basic seed of the female and male parental lines. The female seed donor line is treated with CHA. After the treatment

it becomes 100 % sterile. Sterility is tested in the field by using so called pollen cages.

Finally, hybrid seed is the grain which is harvested from the female parent after cross pollination. The hybridisation rate of hybrid wheat is regulated by the EU law. The standard level is 95 %. The hybridity rate in the field is evaluated according to the number of seeds formed on ears covered with pollen-proof bags. ASUR double checks all seed lots with electrophoresis tests to ensure a hybridity rate between 95 % and 98 %. An alternative field hybridity control method using marker analysis on DNA extrac-



Appliaction of CHA

ted from immature seed has been developed by ASUR. It gives more accurate and faster results and avoids the tedious and time-consuming system

of working with pollen bags. It has currently being tested by the French Certification Agency in terms of a possible approval and substitution by 2021.

3. Seed purity

homogeneous and free from inert matter, other crop and weed seed. Hybrid wheat seed is cleaned by using several different sorters, including an optical sorter, achieving high purity rates (>98 %).

4. Seed treatment Two different standard seed treatments

Vibrance Gold - Fungicide containing sedaxane 50 g/l (pyrazole/SDHI), fludioxonil 25 g/l, difenoconazole 25 g/l (triazole), effective against seed and soil-borne pathogens like *Fusarium* species and *Rhizoctonia* species, improves crop establishment.



Seed production field with pollen cages for quality control

Disease risks can be reduced with this seed treatment if second cereals are cultivated.

Langis – Insecticide containing cyper-

methrin 300 g/l (pyrethres), protection of cereals, which had maize or grassland as a preceding crop, against wheat bulb fly and wireworms that

cause feeding damages on seedlings and tillers.

Additional seed treatment Silver Coating

Due to the high genetic value of hybrid wheat and hybrid barley the level of seed processing has to be improved. The coating agent Silver-Coat®, a microporous film applied to the surface of the seed, improves coverage and uniformity of the seed treatment as well as grain flow in the drill.

The bright, silver colour of Silver-Coat® has also the additional advantage to make it easier to track

seeds in the drill furrow. Dosing and choice of coating products are regularly reviewed in order to optimise seed coverage and to limit the risk of dust emissions as much as possible. Untreated seeds can also be delivered.

5. Biostimulant seed treatment

Biostimulants used as seed treatment become more and more popular. At present, we are not offering seed treated with such a substance but we are working on a project. We are testing and analysing comprehensively in order to be able to offer our customers the best treatment possible.

6. Bagging types

We can propose different kind of bagging. Usually in hybrid wheat we are dealing with units of 500.000 seeds-the standard bags. Furthermore, we also offer big bags with 12 million seeds

Innovative storage technology at ASUR Plant Breeding

TAMIA PACK technology is a newly created subsidiary of ASUR PB. TAMIA PACK offers the SAFET'HY industrial process for all seeds including hybrid and non-hybrid cereals. At ASUR all seed stocks are now stored using this process.

SAFET'HY® industrial process for vacuum preservation of seed and grain:

- Controlled storage: preserving quality. Germination level remains on a high level.
- Securing stocks without insecticide treatments:

After 5 years of use performance has been proven on more than 6,500 tons.

Advantages for farmers: High level of seed quality in regard to germination rate and low risk of contamination by insects.

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Advantages of Using Certified F1 Seed.

According to European law it is forbidden to sell or to grow farm saved seed of hybrid wheat. Furthermore, reproduction of hybrid wheat seed results in heterogenous fields as well as severe yield reductions.

A conventional variety is selected from a cross over eight to ten generations, with pollination taking place via the natural mechanism of self-pollination. Throughout the process "countless" genetically different strains segregate from one cross of which only the "best" is developed into a variety. Thus, a conventional

variety is based on genetic "equality", which means if reproduced largely identical offspring with hardly any changes in performance characteristics are produced.



Efficient, homogeneous F1 generation

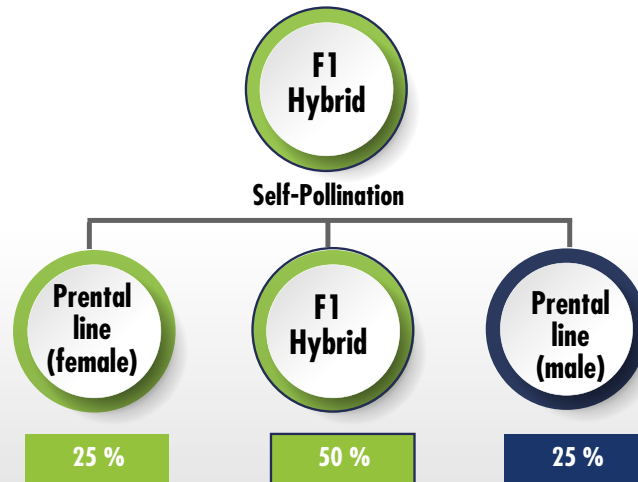
On the other hand, the hybrid variety is only a recently created cross ($A \times B$). It is a combination of two different parental lines. In this state the so-called heterosis effect is expected.

Heterosis of a cross is defined as superior performance surpassing the average of its parents. According to the law of segregation (Mendel's laws of inheritance) hybrid reproduction/self-pollination inevitably leads to a genotypic segregation ratio of 1:2:1. The heterosis effect is lost, performance decreases.

Certified F1 Seed has following advantages:

- 1. Newest genetics with 100 % heterosis effect**
- 2. High level of hybridization (min. 95 %)**
- 3. High level of purity**
- 4. High quality seed treatment**
- 5. Less workload**

Segregation of F1 Hybrid Wheat





Hybrid Wheat in Practice.

Farmer Testimony CZ

- Farm: Farma Vilímovský, Trhový Št pánov
- Acreage: 200 ha
- Altitude: 410 m n. m.
- Average rainfall: 630 mm
- Soils: medium to heavier
- Structure of crops: 25 % WW, 25 % WOSR, 25 % maize, 25 % clovers

"I tried hybrid wheat for the first time on 24 ha last year. We made sowing in late September, so plants went to winter with only one tiller.

The advantage was that it grew all winter. Still, the crop was thin till the May. It had an average of 8 tillers and it was interesting that it kept them till harvest.

During the vegetation there was no need to treat anything significantly, not even mildew. Surprisingly, compared to OP wheat, the yield was 8.4 t/ha. The OP variety had around 700 ears per meter and yield 6.8 t/ha. Hybery with 500 ears did a ton and a half more and extra plus was good harvestability."



Farma Vilímovský, CZ



Ing. Peter Bereš, SK

Farmer Testemonies SK

Ing. Peter Bereš
AGROVES s.r.o. Zalužice
(Tušická Nová Ves)

- Acreage: 70,5 ha
- Soils: medium heavy
- Pre crop: winter oil seed rape
- Soil preparation: ploughing
- Date of sowing: 28. - 30.09.2017
- Fertilizing: N 190 kg. P 18 kg
(pure nutrients)/ha

"In the autumn period, HYBERY had balanced growth and emergence. During spring after one fertilizing the expected rapid growth with good health status. With the achieved yield 7.13 t/ha and with the quality we

are satisfied. The wheat was grown overall at 641 ha and the average of the company was 6.17 t/ha.

This means that hybrid wheat had a higher harvest of about a t/ha than the line."



Boris Žitný, Sk

Farmer Testemonies SK

Boris Žitný
SHR Ringwald Peter,
Levice - Ondrejovce

- Altitude: 200 m above sea
- Soils: brown, medium heavy
- Pre crop: winter oil seed rape
- Soil preparation: 1x disk, direct sowing
- Fertilizing:
autumn: NPK 10:15:15 2q/ha,
spring: DASA 2q/ha

"We grow the wheat hybrid due to higher performance in wheat production. At the beginning we chose a hybrid HYBERY, which is plastic and adaptable, has a very good condi-

tion and responds very well to the benefits of nutrients. We refer it to the sowing process with respect to crop rotation."



Adapted Growing Technology.

SOWING: THE KEY FACTOR TO
SUCCEED WITH HYBRID WHEAT

REDUCE YOUR SOWING RATE

The raised tillering capacity of hybrids allows to reduce sowing densities.

Reduce by at least 1/3 your sowing rate to optimise the seed cost and increase benefits. Experienced farmers go down as low as 80-100 seeds/sqm.

ADAPT SOWING DATE

Sowing period for hybrid wheat should be a few days earlier than for



100 seeds/sqm

conventional wheat. Hybrid wheat plants should achieve the development stage BBCH 25 before winter.

Target

High proportion of early stocking shoots of 1st and 2nd order - few spring shoots

Information about pest management, plant nutrition and application of growth regulator see page 43.

Agronomy Guide

Cultivation suitability depending on preceding crop		Sowing date and seed rate**			Sowing depth
Preceding crop	Suitability	Drilling date	Seeds/m²	Units/ha	cm
Winter oilseed rape*	++	Start of Sept. to 20th of Sept.	100 – 120	2.2 – 2.6	2 – 3
Legumes*	++				
Potatoes*	++				
Wheat	+	20th of Sept. to start of Oct.	120 – 140	2.6 – 3.0	
Triticale	+				
Barley	+				
Rye	+	Start of Oct. to 15th of Oct.	140 – 160	2.6 – 3.5	
Forage maize	+				
Grain maize	+				

*Favourable preceding crop but luxury as other following crops can make better use of the preceding crop.

**Average

Hybrid Wheat Agronomy Guide

Nitrogen fertilisation: Emphasis should be placed on starter application.

Fertilisation	Common practice	*Alternative splitting
Starter application	130 kg/ha – N _{min} 0 to 30	**190 kg/ha – N _{min} + 20 kg S/ha
Stem extension (GS 30/31)	70 kg/ha – N _{min} 30 to 90	/
Flag leaf application (GS 37/39)	30 kg/ha	40 kg/ha + 20 kg S/ha

* Favourable splitting, fertiliser is dissolved in soil before spring and early summer drought respectively – good experiences in practice.

** Use of stabilised N fertiliser or slurry/fermentation residues

Note: consider fertiliser requirement calculations

Plant growth regulator

Necessity	2 nd application if required
GS 25-29: e.g. 0.8 to 1 l CCC/ha (suppressing apical dominance)	GS 31/32: e.g. 0.4 l CCC/ha + 1 l CCC/ha + 0.2 l Moddus/ha Alternative: 1 kg Prodx/ha

Fungicide treatments

Depending on disease pressure

In general one treatment at GS 39/40 is sufficient.

(Note: Choose fungicides with a good protective performance!)



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