HIGH-YIELD, RESISTANT, EFFICIENT– EXSAL

THE NEW GENERATION OF E-WHEAT

Plant breeding never stands still! This is demonstrated by the new E-wheat EXSAL from Deutsche Saatveredelung AG (DSV). It combines a wide range of resistances, good quality properties and high yields, which were achieved through a clever combination of traits from different varieties and first-class breeding work. The results of these combinations and what is behind EXSAL, you can read here.

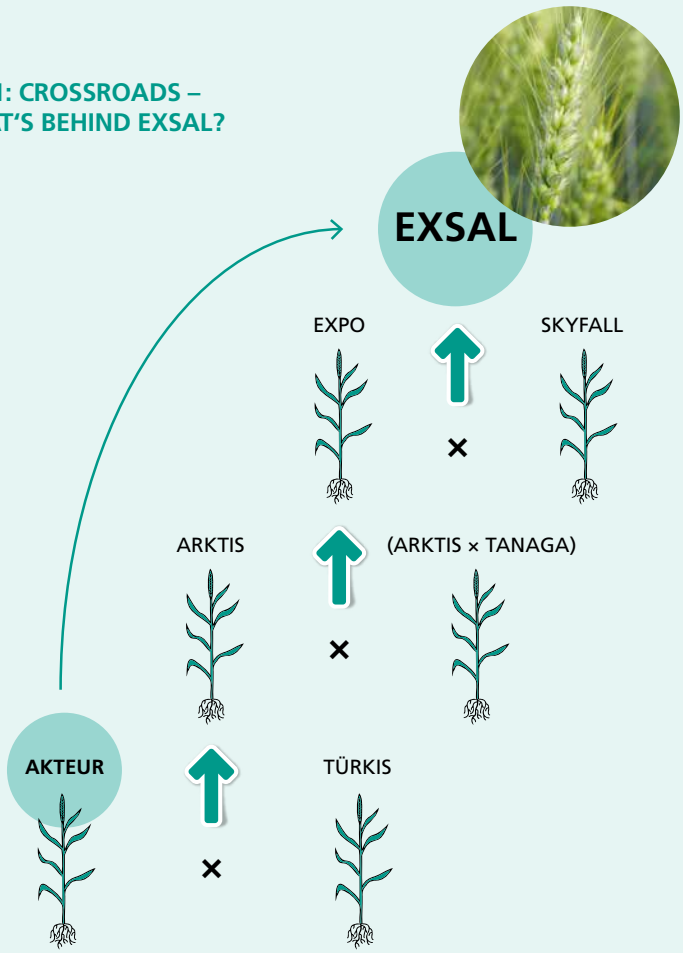
EXSAL has succeeded in combining many different resistance genes in one variety. This is shown by the BSA (Bundessortenamt; federal office of plant variety rights in Germany) scores: The score of 3 in ear fusarium is outstanding, as well as the low susceptibility to stem breakage (resistance gene Pch1). EXSAL is also resistant to the orange wheat gall midge (resistance gene Sm1). Its greening also provides a certain degree of protection against game damage. EXSAL provides reliable marketing quality due to its great values in the quality-determining properties falling number, protein content, baking volume and sedimentation value. The high flour yield and the good baking volume are interesting for millers and bakers. For farmers, the good falling number stability, the high crude protein yields and the high hectolitre weight are important. EXSAL is the ideal variety for quality wheat growers who are looking for an easy to manage, high-yielding E-wheat or protein-safe A- wheat.

The fine art of combining features

The targeted combination of the most important cultivation and quality characteristics is the goal of modern plant breeding. In addition to yield, this includes resistance to various diseases and high quality. Many years of breeding work are necessary to find the optimal combination of all these characteristics.

A picture says more than a thousand words: Excellent stability in the breeding garden in Leutewitz (Sachsen, Germany).

FIG. 1: CROSSROADS – WHAT'S BEHIND EXSAL?



In 2014, quality-driven AKTEUR genetics were combined with English high-yield genetics. This was the first development step towards EXSAL. The weaknesses of AKTEUR, such as the susceptibility to yellow rust, powdery mildew, septoria and the weaknesses in the untreated yield were further minimised over the years by healthy and high-yielding crossbreeding partners. Figure 1 shows these crossing partners. Later on, the English short straw variety SKYFALL was crossed with EXSAL, which, in addition to good resistance to typical leaf diseases in the UK (yellow rust & septoria), has brought the yield-stabilising trait „stability“ as well as the resistance gene Sm1 against the orange wheat gall midge with it. The result: EXSAL tends to be a shorter variety with a very good stability (grade 4 bordering on 3) and it is also very well suited for grafting regions. In addition, sufficient winter resistance for temperate climates was integrated into EXSAL through the crossing partner ARKTIS.

Health is the be-all and end-all

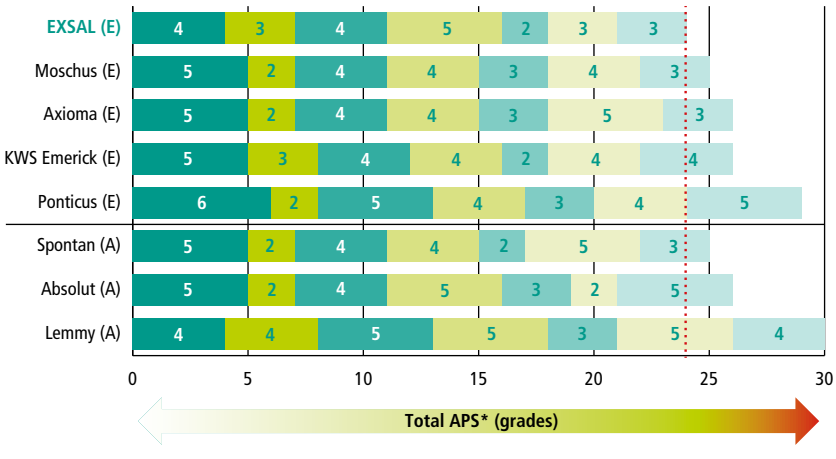
In winter wheat, the Descriptive List of Varieties of the Bundessortenamt provides information on eight important diseases. The new E-wheat of the DSV shows in comparison to the most prolific E- and A-wheat, the new E-wheat shows the best health to the ear (Fig. 2). In addition, EXSAL possesses the stalk-break resistance gene Pch1 and the resistance gene Sm1 against the orange wheat gall midge, which prevents the development of the next larval stage in the event of an infestation with larvae. Egg laying can also take place in the ears of resistant varieties, but these under developed larvae cannot damage the grain plants.

Strategy for fertilisation and cultivation in red areas

EXSAL showed good crude protein contents (grade 6) with high yields in the course of the value test. In the newly recorded trait „crude protein yield“, which is the multiplication of yield × crude protein content, EXSAL is one of the highest-yielding and thus most efficient varieties of the approval year (Fig. 3, p. 6).

The protein content must be ensured by towards nitrogen fertilisation geared to the production of E-wheat. The rule of thumb is 2.5 kg N/ha per dt of expected yield. In the course of the evaluation, EXSAL achieved peak values of up to 15.4 % crude protein level 2, and that without targeted quality fertilisation. For practical cultivation, this means that EXSAL has to be adapted to the targeted marketing segment.

FIG. 2: EXSAL – BEST HEALTH FROM FOOT TO EAR

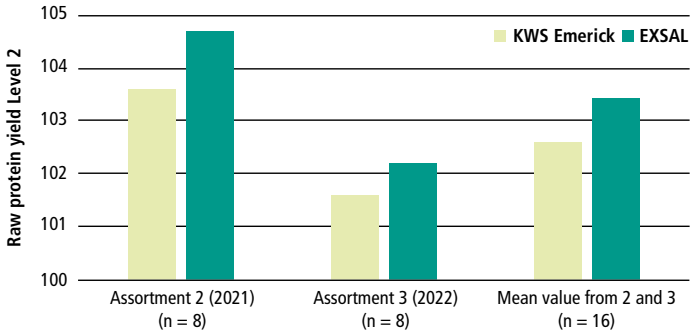


Source: BSA and BSL 2022, comparison to WW varieties of quality group E with > 100 ha and A with crude protein APS approved in Germany. ≥ 6 and with >100 ha VMF 2022 reported for field inspection (without further DSV varieties), *APS = expression level of susceptibilities according to „Descriptive List of Varieties“ of the Bundessortenamt, 1= very low susceptibility, 9 = very high susceptibility

Did you know?

The elite wheat AKTEUR turns 20 years old this year and thus writes a piece of history! In its career, it has generated more than 70,000 ha of multiplication area throughout Europe.

FIG. 3: HIGH CRUDE PROTEIN YIELD = HIGH N-EFFICIENCY



Source: BSA, value tests final report winter wheat 2023; only orthogonally tested assortments; extract E-wheat

According to the Fertiliser Ordinance (Düngeverordung, DüV), the N requirement value of an A/B wheat with a yield of 80 dt/ha is 230 kg N/ha and that of an E wheat is 260 kg N/ha. Thus EXSAL may be fertilised with 30 kg/ha more N than E-wheat. If the resulting difference in N-requirement is reduced by 20 %, as required in red areas, this results in a fertilisation difference of 24 kg N/ha. Conversely, this means that E-wheat can be fertilised with 24 kg N/ha more in red areas.

High-yield, resistant, efficient: EXSAL

EXSAL achieved the highest yield index (Ertragswertzahl, EWZ) of its approval year in the three-year official evaluation of the Bundessortenamt. The EWZ is an index number composed of the sum of the following characteristics: yield number (relative grain yield (treated and untreated)), resistance number (powdery mildew, leaf septoria, DTR, yellow rust, brown rust, glume browning and ear fusarium), agronomic number (storage before harvest and wintering out) and quality number (falling number, crude protein, sedimentation value, water absorption, flour yield and volume yield). On the basis of the EWZ, it is possible to the current breeding progress of each tested strain compared to the reference varieties.

Outlook

Healthy wheat varieties, which are available in different environments, have a high cultivation value. These are the varieties of the future. This also includes the new E-wheat EXSAL, which combines different resistance genes and also has very good stability. The quality-giving traits were specifically bred in via AKTEUR genetics.

The first Z-seed from EXSAL will be available from your dealer for sowing in 2023.

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„THERE IS NO STANDSTILL IN BREEDING“

The national reduction targets in Germany for plant protection products of 50 % by 2030 compared to the reference period 2015–2017 will considerably limit the availability of chemically synthesised plant protection products and thus the possibility of controlling harmful organisms during vegetation. In order to still achieve high yields and qualities of the important crops, the plant's own resistance – the resistance profile of the varieties – is becoming increasingly important.

A look at the descriptive list of varieties and exact trials that examine breeding progress with regard to disease resistance, shows that plant breeding is already very successful. Modern varieties are more resistant than older ones to the pathogens that occur frequently today. However, this is no reason to rest on our laurels in research and breeding – on the contrary. Due to the adaptability of the pathogens and changes in the pest spectrum, resistance mechanisms could lose their effectiveness over time. Therefore, one goal is to achieve a so-called pyramidisation of resistances by combining several mechanisms or genes in one variety. The identification of molecular genetic markers that allow the differentiation of carriers and non-carriers of resistance genes on the basis of DNA, is of great importance.

It makes it possible to combine several resistances more quickly in one variety. These and other innovative methods in plant breeding based on scientific findings make it possible to adapt varieties to changing climatic and socio-political environments.

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