DANBRED

DANBRED VOLUR BUSINESS OUR DNA

Your business. Our DNA.

DanBred is ready for the future

A few years into its new company structure, DanBred is finding its place in the world. A constant focus on customer needs and what will influence the market for pig production and genetics in the future guides all decision processes in DanBred. Thomas Muurmann Henriksen, CEO at DanBred, shares his thoughts on what the future holds for global pig production.

Knowledge and expertise have always formed a solid foundation for us, and we are confident in the hard work our R&D department carries out day after day, year after year. We are focused and, in many ways, our products are superior to our competitors'. However, the commercial environment is rapidly changing, so our ability to understand and meet end user needs is key to the strong growth, which we anticipate for DanBred. Here are the five key trends, we believe will influence the global pig production.

1: Growing global demand for pork

An important trend is that the global demand for pork is expected to grow by up to 45 % by 2035. This is due to the growing population; especially a growing middle class and increased buying power in the Asian and American markets. The growing global demand represents great growth potential, and as a supplier of breeding animals to more than 40 countries, DanBred is well-positioned to tap into that potential.





We have already established DanBred in key markets such as Spain, France, and the Netherlands, and are well under way in Russia, Mexico, the Philippines and the US.

The local DanBred teams are supported by strong resources in Denmark; our genetic improvement derived from our nucleus and multiplier herds and our R&D engine, Danish Pig Research Centre (DPRC).

2: From supplier to business partner

Pig producers are getting bigger, more professional and have more complex buying criteria. This puts high demands on us. It is no longer enough to be a supplier of genetics or sows. We are, increasingly, becoming a business partner delivering solutions, which ensure that the animals' genetic potential is fully realised. It is a trend we have seen in several other trades, where service solution sales have even exceeded the sale of core products.

In DanBred, we welcome this development, because it goes well with our open and pragmatic culture of cooperation as well as our expertise and product portfolio. High-quality genetics form the foundation of our business. Now we also offer a comprehensive range of service solutions, which help our customers capitalize on the full potential of our products. This allows us to build close and lasting relations to our customers.

We also anticipate that more pig producers will have investors who want performance-based business models, where they pay for the production results that our products deliver. In this regard, DanBred has a clear competitive advantage due to the great potential of our products in relation to sustainability, productivity, health and profitability. For the past decades, we have bred for both large litter size,



low mortality and low feed consumption – and, therefore, our customers currently achieve up to 40 live piglets per sow / per year.

3: Closed herd production gains ground

A third trend is that a growing number of pig producers around the world are shifting from open herd production to closed herd production as a consequence of the growing focus on health in pig production – and that development is expected to pick up speed as diseases like African Swine Fever (ASF) are, sadly, ravaging large parts of Asia and Eastern Europe. In DanBred, we have many years of experience delivering genetics for closed herd productions, not least in Denmark, where the majority of pig producers are practicing this model. This know-how is scalable in relation to customers outside Denmark as well. We offer our customers unlimited and direct access to DanBred's breeding system through GenePro, which ensures genetic progress while maintaining the health status of the herd.

4: Sustainability becomes license to operate

Sustainability is high on the agenda – and it is here to stay. We are at the forefront of this development, as we have had balanced breeding goals for decades focusing on high efficiency, longevity and survival rates, which, among other benefits, contributes positively to the climate footprint of pig production and, thus, sustainability.

Our R&D activities have generated breeding progress and resulted in genetics, which have reduced the feed consumption in DanBred animals and ensure that every sow produces as many live piglets as possible. Furthermore, we breed for robustness. This results in healthy, strong and durable animals, which in turn improves animal welfare and optimizes our costumers' earnings. It is also worth remembering that, as a supplier of genetics for more than 40 countries, we enable pork to be produced "High-quality genetics form the foundation of our business. Now we also offer a comprehensive range of service solutions, which help our customers capitalize on the full potential of our products."

Thomas Muurmann Henriksen, CEO, DanBred

locally, close to where it is consumed.

5: Industry consolidation

We anticipate a consolidation in the pig genetics industry, as the customers become bigger, more professional and more advanced. There will be fewer players, and it will happen soon. There will only be room for the players who deliver genetic solutions with the highest efficiency and health. Our objective is to be among the top 3 global pig genetics brands well-positioned for the long run.

An important element in the race for leadership will be R&D. Genomic selection and other technological tools and methods are gaining ground, and only the large and most professional genetics companies have the R&D muscles required for the future.

DanBred is already among the leaders. We have a strong R&D engine in DPRC, which ensures continuous and record-breaking breeding progress. Our R&D is deeply rooted in one of the most developed and demanding markets, and the best suppliers and customers in the world are right outside our door.

We are ready for the future.

Thomas Muurmann Henriksen CEO, DanBred



RESEARCH & DEVELOPMENT

Great expertise behind DanBred's innovation and knowledge

DanBred R&D develops tools and solutions, which ensure pig producers high productivity and profitability.

DanBred R&D is a part of the Danish Agriculture & Food Council, which is deeply rooted in the Danish cooperative movement; a system created by pig producers, for pig producers, through more than 100 years of collaboration. To this day, pig producers are still active leaders in key decision-making processes.

Focus is on constant development and innovation to ensure low production costs and great breeding progress, and publications are shared with Danish pig producers and DanBred's costumers all over the world. We employ a wide range of experts within all areas of pig production, including feeding, animal welfare, health, environment, pens, genetics, breeding and the DanBred breeding system. More than 100 trials and experiments are carried out every year.

DanBred – **The Danish Pig Breeding Programme** – is constantly developed through research and development

DanBred's research and development centres around our purebred breeding populations of 2,200 DanBred Landrace, 2,200 DanBred Yorkshire and 1,800 DanBred Duroc sows, respectively, and the crossbreeding system for DanBred Hybrid and DanBred finishers. DanBred is known all over the world for our exceptional and effective breeding system, which has provided global pig producers access to genetics that have boosted their profits for decades.

DanBred constantly creates innovation through state-of-the-art research in broad cooperation with universities both within and outside Denmark. DanBred documents breeding results and shares them openly in international journals and expert articles in eight languages as well as in Danish publications. No one else does that.

BREEDING SYSTEM Generations of selected genes

Year on year, DanBred delivers breeding progress for all traits in our balanced breeding goals. For instance, over the past decade, each year, DanBred has reduced feed consumption with 0.041 FUs/kg gain (~ 0.038 kg feed/kg gain), and because this is the trait with most economic impact, it is the most valued by pig producers globally.

23 professional DanBred nucleus herds and DanBred's boar testing station, Bøgildgård, work closely together with DanBred's experts and technicians to create genetic progress and development.

Each year, more than 100,000 DanBred breeding animals are evaluated and DNA-tested. The many test results and genomic analyses form the basis of weekly estimates of highly accurate DanBred Indexes – or unique genetic product declarations, if you will.

This large number of tests, together with the quality of DanBred's evaluation and R&D, result in a continuous and significant genetic progress in all traits in the consolidated balanced breeding goals.

Each week, the genetically superior new animals are evaluated based on DanBred's index, and other DanBred animals complete performance testing either in the nucleus herd or at the boar testing station.

The weekly indexes form the basis of an early selection of DanBred Al boars for Al stations. This selection and use of DanBred Al boars in nucleus herds creates a short generation interval, which contributes to more genetic progress.

As soon as the indexes are calculated, they can be accessed by DanBred's nucleus and multiplier herds as well as GenePro customers, allowing them to make the right decisions about next the generation of DanBred breeding animals and optimal replacement strategy.

EXPERIENCE More than 100 years of genetic enhancement makes a difference

DanBred's breeding goals are focused and set in a way that ensure breeding progress in the purebred breeds and reflect the pig producers' future needs. They deliver high productivity, robust breeding animals and high-quality finishers, thereby directly contributing to pig producers' profits.

World leader in breeding progress

Even though the different traits in breeding goals often presents as negatively correlated, DanBred has managed to deliver record-breaking genetic progress for decades. In the past years, annual progress in LP5 (live piglets on day 5/litter) has been 0.37-0.40 extra live piglets, and the documented progress in daily gain has been 18-19 grams, a lean meat percentage increase of 0.11-0.16 %, and an improved feed conversion equal to -0.041 to -0.037 FUs/kg gain (~ -0.038 to -0.035 kg feed/ kg gain).

Genomic selection

DanBred's breeding programme has developed through decades of research and development based on the latest methods, models and technologies. DanBred was the first to introduce genomic selection in pig breeding in 2010. Since 2017, all DanBred's breeding candidates, about 100,000 animals each year, are DNA-tested, and the results are used to calculate even more precise DanBred Indexes. By using genomic selection, DanBred achieves an extra 30 % breeding progress.

DanBred's Herd Book

DanBred's Herd Book is the original one approved by the Danish authorities according to EU regulations. Since 1991, it has been kept for DanAvI animals in the Danish Pig Breeding Programme. DanBred can document more than 50 years of purebred and focused breeding through DanBred's Data Bank, which includes more than 35 million breeding animals that can be looked up individually and traced generation after generation.





DanBred and sustainable production

DanBred's breeding progress not only ensures a better economic result for you as a pig producer. With increasing progress, particularly in feed conversion, we also contribute to making your production more environmentally sustainable.

Economic and environmental benefits

Environmental sustainability is high on the agenda of public debate – not just among the general public at large, but also specifically within the agricultural sector. In this sector, progress is ongoing in areas such as slurry acidification, regular slurry discharge and feed conversion, and DanBred's breeding programme plays an important role in the effort to ensure more sustainable and climate-friendly productions now and in the future.

"We are firmly focused on maximising our genetic progress for the benefit of DanBred's customers, and, for years, we have generated genetic progress in all the traits in our breeding goals. This is not only economically beneficial for our customers, but also contributes to making our customers' production more environmentally sustainable," says Helle Palmø, Chief Geneticist at DanBred.

- This is not only economically beneficial for our customers, but also contributes to making our customers' production more environmentally sustainable.

Helle Palmø

More with less

In essence the significant breeding progress for DanBred genetics in recent years means that pig producers can produce more pigs with fewer resources. 100 % genomic selection, i.e. DNA testing of all breeding candidates, has made a significant difference to breeding progress since it was introduced gradually in 2010. Knowing all the breeding animals' DNA (to put it in simple terms) and their relations to each other makes it easier for us to find the breeding candidates with the best genetic system for the traits that we want to develop. Consequently, DanBred can target the breeding for even better economic and environmentally beneficial traits, such as feed conversion and LP5 (live piglets on day 5/litter).

"It is precisely these traits, which are of great value to both the pig producers and the environment, that have seen significant progress in recent years. The progress in feed conversion means that less feed is needed in the production, and this naturally reduces the climate footprint significantly. At the same time, breeding progress in the LP5 trait means that DanBred sows have more pigs than before. As a result, fewer sows can now produce the same amount of finishers with less feed than earlier. In this way, everything points in the same direction," concludes Helle Palmø.

A long-lasting commitment

DanBred's commitment to a more sustainable pig production is not a new invention. In fact, DanBred has adopted the Code EFABAR since its birth in 2006.

The Code EFABAR (Code of good practice for farm animal breeding organizations) is a voluntary practical guideline that provides a platform to engage in responsible breeding.

By adopting the code, DanBred commits to responsible breeding with regards to key issues such as food security, economic and resource efficiency, environmental impact and animal health and welfare.

Production scale - effect of the breeding programme

Year sows

2005	1,151,000
2019	1,045,000
Produced pigs per year	
2005	25,800,000
2019	32,700,000

Fig. 1: Production scale – effect of the DanBred breeding programme

In figure 1, the top bars show the number of sows in Denmark in 2005 and 2019, respectively, and the lower bars show the number of produced pigs per year in the same years. The reduced number of sows and the increased number of produced pigs in 2019 clearly shows the effect of the DanBred breeding programme.

Source: extract from Statistics Denmark and statistics from Danish pig slaughterhouses





YOUR BUSINESS

The customers' needs are in focus

In DanBred, we strive to improve our customers' business. It is at the core of our breeding goals and customer solutions. The genetic potential of the farms must progress and be turned into profits.

Every customer we meet has their own vision and challenges. Therefore, we have developed a range of digital tools and strategic service solutions – spanning from professional advise on how to optimize the day-to-day practical management in the farm to long-term solutions, which generate measurable results for our global key customers – that bring them closer to their objectives.

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PROFFESSIONAL ADVICE

DanBred's in-farm solutions are carefully designed strategic interventions, which generate measurable results for our global key customers and bring them closer to their objectives.

Our advisors help establish practical routines, which make a difference in the production and on the bottom line. This global team of advisors is growing, as our foreign customers grow bigger, and the demand for brand-specific consulting services increases.



DanBred Gilt

The first period in a young animal's life is important to its productivity. Factors such as rearing, health, feeding and management play a role in determining how successful the young gilt will be as a productive sow.

The DanBred Gilt solution is designed for best practice and to ensure an optimal integration of the young gilt into an existing production unit or at the start of a new one. We follow up with advice and guidance all the way up to its first weaning. The objective is to ensure that the customer gets as much value as possible from the purchased animals.



DanBred MaxWean

It is important to be able to adjust your business to changing market conditions. In a time where each pig has a high value, it is important to wean as many pigs as possible. The great potential in the robust DanBred Hybrid sows and the addition of DanBred Duroc as the terminal boar can be optimised in many ways to ensure a maximum utilisation of the production. The DanBred MaxWean solution delivers this optimisation in farm.

We analyse the opportunities based on a benchmarking from our most skilled customers and make a practical evaluation of how it will affect the outcome. The solution also includes the implementation of changes in farrowing unit management practices in order to ensure that the customer reaches their objective.

DanBred Validated Feeding

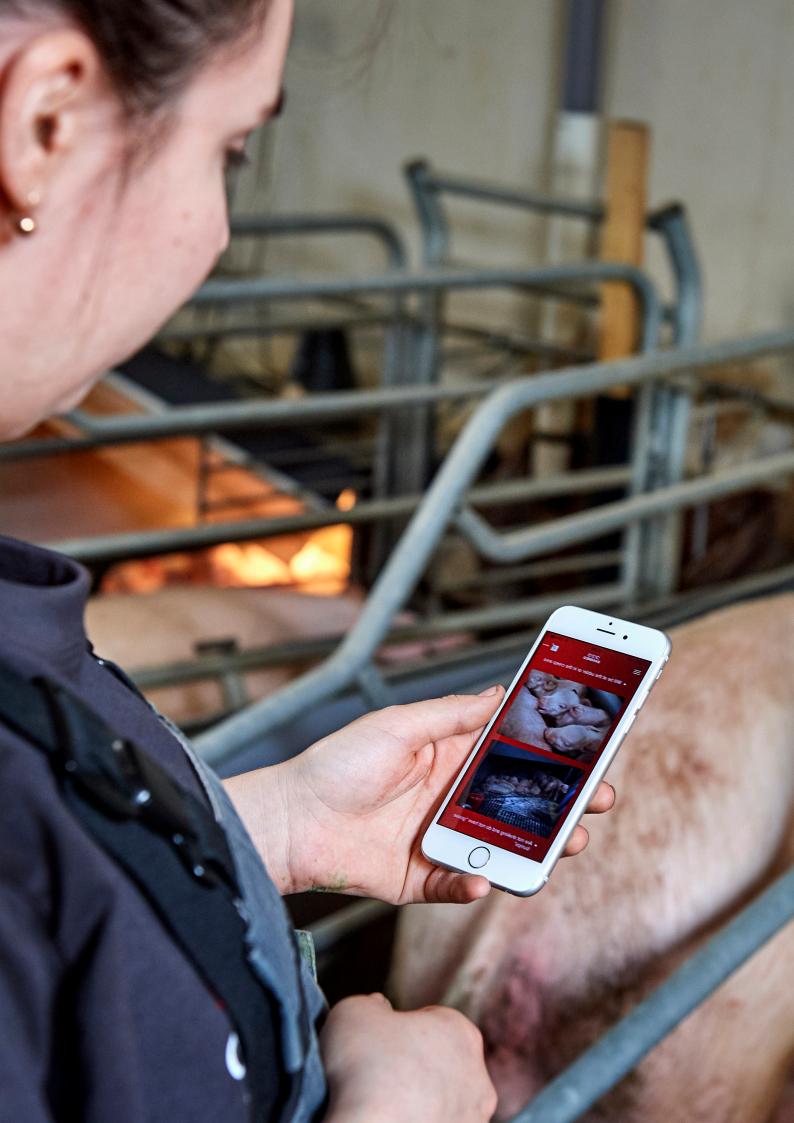
The genetic potential in DanBred animals develops fast. So does the animals' physiological need for nutrition as production further increases. In the DanBred Validated Feeding solution, we focus on feed optimising of the total production. We actively use feed formulation as a tool to help customers reach their specific objectives.

An example could be a special need for high daily gain in finishers in order to make optimal use of an integrated production. In this case, we will, while considering costs, plan feeding initiatives to ensure that the DanBred animals' great potential for growth is realised.



This solution includes both an analysis of how recipes can be optimised and a practical evaluation of the opportunities in the customer's production. Here, theory and practice go hand in hand.

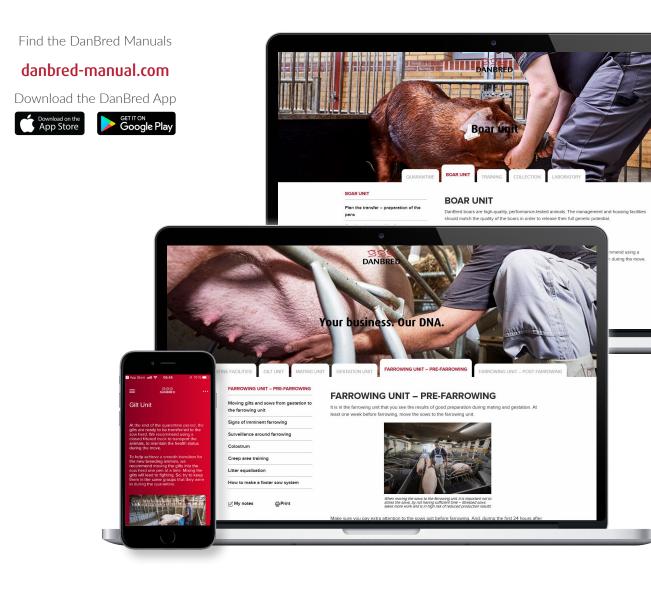




MANAGEMENT The DanBred Manuals are always at hand

The DanBred Manuals help our customers release the full potential of our DNA through easy-to-follow guidelines, videos and instructions.

Our philosophy is that knowledge and guidance should always be available for those who seek it. Therefore, we have transformed the great Danish tradition for knowledge sharing into a digital platform, which is currently translated into seven languages and actively used in more than 36 countries.



KNOWLEDGE

Stay updated with our open online Knowledge Hub

With easy access to practical knowledge that can be applied directly in the production, the DanBred Knowledge Hub expands the DanBred Manuals into a user-guided workspace.

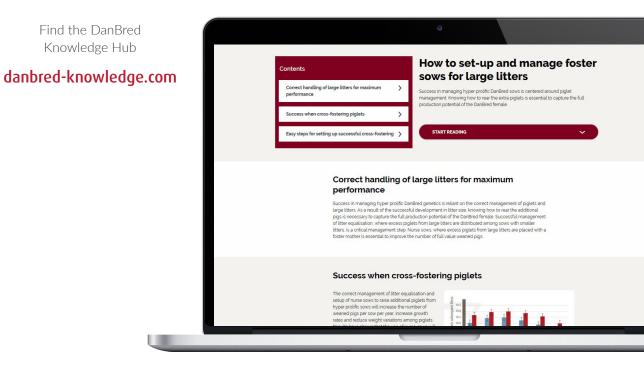
All over the world, you see the same trend; knowledge is found online. To this end, DanBred has developed an online knowledge universe, where our customers can find expert advice and knowledge.

The new Knowledge Hub contains easily accessible articles, informative videos and step-by-step guides.

"With access to our knowledge library and with DanBred breeding animals in their pen, pig producers have the optimal prerequisites for achieving world-class results."

Trine Lund Pedersen, Head of Technical Services, DanBred





DanBred's supply chain connects the world

DanBred's chain of genetic supply is put to the ultimate test in the African Swine Fewer (ASF) ridden Chinese market, where production output is forecasted to decline a further 25 % (10-15 million tonnes pork) in 2020. Despite a marked increase in extra EU exports of pork to China, this has so far only contributed to an increase of about 500,000 tonnes for Chinese consumption, and as it stands, EU has a quite limited surplus for exports from its own, slightly decreasing pork production.

Local supply will be crucial

Other Asian markets, such as the Philippines and Vietnam, are also expecting to see significant drops in production. But despite the fact that the global pig industry enjoys dramatically increasing prices, supply from the EU is still insufficient to meet the demands stemming from ASF affected countries in Asia. So as of now and for the years ahead, it would seem that Asian consumers will have to rely mostly on domestic producers' ability to restore the local pork supply. However, the restoration and/or creation of a biosecure pig production in Asia is associated with enormous investments and risks, which will extend beyond the local industry, as it must rethink most aspects of genetic sourcing, supply and transportation as well as entire production systems.

China taking charge

Large Chinese integrators are first movers in taking on this vast responsibility, and they are well positioned to capitalize on the unmet demand and soaring prices. Supported by an active government, the ambitious development plans of large integrators will challenge leading genetic companies to assist in building new and highly biosecure supply chains of high quality as well as being able to deliver under very diverse, rapidly changing and difficult conditions.

Setting up new and biosecure pipelines of supply in China will require linking up with a breeding company renowned for its sophisticated weekly index ranking of its nucleus and multiplication herds and for safely delivering to the highest health status available.

DanBred can help

"This is where DanBred's unique 100-year heritage as the genetic powerhouse behind the Danish pork industry comes into play. DanBred is wellintegrated both vertically and horizontally with all key players that define the Danish pig production, and we are consistently setting new records in terms of genetic and economic progress, animal welfare and environmental sustainability, in what is perhaps the safest and most sustainable agro food cluster in the world – now set for climate neutrality in 2050," says Jens Fabricius, CTSO & Director of Supply Chain and Solution Sales at DanBred.

DanBred's nucleus and multiplier herds, which amount to more than 145 sites with the highest possible safety level (red SPF), hold approximately 75,000 breeding sows, and with about 7,000 boars in service in Danish AI stations, DanBred delivers direct genetic supply from its core system to a large volume of customers around the world. - This is where DanBred's unique 100-year heritage as the genetic powerhouse behind the Danish pork industry comes into play. DanBred is well-integrated both vertically and horizontally with all key players that define the Danish pig production.

Jens Fabricius

World-renowned SPF health system

This entire breeding and multiplication nucleus in Denmark is free of contagious diseases including Classical and African Swine Fever, Foot and Mouth Disease, SVD, Aujeszky's Disease and Tecschen's Disease as well as Brucellosis, Tuberculosis and Trichinosisare. Furthermore, DanBred's close affiliation with the Danish Pig Research Centre managed SPF-SuS programme secures DanBred's position as a global source of genetics of the highest health and safety levels.

"All in all, our breeding system is rooted in and operates according to world-class health systems," affirms Jens Fabricius. "Every step of the way, including transportation in DanBred's air filtered trucks, which are approved by SPF-SuS, DanBred's policies and procedures comply with the Danish transport standards and the SPF-SuS system,

Left: Bo Kibsdal from Kibsdal Svineavl, a DanBred nucleus herd in Denmark

Right: DanBred airfiltered truck approved by SPF-SuS







thereby setting the highest bar possible for health and biosecurity standards," he continues.

- All in all, our breeding system is rooted in and operates according to world-class health systems.

Jens Fabricius

Growing capacity globally

In addition to these standards, the DanBred breeding system also features the DanBred Index. The DanBred breeding index is universal for all animals whether they origin from a French, Thai or Danish herd, and the chain of supply is 100 % dedicated to supplying only the best-in-breed animals at all times.

"We are also constantly looking for new multiplication partners, also outside of Denmark, where industry growth in Europe requires a capacity increase to supply gilts. DanBred is also well equipped for large multiplication projects in Russia, China and Brazil where DanBred F1 hybrid capacity is set to grow by >10,000 in 2020," explains Jens Fabricius.

"In parallel to the increasing demand, in-house breeding is a growing trend, and DanBred's GenePro programme caters to this need," he continues. "GenePro draws on more than 350,000



Left: Delivery of animals to DB Brazil in the fall of 2019

Right: Shipment of animals to C.P. in China in the fall of 2019

in-house bred sows from leading Danish pig producers, which make up half of DanBred's total genetic supply in Denmark. This is a testament to our capacity and capability to continuously expand our global GenePro network of in-house breeding and multiplication partners in key areas such as China".

What will it take?

Taking all these standards, experiences and features abroad, DanBred must, however, be able to adapt to very different local conditions and legislation.

"We must be able to operate with end-to-end transparency and with a firm, yet flexible direction of genetic resources for the development of new and biosecure pipelines of supply," begins Jens Fabricius. "Furthermore, it takes a handson approach, organizational competency and decision-making ability to engage in fast and risky development projects. DanBred routinely commits to execute plans with top management approval from initial project design through to implementation of integrated production".

As one of very few genetic suppliers allowed to export live animals to China, DanBred demonstrated these abilities in full in close collaboration with a top 5 Chinese integrator in the fall of 2019. In this case, DanBred supplied three consecutive air shipments of a total of 1,000 gilts for a new 6,000 sow farm and full line slaughter pig production system in the Hubei province, South-West of Shanghai – a province that was hit by major ASF outbreaks between 2018 and 2019.

- DanBred routinely commits to execute plans with top management approval from initial project design through to implementation of integrated production.

Jens Fabricius

DanBred takes part in strategic projects like this together with best-in-class providers of farm design, equipment, climate controls etc. In these projects, as well as in the Chinese case mentioned above, DanBred commits services and expertise to deliver results according to the agreed production plans.

Strong links form a complete supply chain

As illustrated, DanBred's supply chain delivers much more than simply transporting pigs around

the world. It is a complete supply chain of highperformance products, knowhow and services sourced directly from the core of the Danish nucleus and multiplier herds as well as our exclusive R&D partner, the Danish Pig Research Centre, and its science network that constantly develops and improves the data collection, index calculation, storage, management and software. This has enabled DanBred's increasing international expansion of a dedicated network of high-performing DanBred multiplier herds as well as the fast expansion of our global GenePro inhouse breeding network.

"We take pride in our ability to mobilize a flexible, yet reliable chain of supply characterized by endto-end trust and commitment. From our base of breeders and multipliers in Denmark, genetic resources, logistical skills and open communication are just some of the traits that enable DanBred to contribute to the pig production industry's economic progress, animal health and sustainable food production all over the world," concludes Jens Fabricius.

"From our base of breeders and multipliers in Denmark, genetic resources, logistical skills and open communication are just some of the traits that enable DanBred to contribute to the pig production industry's economic progress, animal health and sustainable food production all over the world."



Stéphanie Calloc'h, co-owner of Earl du Ruot farm in France with 500 sows and fattening unit Photo: A. Puybasset - Résussir Porc

Jens Fabricius



OUR DNA

DanBred's purebred populations and hybrids

DanBred's breeding goals are not only balanced, they are also focused and include all important traits for production, meat quality, robustness and male fertility as well as good mothering abilities.

DanBred's breeding populations and hybrids all have a great genetic potential. Not only do they contribute to solid profits, they also contribute to a reduction in the climate footprint, as effective breeding animals contribute to a sustainable production.



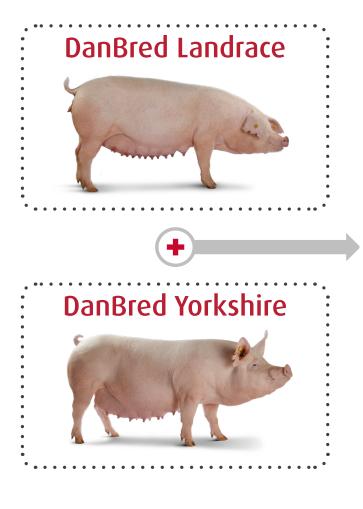
TICGENETICGENETICGEN ETICGENETICGENETICGE NETICGENETICGENETICG THREE-WAY CROSSBREEDING SYSTEM

The sure way to world-class results

DanBred's end customers, producers of piglets and finishers, do not only benefit from the breeding progress in DanBred's purebred populations, but also from the heterosis in DanBred Hybrid as well as DanBred finishers.

The first cross between the DanBred Landrace and DanBred Yorkshire is the DanBred Hybrid, which is used as a female breed in commercial production of DanBred finishers. DanBred Duroc is bred and used as a terminal sire line in the DanBred crossbreeding system.

The breeding goals for the breeds depend on how each is used in the threeway crossbreeding system, and they are different for sire and female breeds. The traits daily gain, feed efficiency, meat quality and robustness are important across all breeds, and the traits for good mothering abilities, LP5 and early growth, are especially important for the DanBred female breeds, as is male fertility for DanBred Duroc.





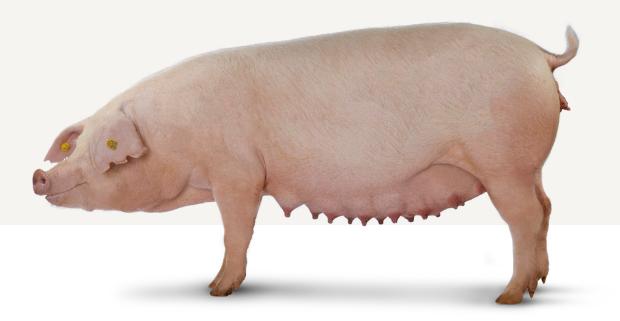
PUREBRED POPULATION DanBred Landrace

DanBred Landrace is one of the female breeds in the DanBred crossbreeding system.

DanBred Landrace has a high fertility and good mothering abilities, and it is known to produce large litters of robust pigs. Additionally, DanBred Landrace is a strong animal with solid legs and a high lean meat percentage.

As a result, DanBred Landrace is often used as a female breed for production of DanBred Hybrid, which is the optimal cross for production of finishers.

DanBred Landrace originates from the Danish Landrace, which has been bred specifically for production of bacon for the British market since the beginning of the 20th century. DanBred Landrace is the result of the Danish Pig Breeding Programme, which, since the early 1970s, has focused on daily gain, feed conversion, longevity, fertility and meat quality in a 100 % professional setup based on state-of-the-art methods and technology.



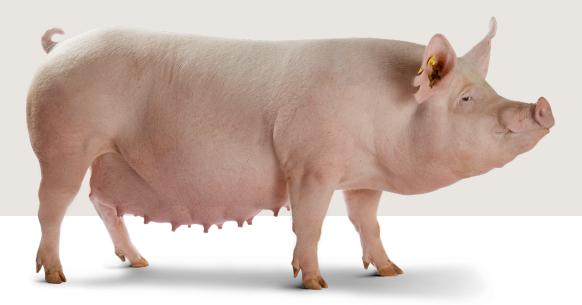
PUREBRED POPULATION DanBred Yorkshire

DanBred Yorkshire is the second female breed in the DanBred crossbreeding system.

DanBred Yorkshire is characterised by its good mothering abilities, and it produces large litters of uniform and vigorous piglets. Furthermore, DanBred Yorkshire has a high daily gain, high feed efficiency and a good meat quality, which makes this breed extremely effective for production of pork.

Consequently, DanBred Yorkshire is primarily used as a female breed for production of DanBred Hybrid, which is the optimal cross for production of finishers.

DanBred Yorkshire originates from England and has been part of the Danish Pig Breeding Programme since the beginning of the 1970s.



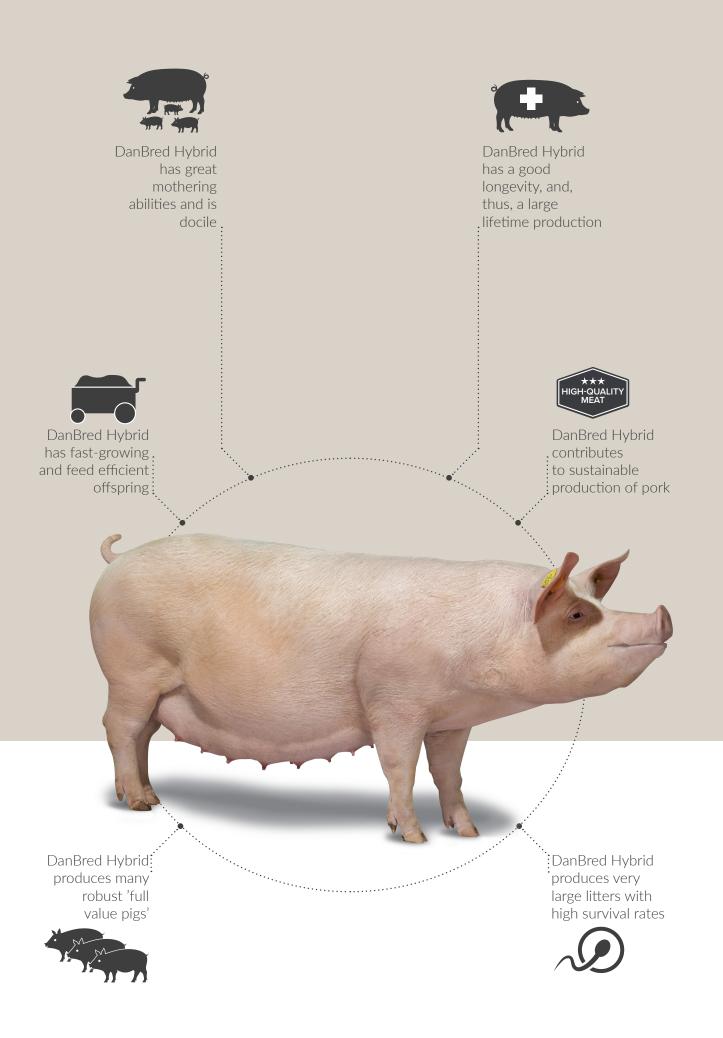


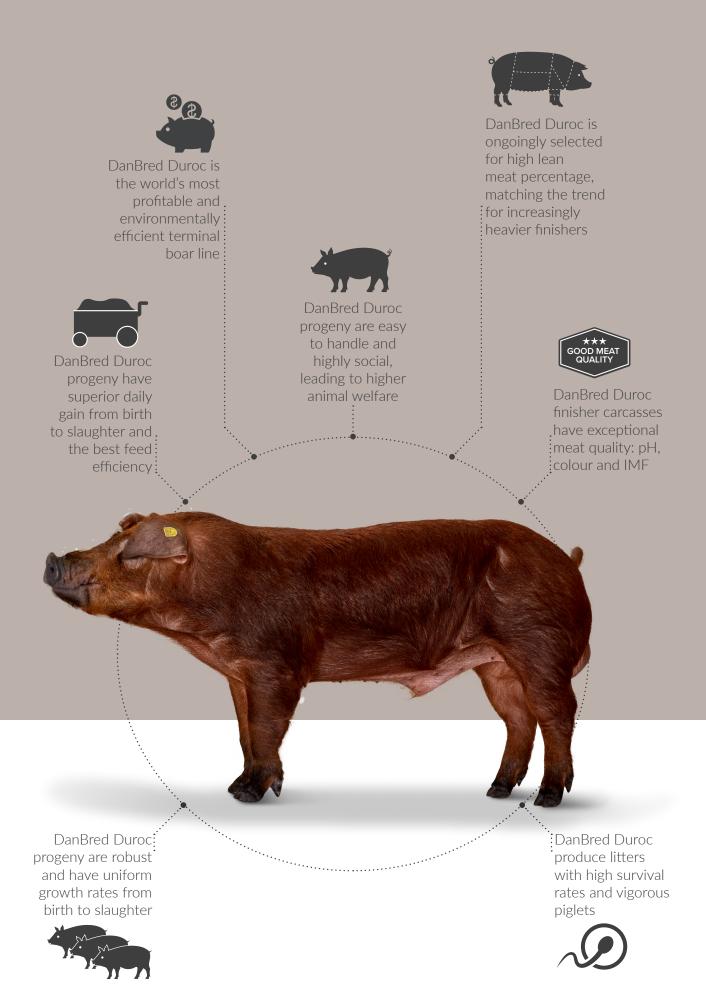
DanBred Hybrid

The most prolific hybrid for production of optimal finishers.

DanBred Hybrid is a first cross between DanBred Landrace and DanBred Yorkshire. It is the optimal dam line, which ensures high efficiency in the production by combining the best traits.

DanBred Hybrid is docile and has excellent mothering abilities as well as a good longevity. The breed produces large viable litters of robust pigs, which grow fast and have a high feed efficiency all the way to slaughter, and when crossed with DanBred Duroc, the offspring will inherit all these traits as well as an excellent meat quality. Therefore, DanBred Hybrid contributes positively to the bottom line and to a sustainable production.



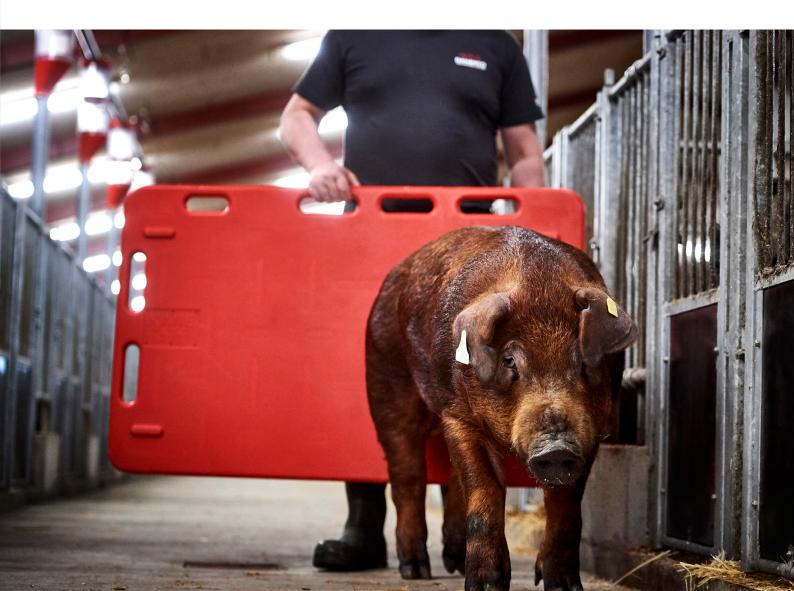


PUREBRED POPULATION DanBred Duroc

DanBred Duroc is the most competitive terminal sire and gives our customers more pork for less money.

DanBred Duroc is used as the terminal sire in the DanBred crossbreeding system for production of DanBred finishers. DanBred Duroc contributes to large litters as well as fast-growing finishers with low feed conversion ratio and a high lean meat percentage. Furthermore, DanBred Duroc produces carcasses with an excellent meat quality, as the breed has been genetically improved through decades of targeted selection, especially in relation to lean meat percentage and slaughter loss – which also corresponds to the growing slaughter weight globally.

When DanBred Duroc is used as the terminal sire, our customers not only get more pork for less costs, but they also get high-quality pork, which is in high demand all over the world. DanBred Duroc's effective genetics are profitable for the pig producer and also contribute to reducing the carbon footprint from the pig production.





Balanced breeding for ambitious results

DanBred's current breeding goals include several traits, which contribute to maintaining optimal animal health and welfare for our highperformance animals.

DanBred's breeding goals

DanBred's breeding goals are balanced and include the most economically important traits for pig producers such as finisher efficiency, maternal traits, robustness and meat quality traits. Although some traits may have an unfavourable genetic relationship with other specific traits, DanBred has been able to successfully achieve genetic progress for all traits – with subsequent impressive economic and sustainable results as well as increased productivity. The robustness trait, conformation, which was included in 1995, and the maternal trait LP5, live piglets on day 5/ litter, are both examples of traits that contribute to animal health, welfare and productivity simultaneously. However, as productivity increases, so does the importance of balanced breeding goals in order to avoid compromising on animal health and welfare. Therefore, DanBred's breeding goals not only focus on increasing productivity, but also ensure genetic gain in robustness to improve the health and welfare of the pigs.

Robustness is key

The breeding of robust pigs is a substantial key input factor to global pig production and ensures healthy and strong animals that are more resistant to changes in their environment. They stay fit and free of infections and diseases, and they maintain a high productivity and a high level of animal welfare.

Selection for improved robustness, i.e. the conformation trait, has contributed to a robust DanBred pig that grows 150-200 g/day faster and has a meat percentage that is 1.5-2.5 percentage points higher than 10 years ago. With such

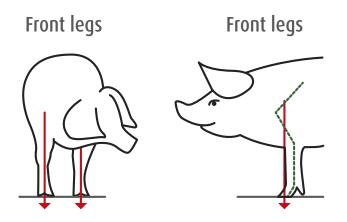


Fig. 1. Correct position of front legs, an example of good conformation score in front legs

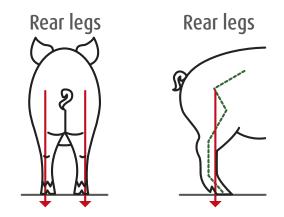


Fig. 2. Correct position of hind legs, an example of good conformation score in hind legs

considerable genetic progress for productivity, simultaneous selection for health and survival related traits, such as conformation and LP5, is paramount to ensure healthy and robust pigs. The fact that DanBred has successfully carried out this concurrent focus on productivity, health and welfare, is also one of the key reasons why DanBred has never experienced any serious health issues in its breeding stock.

Social behaviour and survival past day five

In the near future, DanBred plans to include "social genetic interactions" in its breeding goals, which will add to the genetic progress for daily gain and improve animal welfare further due to a reduction in "misbehaviour" such as tail biting. At the R&D level, DanBred is researching the possibility of including an additional survival trait, "from day 5 and onwards", which has a tremendous perspective for both animal welfare and production economy.

Selecting for conformation

DanBred collects phenotypic records on conformation by using expert technicians, who allocate a subjective conformation score to each pig. The score is based on an evaluation of the pig's front and hind legs as well as its back and general carriage. The pig's conformation is assessed while the animal is moving, because limping and lameness are not always visible in an immobile pig. To obtain an accurate and objective evaluation of conformation with the highest possible genetic variation and heritability, it is important to ensure an optimal environment while scoring.

Examples of undesirable conformation characteristics include inwardly or outwardly curved front legs or swayback. Examples of desirable conformation characteristics are a smooth back line and no problems observed on the legs or hooves (Figs. 1 and 2). In total, ~100,000 pigs from 23 nucleus herds are performance tested each year and receive phenotypic records on conformation.





GENEPRO

Let knowledge and data show the way

DanBred GenePro is for the customers who want to produce their own DanBred Hybrids for closed herd production.

GenePro gives access to the continuous genetic progress generated by DanBred and boosts the productivity and, thus, the value of on-farm replacement gilts – maximising customer profits.

Easy to get started

DanBred GenePro is focused on production of on-farm replacement gilts, and it is easy to get started.

DanBred helps analyse and identify the genetic potential of the customer's herd. Then our customers get access to DanBred's genetic progress, either through their own on-farm boars or with semen from DanBred AI.

Easy to see progress

GenePro gives access to DanBred's Data Bank, which allows the customers to follow the breeding index of their boars or the semen delivered to them. This way, with minimal time for administration, the customer can follow the genetic progress of their herd, and GenePro users will see better production results in the herd within the first generations.

"Getting started was much easier than I anticipated. And I already see a clear progress after one year. We are very satisfied."

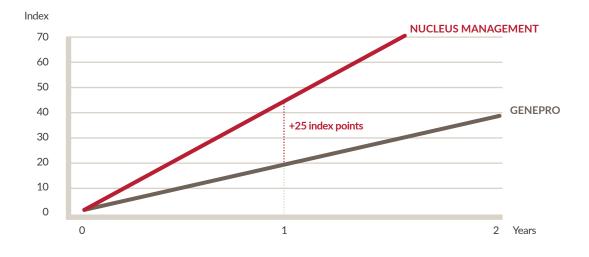
Lars, integrated pig producer, Denmark



NUCLEUS MANAGEMENT Optimize your gilts and boost your bottom line

Nucleus Management is designed for DanBred customers who want the best breeding potential in the long run. This is achieved by using DanBred's digital breeding management tool, Nucleus Management.

Nucleus Management maximises the effect of GenePro with only a few weekly hours of routine administration. The digital tool offers access to all important key figures for planning the breeding work in your own herd. At the same time, users become part of the GenePro ranking system, where it is possible to compare progress against other herds – completely anonymously, of course.



"It is impressive how we can optimise our production with our own access to DanBred's Data Bank. It has made a significant difference in the herd. And even more amazingly, it is both affordable and very easy to manage."

Martin, weaner producer, the Netherlands



NUCLEUS MANAGEMENT

What to expect from Nucleus Management

After just one year with Nucleus Management users will see great progress. It is the most advanced, thorough breeding tool for on-farm production of replacement gilts. With Nucleus Management, users can expect DanBred Hybrids that:

- produce very large litters with high survival rates
- have great mothering abilities and is docile
- produce many robust 'full value pigs'
- have fast-growing and feed efficient offspring
- have a good longevity, and, thus, a large lifetime production
- contribute to sustainable production of pork

In brief, by using Nucleus Management you ensure implementation of DanBred's yearly genetic progress. In the past years, annual progress in LP5 (live piglets on day 5/litter) has been 0.37-0.40 extra live piglets, and the documented progress in daily gain has been 18-19 grams, a lean meat percentage increase of 0.11-0.16 %, and a lower feed consumption equal to -0.041 to -0.037 FUs/kg gain (~ -0.038 to -0.035 kg feed/kg gain).

Easy to get started - intuitive to use

DanBred helps customers get started with Nucleus Management. We show how to achieve genetic progress for the herd and help establish data routines. And because the digital system is easy and intuitive to use, it only takes a few hours of routine administration per week to reach your ambitious goals.

Generation after generation, the productivity of the gilts will increase way beyond average. Nucleus Management is the easiest and best way to ensure transformation of the herd's breeding potential into profit.



Productivity and economic progress

DanBred delivers world-class genetics and service solutions that aim for the best overall economy for you as a pig producer by simultaneously and continuously providing you with improved productivity, genetic and economic progress and technical management support. By doing so, DanBred makes it possible to produce the highest quality pork with the least possible cost; maximum output for less input.

- A breeding programme is like a super-tanker; we have to set and maintain a steady course, which we then finetune at regular intervals in order to reach our desired destination; the highest possible value for our customers.

Thomas Muurmann Henriksen

Keeping a steady course

The main tool to achieving this goal is, naturally, the DanBred breeding programme, which has produced high genetic progress and corresponding economic profits for pig producers for decades. In average, over the past three years, the lasting annual profit per pig has improved by €1.81; an excellent result that further adds to the recordbreaking improvements achieved in preceding years.

"Together with our R&D partner, the Danish Pig Research Centre, DanBred continuously focuses on developing our genetics in order to ensure continued genetic gain both now and in the future, and the progress we have seen in recent years is the result of the focused effort in the breeding programme," says Thomas Muurmann Henriksen, CEO at DanBred. "A breeding programme is like a super-tanker; we have to set and maintain a steady course, which we then finetune at regular intervals in order to reach our desired destination; the highest possible value for our customers".

As the genetic progress results in table 1 show, there are plenty of noteworthy productivity

improvements. The survival rate in nucleus and multiplier herds is increasing and litter size has improved. Furthermore, there is clear progress in finisher traits, such as feed conversion, daily gain and meat percentage, and, at the same time, the robustness traits of longevity and conformation are kept at an optimum, steady level. In addition, trials have shown that breeding progress impacts cross-breed herds just as much as animals in the breeding nucleus, meaning that improvements have a positive effect on all our customers throughout the supply chain.

Achievements in litter size and survival

A substantial part of the productive and economic increase seen over the past decade can be traced back to high genetic progress for the trait LP5, live piglets on day 5 per litter. Since its introduction into the DanBred breeding goals for DanBred Landrace and DanBred Yorkshire in 2004, selection for LP5 has simultaneously contributed to an increase in litter size and a reduction in piglet mortality in the crucial time period between the piglets' birth and day five after farrowing (figs. 1 & 2).

Consequently, today, DanBred is leading the field of improvements in litter size and survival, and the transfer of the genetic traits to production herds is also going very well. The top producers in Denmark are currently weaning just above 40 pigs per sow per year, and this figure is closely followed by similar results outside Denmark.

Focus on finisher traits and feed conversion

Positive as these figures may be, the fact that LP5 has improved so significantly since 2004 also means that further improvements are less valuable today, than when the trait was first introduced. "To be sure, LP5 is still important to have in the breeding goals, and the value of large litters with high survival rates is still high. Nevertheless, by putting slightly less emphasis on LP5 in the breeding goals for DanBred Landrace and DanBred Yorkshire, there is relatively more

The average annual genetic progress (2017-2019)

Daily gain 30 kg – slaughter (g/day)	18
Daily gain birth - 30 kg (g/day)	1
Feed conversion (kg feed/kg gain)	-0.038
Lean meat percentage (%)	0.17
LP5 (live piglets on day 5/litter)	0.33
Conformation (points)	0.11
Longevity (proportion)	0.01
Killing out (kg)	-0.03
Male fertility (piglets born/litter)	0.20

Table. 1. The average annual genetic progress over the past three years (2017-2019)

Maternal traits in the breeding goals

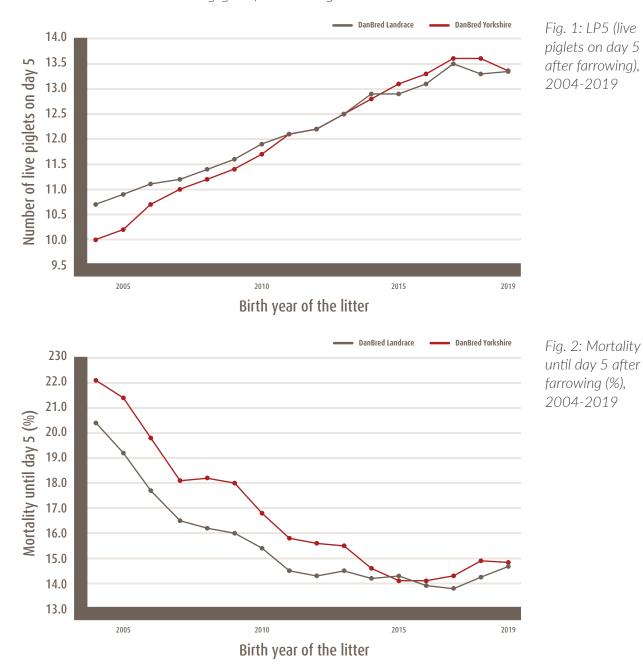
Data show that some sows have a genetic disposition for providing their offspring with a faster daily gain from farrowing up to 30 kg. Therefore, a new trait for maternal abilities, maternal effect on early growth, was added to DanBred's breeding goals in 2018.

Terminal sire impact on litter size

A male fertility trait was added to the breeding goal for DanBred Duroc in 2015, which relates to the sire impact on litter size. Since then, breeding has been more targeted, and data shows that the DanBred Duroc is now making a significant contribution to productivity improvements in sow herds, which directly benefits DanBred's customers. scope for improvements in finisher traits such as feed efficiency, which is the economically most important trait for pig producers around the world," says Helle Palmø, Chief Geneticist at DanBred.

During the past few years alone, DanBred's selection for improved feed conversion ratio has resulted in -0.041 FUs/kg gain (~ -0.038 kg

feed/kg gain) in genetic progress. "Keep in mind that during the last decade, slaughter weight has increased by ½ – ¾ kg annually, which partly blurs the result, as feed efficiency decreases when slaughter weight increases," explains Helle Palmø, before concluding: "-0.041 FUs/kg gain (~ -0.038 kg feed/kg gain) is a highly satisfactory genetic gain".







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We can help with genetics, solutions, logistics and much more.

If you are not already using DanBred genetics, and you would like to switch or learn more, please do not hesitate to get in touch either DanBred or one of our local contacts.



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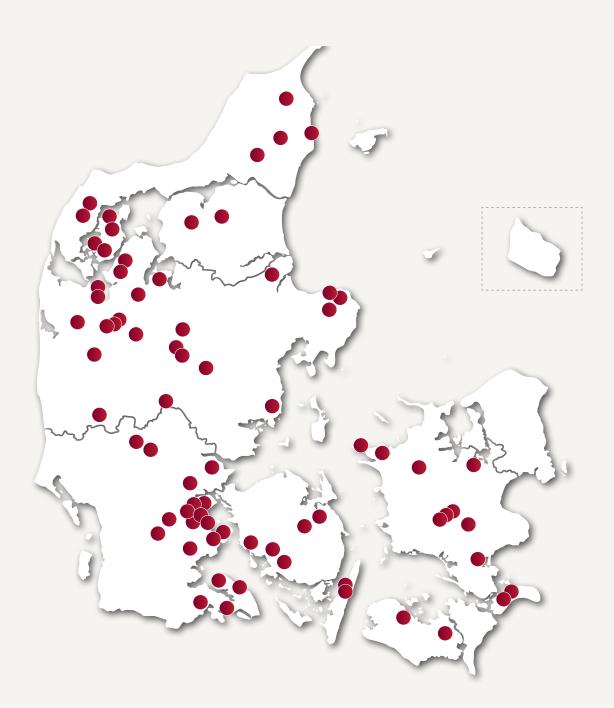
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A network of reliable suppliers

DanBred has a strong base, and our global success story is based on animals from these Danish nucleus and multiplier herds.

DanBred has more than 75 skilled nucleus and multiplier herds all over Denmark, which produce breeding stock with a high health status and world-class genetic potential. Their daily work is vital to the development of the DanBred breeding programme, and it enables DanBred to be able to support pig producers across the globe in optimizing their businesses, increase their profits and create success stories in their own herds.





Your business. Our DNA.

DanBred is one of the world's leading international pig breeding companies supplying genetics and service solutions.

DanBred has highly reliable breeding data and is the first pig breeding company in the world to use genomic information from all breeding candidates when calculating breeding index, which amounts to more than 100,000 animals per year.

DanBred sets long-term, balanced breeding goals, which are revised regularly. This ensures that the genetic progress for the DanBred Duroc, DanBred Landrace and DanBred Yorkshire breeds delivers maximum profit and creates a sustainable high investment return for our customers. See our breeding goals at www.danbred.com.

Well-documented genetics and comprehensive service solutions are the foundation of DanBred. This has made DanBred the first choice for leading pig producers all over the world who expect optimal, predictable business results.

DanBred P/S is owned by the Danish Agriculture and Food Council, Danish Agro and the former DanBred International A/S (now Holdingselskabet DBI A/S).