

The Art of Horse Breeding

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Horse breeding can be more personal than the breeding of most other animals, because of differences in opinion on what is considered to be “the ideal horse.” In the past, breeding was connected to farms. There was a breeding line for each of them. Today, breeding has changed to an industry where lots and lots of money is involved, and the value of a good breeding horse is often gigantic.

In the early part of the last century (1900-1950), Icelandic horse breeding differed from that of today. A lot of it was “free love.” There were hardly any fences. A farmer would release a stallion to his herd of mares in a valley, or some huge pasture, and the stallion would breed to any mare he could, sometimes even the neighbor’s, or stray mares. There might even have been two or three stallions in one huge pasture, and the mares simply bred to the stallion that dominated their herd.

Registration was not practiced, so the knowledge of a pedigree was often undependable or totally unknown. The forces of nature, survival of the fittest, and coincidence often molded horses and the spread of their genes.

A lot of breeding among related horses was caused partly by farmers not thinking twice before keeping a stallion intact, and partly because natural obstacles caused horses of a certain area not to mingle much with horses from other areas. A good example were horses from Hornafjörður. They lived in an area surrounded by one of Europe’s biggest glaciers, the Atlantic Ocean, and some of Iceland’s wildest glacial rivers. The farmers there kept stallions intact that were great at swimming through these glacial rivers, because there were no bridges. As a result, the stock became famous for that quality.

Horses from Austanvatn were another great example, living in an area close to the mountains, oceans, and big glacial rivers on all sides. In that area, horses developed that were related, partly because of intentional breeding and partly by coincidence. These horses had a tendency to be late bloomers (seven to eight

years old). Until then, they were often timid or lazy or both, but with great gaits (four or five), fast, strong, energetic, big boned, with abundant, often curly, mane and tail, good conformation, and good speed in all gaits.

If we think of the Icelandic horse today, we can look back and see that this was the best stock in Iceland at the time. The most famous farms in this area were Kolkuós and Svaðastaðir. When the modern way of approaching horse breeding started to really influence breeding, and when transporting breeding horses between two different areas became more common around 1970, these bloodlines became popular for good reason. Understandably, these horses were used a lot to breed all over Iceland. Many breeders wanted to use this bloodline. This use became a subject of debate back then, and through the next couple of decades.

There is no longer such isolation in the Aus-





Honor stallion, Keilir frá Miðsitju, receiving his honor stallion award at Landsmót.

tanvatn area. Horses are transported back and forth over bridges, across the natural “borders” all the time. The Kolkuós and Svaðastaðir farmers have passed away, and nobody lives on their farms. (Kolkuós has become a kind of a museum/nature reserve). Those that breed solely with these horses, without any outside influence, are becoming few and facing a diminishing gene pool. BUT the genes are all over Iceland. Breeding stock from famous farms and areas like, Flugumýri, and Miðsitja are all originally Austanvatn horses.

Today, a huge population, if not virtually all, the best horses in Iceland trace their origin back to this stock (for example, in Ófeigur frá

Flugumýri, Otur frá Sauðarkróki [father of Orri frá Þúfu], Hervar frá Sauðarkróki, Rauður frá Kolkuósi, and Hrafn frá Holtsmúla, are virtually pure Austanvatn horses).

Today, newer bloodlines are emerging such as the Sauðarkrókur-line from Sveinn Guðmundsson, Flugumýri-line, and Kirkjubær-line. Farms to mention are Kjarnholt, Þúfa, Fet, and Miðsitja, from which we have seen many promising horses over recent years.

Today, with the evolution of the computer age, databases are available to anyone with access to a computer. This has enabled breeders from around the world to gain access to potential breeding prospects and their ancestors. It is important, however, before you dive into your research to ask yourself what your breeding goal is.

Are you looking for great tölt, high movements, or easy temperament? Or are you maybe looking for good conformation, not so high movements, but good easy tölt? Maybe you would love to breed a horse with great pace.

For us in North America, we are of course limited by available breeding stock, as well as by great distances between mares and stallions. It seems logical that the owner of a mare would breed to the nearest and most convenient stallion. Or does it? Let us look at the different factors and options.

Bloodlines

As with any breeding, bloodlines play a strong role in deciding which horse to breed to. Bloodlines are equally as important on the mare's side as they are on the stallion's. They will tell you about the genetic strength in the horse. If a horse has strong, proven bloodlines, it is more likely to carry strong genetic material through to the next generation. Strong proven bloodlines can be found in horses that have repeatedly produced outstanding offspring with great temperament and gaits. Many of these horses have received the status of first prize, or honor prize for offspring. Many of today's horses have some of these proven bloodlines in their heritage. It is important to look at the bloodlines going back several generations, in both mare and stallion, when deciding to breed. It is interesting to see if any of these bloodlines are present in both mare and stallion. This is called line breeding, cross breeding, or inbreeding.

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Sær frá Bakkakoti (foreground) receiving his honors award, with some of his offspring beside him.

“The Icelandic horse has one breed standard by which all Icelandic horses are judged.”

Line breeding means that the same bloodlines have been bred to produce offspring. The bloodline of a line-bred horse will reflect several relatives being bred together. NOT close enough, however, to be inbred (e.g., father and daughter), but enough so that the names of two or three horses should appear more than once.

Line breeding has created some powerful breeding lines in Icelandic horses. Here the Kolkuós horses, and older line Kirkjubær horses, as well as Hornafjörður horses come to mind.

If thoughtfully done, with culling, line breeding can be a useful tool toward developing “type” within a breed.

Cross breeding means that horses of different bloodlines have been bred to produce a new line. Looking at the bloodlines two to three generations back, it is often apparent that many horses have been both line and crossbred repeatedly. So you could, for instance, see that a horse’s grandfather on both sides is Hrafn frá Holtsmúla, but different Hrafn offspring were then used to continue breeding and crossed with a completely different line.

In breeding is typically referred to as breeding direct family members (e.g., mother-son, father-daughter, and brother-sister). While inbreeding can preserve desirable traits, typically breeders stop when the inbreeding coefficient reaches 12 percent. Geneticists say that loss of vigor occurs at 25 percent. Ófeigur 882 frá Flugumýri, honor stallion, and a major

modern foundation sire, was the product of a full sister to a full brother breeding. He was a healthy, vigorous horse until his death in his mid 20s. Ófeigur’s tremendous breeding strength has had an identifiable positive impact on his offspring, and on two to three generations down the line!

The topic of bloodlines is an interesting one. It is always a good idea to ask well-known breeders their opinion on bloodlines.

Bloodlines

In Breeding:

Sire to daughter	25%
Dam to sire	25%
Full brother to full sister	25%

Line Breeding:

Half brother to half sister (typical of line breeding)	12.5%
Grandsire to granddaughter	12.5%
Uncle to niece	12.5%
Aunt to nephew	12.5%
First cousins	6.3%
3 common great grandparents	4.7%
1 common grandparent	3.1%
2 common great grandparents	3.1%
1 common great grandparent	1.6%

A well bred horse has great gaits, a great temperament, and is as fun on the track, as well as on the trail.



In general, however, it is desirable to breed to excellent, proven bloodlines. You should look for those in both horses' pedigrees.

Evaluation scores

"Reaching beauty via top quality rideability."
The Icelandic horse has one breed standard by which all Icelandic horses are judged. This judgment system goes back to the 1950's when the remarkable Horse Breeding Advisor, Gunnar Bjarnason, formed the judgment scale. We have used it with small changes until now! Horses are scored for conformation and rideability at breed evaluations, and the scores are weighed according to importance. Presenting horses for scores helps breeders determine where in their breeding they went right, or wrong.

All horses as of age four can be presented for evaluation. Most horses are presented more than once in their lifetime, and their scores usually improve with maturity and training. Most horses assessed are breeding horses, although it is also often of importance to riders when buying a horse for competition. The truth is that breeding evaluations are there to judge how close current breeding is, to the Icelandic horse standard. Although many high-scoring horses go on to be competition horses, it is not a standard in itself for competition.

What the breeding judges look for is great conformation with great gait ability. These traits are what should be passed on to the next generation. This helps the breeder see the potential of the horse. Conformation scores tend to vary less than the riding scores as those

aspects are only minimally affected by training.

A score of 5.0 indicates that the horse does not have, or did not show this gait. A score of 6.0 is undesirable. It indicates that the horse does not have sufficient gait ability and balance to be considered average. A score of 7.0-7.5 is average. This score, depending on the age and training level of the horse, can often be improved. A score of at least 8.0 is desirable and 9.0 or over, is exceptional. Scores, of course, are just a guideline and show us what that particular horse was capable of at one time. There is no guarantee that the traits will be passed on, but several scores are looked at more closely than others by breeders.

For instance in conformation, it is preferable to get a good score (8.0 or over) for neck/withers/shoulders. This score is directly related to gaits and the features that help a horse carry itself well. The second highest score is for proportions, and weighed at 7.5 percent. Another score looked at closely, is leg quality. This score is of great importance in determining how strong the horse's legs are to support itself, and its longevity as a riding horse. The hoof score is the fourth important score as it determines the health of the horse. Without good feet the horse is not rideable. A good hoof can prevent injury, and absorb the shock of movement more efficiently.

In rideability, it is preferable to get a high score for tölt (8.0 or over), and pace if the horse has pace, as these are the Icelandic horse's main attributes. In a four-gaited horse, where there is no pace score, breeders like to see a slightly higher score in tölt than in a five-gaited horse, to make up for the lack of pace.

Temperament is another score that is of importance, as it reflects the horse's willingness to please. In the past, this score has been changed several times. It originally showed how fast the horse liked to go, and not necessarily how well it listened to its rider. This score has since been split into temperament and spirit to show a score for both attributes. Character is a trait of great importance, and can make the difference between a difficult-to-train horse, and an easy one. There is no score for this trait, but it is one that should be strongly considered when choosing to breed.

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Honor Stallions

	Score	Offsp.	BLUP
1978			
Sörli frá Sauðarkróki	8.24	1198	96
1982			
Hrafn frá Holtsmúla	8.56	1205	114
Páttur frá Kirkjubæ	8.16	677	104
1986			
Ófeigur frá Hvanneyri	8.55	707	95
Náttfari frá Ytra-Dalsgerði	8.54	711	103
1990			
Hervar frá Sauðarkróki	8.27	910	109
Gáski frá Hofsstöðum	8.32	703	109
Ófeigur frá Flugumýri	8.19	811	111
1994			
Pokki frá Garði	7.96	519	113
Kjarval frá Sauðarkróki	8.32	861	109
Stígur frá Kjartansstöðum	8.15	483	111
1996			
Angi frá Laugarvatni	8.26	646	108
1998			
Stígandi frá Sauðarkróki	8.15	524	104
2000			
Orri frá Þúfu	8.34	1117	126
Kolfinnur frá Kjarnholtum	8.45	820	115
2002			
Porri frá Þúfu	8.26	476	119
Gustur frá Hóli	8.57	660	123
Oddur frá Selfossi	8.48	396	118
2004			
Kraflar frá Miðsitju	8.28	257	116
Óður frá Brún	8.34	509	114
Andvari frá Ey I	8.36	552	120
Galsi frá Sauðarkróki	8.44	552	115
2006			
Hugi frá Hafsteinsstöðum	8.31	415	117
Keilir frá Miðsitju	8.63	502	118
2008			
Hróður frá Refsstöðum	8.39	460	123
Sær frá Bakkakoti	8.62	469	127

Some other influential foundation horses that are not honor stallions include:

Nökkvi 260 frá Hólmi, Lýsingur 409 frá Voðmúlastöðum, Hörður frá Kolkuósi, Rauður frá Kolkuósi, Gustur frá Sauðarkróki, Adam frá Meðalfelli, Otur frá Sauðarkróki



Photo Gígja Einarsdóttir



Above (L-R): Hjörtur frá Holtsmúla, highest scored 5 gaited stallion in the US; Stari frá Bredhall, highest scored 4 gaited stallion in the US; Logi frá Skarði, highest scored 4 gaited stallion in Canada; Segull frá Stóra-Hofi, highest scored 5 gaited stallion in Canada

Horses are considered second prize if they have been evaluated and have a combined score (rideability and conformation) of 7.75-7.99 for stallions, and 7.5-7.99 for mares. Horses that have received a combined score of 8.0 or higher are considered first prize. The riding score is more heavily weighed than the conformation score (60 percent – 40 percent), and is considered more important. Each gait, or trait, is also weighed differently by percentage. The tölt counts as the highest percentage (15 percent). The walk counts as the lowest percentage (1.5 percent). Neck, withers, shoulders counts as the highest (10 percent), mane and tail counts the lowest (1.5 percent).

It is important to consider that many horses are shown more than once in their life, and that their scores can improve with maturity and training. So although some horses might have higher scores than others, they might have been shown several times, whereas the lower scoring horse might have only been shown once. Another thing to consider is the age of a horse at which it receives the scores. A 5-year-old horse that receives high scores shows much more natural talent due to less years of training, than an 8-year-old receiving the same scores.

BLUP

BLUP is short for Best Linear Unbiased Prediction. The BLUP breeding value is an estimate of what the individual could be expected to pass on to its offspring. The BLUP score shows us a prediction of heritability for any given trait. Based on the breeding judgment, mathematical calculations are made to determine the breeding value of a horse. This calculation can be made based on judgments of ancestors, judgments of the individual, or information about the offspring. It is a valuable system that gives us an indication of what we might expect.

The BLUP score does not take environmental influences or training into consideration, and is therefore only to be used in conjunction with bloodlines and scores. The BLUP score changes yearly, depending on the performances of the offspring and its relatives, so a horse with more offspring (and relatives' offspring) would have a more accurate BLUP prediction than a horse with fewer. When looking up the horse's BLUP, a percentage is calculated at the end to determine how accurate the given BLUP score is. For instance, Hervar frá Sauðarkróki has an accuracy of 100 percent based on his offspring and his ancestors. Some of the newer, popular breeding stallions, like Auður frá Lundum II, or Ágústínus frá Melaleiti, only have 78 percent accuracy. This needs to be taken into consideration when viewing scores.

It is important to know that each BLUP score is calculated separately and independently of the other scores. The total BLUP score is not a calculation of the other scores, like it is in the evaluation scores. This is why you sometimes see the total score vary greatly from the individual scores.

You should also consider that all evaluation scores are used in the calculations, including horses judged for conformation only. This will often give the appearance that the calculation of the total scores don't mathematically equate, when in actuality the conformation scores of horses are included, even if they did not receive a score for ridden abilities.

The BLUP scoring system is complex, but it is a valuable guide in looking at the probable heritability of the two parents in breeding. Of course, the chances of producing an offspring with good gaits are increased by breeding to parents that have shown consistent high BLUP scores throughout several generations. In BLUP, a score of 100 is average, below 100 is below average, and above 110 is desirable, 120 or over is exceptional. But always remember to also check the accuracy percentage when looking at a BLUP score.

“ It is important to know that the BLUP scores are not always accurate . . . some breeding horses are missing either pedigree or evaluated parents in their bloodlines, and are therefore automatically scored lower. ”



When offspring receive a BLUP score, it is just a prediction. The BLUP score is supposed to help the breeder determine which of the horse's features are more likely to be inherited, and how good the offspring will most likely be.

It is possible, for example, to find out what the most likely breeding value will be of an offspring from two known individuals before they are bred! A complex program developed in Sweden by IHBC (International Horse Breeding Consultants) enables breeders to get a potential score of how strong the traits of the offspring will likely be, by enabling one to see a BLUP prediction of the future offspring. This can be done in WorldFengur by simply going to Virtual Mate Selection. All that is needed are the registration numbers of both the mare and the sire. Horses do not need to be evaluated for the program to work, but they do have to have a BLUP value assigned to them. The program will also predict the

possible color outcome, although the color prediction has some flaws and is not completely reliable. This program is of great value in pairing up several different horses to see which combinations would most likely create the outcome the breeder is looking for. To see how accurate the program was, I compared the predicted BLUP score to the actual BLUP score of several offspring from the same parents. The deviation was minimal. The BLUP should be used as a supplement to other data and should not be solely relied on.

It is important to know that the BLUP scores are not always accurate, due to the fact that some breeding horses are missing either pedigree or evaluated parents in their bloodlines, and are therefore automatically scored lower. Their offspring could be very talented, but their BLUP would not reflect that due to the lack of data.

WorldFengur

WorldFengur is the stud book of origin for the Icelandic horse. It is a web database program that contains information on Icelandic horses, in the membership countries of FEIF (International Federation of Icelandic Horse Associations). It is easy and fast to search for information in WorldFengur (www.worldfengur.com). You can search for horses by FEIF-ID number, name, origin, parents, breeder, owner, country of birth, country of location, and more. You can search for owners by ID and name, and you can also perform more specific searches, i.e., you can search for all horses in Iceland that have been assessed. Furthermore, you can find information on all breeding shows in Iceland from the year 1967, with all the assessments.

Now that all USIHC members have free access to WorldFengur with their membership, it is a great opportunity to learn about our horses' heritage and breeding potential. It is a valuable tool in learning about bloodlines. In looking at your horses' bloodlines, you will begin to see some horses that show up

repeatedly. These were horses that have helped make the Icelandic horse as great as it is today. They are considered foundation horses. To name just a few: Sörli frá Sauðarkróki, Ófeigur frá Flugumýri, Hrafn frá Holtsmúla, Hervar frá Sauðarkróki, and many, many more. The database now boasts a record 300,000 horses with more entries added yearly, showing scores, offspring, BLUP, and nowadays DNA.

A guide on how to use WF is available as a PDF on their website under 'Introduction.'

Color prediction

When in the company of Icelanders, as someone naively gushes on about how pretty a horse may be, or fantasizes about one color over another, the Icelandic remonstrance is quickly, "You don't ride the color." This cultural sensibility about horses contrasts with much of horsemanship, and horse breeding in North America, where the breeding of horses has been driven by color, and by people determined to push a show aesthetic. In too many breeds, standards have been changed entirely from what they originally were. Nevertheless, a beautiful color is always great, but it should not be the main consideration when breeding a great riding horse. The predominant color of the Icelandic horse is chestnut. Black, bay, or duns are close runners-up. When looking at the Icelandic horse breed, it is amazing to see so many great, and unusual colors. Many breeders in Iceland have tried to breed horses with great gaits AND with great color. Their success has been limited so far. There are some palomino horses, a few pintos, and grays, but hardly any silver dapple, roan, or other unusual colors among the highly judged horses.

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We are fortunate to have horses of various colors in North America that we can breed to, but it should be clear that breeding for color alone does not necessarily produce the best riding horse. If you breed mares that already have great color, to stallions with great color, you are more likely, statistically, to end up with a foal with an interesting color, than if only one of the parents had an interesting color. If you would like to educate yourself further about color genetics, the book, “Equine Color Genetics” by Philip Sponenberg, is a great reference book.

AI

Breeding with shipped, chilled semen is a common, and successful method. In fact, a properly managed mare will have a higher rate of conception with AI (artificial insemination) than through live cover. The most important benefit, however, is that distances are not an issue. You can breed your mare to the stallion of your choice without any concern where he is, in relation to your mare. In a place as vast as North America, this is extremely exciting for such a rare breed. One of the biggest drawbacks of AI can be the cost. The mare’s owner will have to pay the stud fee, vet costs, and for the collection, and shipment of the semen. The costs, however, are small compared to the upkeep of a horse in its lifetime, and are well worth considering, if the match seems good.

Breeding with frozen sperm has been less successful in Icelandic horses. It might be worth a try if the stallion is exceptional, but be aware that the success rate is low.

Breeding fees

Breeding fees vary from stallion to stallion, and are usually based upon the horses’ bloodlines/scores/BLUP, and their offspring. Fees usually range between \$500 to \$1,500 dollars. Breeding fees in Iceland have risen considerably over the past few years. Some are now over \$3,000 dollars, so breeding fees here in North America are not high.

Final thoughts

There are many variables, but one thing is clear: It is more expensive to breed, and raise a problem horse, than it is to breed a good horse. If you ever decide to sell your offspring, a good horse is much easier to sell than a not so good one.

All breeders should try to educate themselves as much as possible. Use all the information out there, and talk to others about the character of the horse in question, as well as the character of it’s offspring.

Mares are just as important, if not more so, than the stallion. Look up your horses in WF, and see how many of the foundation horses are in their bloodlines.

Bottom line: Try to breed to the best. ●

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Thoughts on breeding by famous breeders



Sigurður Sæmundsson – was at Holtsmúli, is now at Skeiðvellir

When we look for young breeding horses it is very important that the horses have good dispositions. Then we look at the bloodlines, how the horse is moving and, of course, we also want a nice conformation. We use scores, bloodlines, and past offspring to help decide which to breed, but most importantly, we like to see the stallion when we are looking for a stallion for our mares. We think the bloodlines are most important for breeding, but for business the BLUP, and scores are important as well.



Brynjar Vilmundarsson – Fet

It is difficult to explain what it is exactly that makes me decide which horses to use. Usually it is something intriguing about the horse(s). I am usually quick to decide (based on the above mentioned feeling) if a young horse will be good, and sometimes I am right, and I am just as quick to decide if it will not be good.

I study the BLUP and try to avoid using horses with low BLUP scores, which does not mean that I will avoid them completely (here the feel for horses comes into play). In my opinion the BLUP is here to stay, and is a guideline to achieving quality horses.

I speculate about the bloodlines of the horses (as well as the bloodlines of humans). I started my breeding with horses of the Sauðarkrókur line, and have always kept close to that line. There are usually about 40 mares bred at Fet each year, and for this group I'll use 13-20 stallions. In rideability its tölt and pace, which I think, are the most important.



Gunnar Arnarsson – Auðsholtshjáleiga

Strong bloodlines and the qualities behind the horses are the foundation of good horse breeding.

The most important thing when breeding horses is to be very aware- and realistic about the breedability of both the father and mother, as well as what you want to achieve. 'What are you looking for?' – distinguish this. Be truthful to yourself, and don't convince yourself that something that is mediocre is great.

BLUP is a knowledge-bank and is fundamental when breeding. BLUP is really a mapping of the horses' backgrounds, their heritage, qualities and faults. Using the knowledge and technology that is already available speeds up the process, and then the progress will be quicker.

A stallion's scores, heritage, and breeding scores matter to us when we are breeding our mares. We've set our goals high: we have made the decision to exclusively use stallions for breeding that have been shown, and have proved themselves as individuals. We also pay close attention to how the offspring of stallions do in evaluations, and take this all into consideration when breeding our mares.



Jón Friðriksson – Vatnsleysa

There is only one horse breed in the country (Iceland), but there are many different lines within the stock. It is probably not very good, from a genealogical point of view, if everybody bred the same type of horses. It is necessary that each breeder develop horses that he likes himself. In order to achieve this, breeders need to know their own mares. Scores on paper are good, but we must know the individual better than the number on paper. My advice to those who breed horses is to follow their own ideas. Leave it to your heart to make the choice, with a bit of sensibility thrown in. Form your own opinion about what you want to breed, and be true to your idealism. People who start breeding should do so on a small scale. It is much better to buy one good mare, than 10 reasonable ones, and it gives you better chances of good results. I am not much for inbreeding, but it is important to pair off horses with similar characteristics. In that way the outcome is more reliable.

The fun part of horse breeding is that you can never be certain beforehand, and you can get something completely different from what you expected – both good and bad. Everybody who has bred horses knows this.

Jón Friðriksson passed away on November 17th, 2004. Jón was already a legend during his life, and in his younger years he was one of the best riders in Iceland.