

# Crossbreeding Fact Sheet

Interest in crossbreeding has been steadily increasing. Commercial producers want to know what to expect when crossing two or even three breeds together. However, crossbreeding is not an exact science. Research is being conducted to help predict the outcome of crossbreeding.

This Fact Sheet looks at the advantages and disadvantages of crossbreeding. It provides first generation projections when crossing Holsteins with other breeds and provides other considerations for future generations of crossbreeding.

**Table 2. Genetic breed averages.**

Breed	Milk	Fat	Prot.	UDC	Size	FLC	SCS	PL	DPR	CE	SB	LNMS	LCMS	LFMS
Holstein	25,750	931	803	0.5	1,496	0.5	3.000	23.8	21.0	8.0	8.0	0	0	0
Brown Swiss	21,672	865	745	0.5	1,496	0.5	2.840	24.0	22.0	4.8	7.3	-303	-156	-529
Jersey	18,278	829	675	-0.5	990	-0.5	3.240	27.8	26.0	0.9	6.5	-372	-150	-709
Finnish Red*	20,634	817	665	-0.5	1,144	-0.5	2.780	26.0	24.4	3.4	4.2	-491	-449	-543
Montbeliarde	20,136	763	657	-0.5	1,562	0.5	2.900	27.0	27.0	6.5	6.0	-751	-693	-827
Normande	17,756	689	605	-0.5	1,496	0.5	2.900	26.6	29.0	8.6	7.1	-1114	-1010	-1258
Guernsey	16,968	741	583	-0.5	1,144	-0.5	3.200	22.0	22.0	3.4	9.1	-1275	-1167	-1425
Ayrshire	18,640	711	613	-0.5	1,210	0.5	2.860	25.8	23.2	4.5	6.8	-1050	-988	-1129
Heterosis	700	35	26	0.0	44	0.0	.016	0.3	1.8	0.0	-2.0	242	252	224

\* Calculations were also done on other red breeds with similar results.

## Crossbreeding Advantages

- The opposite of inbreeding - hybrid vigor (heterosis) is real
- Fitness traits (i.e. fertility, calving ease, stillbirths etc.) tend to have the greatest benefit from hybrid vigor
- Opportunity to increase components of milk-beneficial in component milk pricing schemes

## Crossbreeding Disadvantages

- Loss of milk production
- Lower value for animals (dairy or slaughter value)
- Genetic improvement limited to breed improvement (small populations = less selection intensity = less improvement)

- Loss of uniformity of herd - cow size differs making it more difficult to feed properly and increases challenges in providing good cow comfort. In some parlors, differences in size of cows can be very challenging.

**Table 3. First generation projections**

Breed	Milk	Fat	Prot.	UDC	Size	FLC	SCS	PL	DPR	CE	SB	LNMS\$	LCMS\$	LFMS\$
Holstein	25,750	931	803	0.5	1,496	0.5	3.00	23.8	21.0	8.0	8.0	0	0	0
Brown Swiss x Holstein	24,411	933	800	0.5	1,540	0.5	2.94	24.2	23.3	6.4	5.7	91	174	-40
Jersey x Holstein	22,714	915	765	0.0	1,287	0.0	3.14	26.1	25.3	4.5	5.3	56	177	-131
Finnish Red x Holstein	23,892	909	760	0.0	1,364	0.0	2.91	25.2	24.5	5.7	4.1	-3	27	-48
Montbeliarde x Holstein	23,643	882	756	0.0	1,573	0.5	2.97	25.7	25.8	7.3	5.0	-133	-94	-190
Normande x Holstein	22,453	845	730	0.0	1,540	0.5	2.97	25.5	26.8	8.3	5.6	-315	-254	-405
Guernsey x Holstein	22,059	871	719	0.0	1,364	0.0	3.12	23.2	23.3	5.7	6.6	-396	-331	-489
Ayrshire x Holstein	22,895	856	734	0.0	1,397	0.5	2.95	25.1	23.9	6.3	5.4	-283	-242	-340

## Considerations

- Projections based on using identical genetic level of sires (+400 LNM\$ Holstein or +400 LNM\$ Jersey). This may not be practical or even possible across breeds due to sire levels differing across breeds.
- Red breeds have profit potential when milk payments resemble more component pricing.
- When future generations (F2, F3, etc.) are examined within the three different index markets it appears:
  - Fluid Merit (Milk paid on volume and fat) - the purebred Holstein is superior to any crossbred combination.
  - Cheese Merit (Milk paid on protein and fat and discounted volume) - a three breed rotation of Holstein, Jersey and Brown Swiss produces optimal results.
  - Net Merit (Milk paid on protein and fat and neutral volume) - a two breed rotation maximizes the index; Holstein must be one breed and Jersey or Brown Swiss should be the second breed.
- Genetic gain for the different breeds is not taken into consideration when projections for F2 and beyond were calculated. In general, as breed population increases, and more importantly as number of sires sampled increases, the greater the genetic gain and larger opportunity exists for extremes (more sires with high indexes).

Disclaimer: Breed averages were sourced through government data bases, Interbull, or science literature when possible but in some cases educated estimates were necessary. Data shown and summaries made will change as more accurate data becomes