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Genetic trends for live weight traits reflect breeding strategies in registered Charolais Farms in Mexico

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Abstract

Genetic trends are commonly used to verify genetic improvement; however, there are few reports on beef cattle in Mexico. Data from 1998 to 2013 from four Charolais bull breeding farms were examined to verify the genetic responses to different breeding management and selection criteria. Analysis included the comparison of regression lines of breeding values for birth (BW), weaning (WW) and yearling weights (YW), and maternal weaning weight (MWW) on the year of birth of the animals. Results revealed differential genetic progress for BW and YW and indicated that the overall analysis may have diluted the perception of genetic progress from the farmer's point of view. The use of breeding values as a tool for selection is effective to achieve genetic progress, even in negatively correlated traits, such as birth weight and yearling weight.

Keywords

Beef cattle Breeding values Genetic change Growth Selection

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Notes

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Compliance with ethical standards

Conflict of interest

The authors declare that they have no conflict of interest.

References

AICA, 2015. 2015 Charolais National Cattle Evaluation American-International Charolais Association. Genetic Trends. http://www.charolaisusa.com/pdf/2015/b%20graph.pdf (http://www.charolaisusa.com/pdf/2015/b%20graph.pdf) Accessed: 12 May 2015.

Ahlberg, C.M., Kuehn, L.A., Thallman, R.M., Kachman, S.D., Snelling, W.M. and Spangler, M.L., 2016. Breed effects and genetic parameter estimates for calving difficulty and birth weight in a multibreed population. Journal of Animal Science. doi: 10.2527/jas2015-0161 (https://doi.org/10.2527/jas2015-0161)

PubMed (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=27285683)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Breed%20effects%20and%20genetic%20parameter%20estimates%20for%20calving%20difficulty%20and%20birth%20weight%20in%20a%20multibreed%20population&author=CM.%20Ahlberg&author=LA.%20Kuehn&author=RM.%20Thallman&author=SD.%20Kachman&author=WM.%20Snelling&author=ML.%20Spangler&journal=Journal%20of%20Animal%20Science&publication_year=2016&doi=10.2527%2Fjas2015-0161)

Arnold, J.W., Bertrand, J.K., Benyshek, L.L. and Ludwig, C., 1991. Estimates of genetic parameters for live animal ultrasound, actual carcass data, and growth traits in beef cattle. Journal of Animal Science, 69, 985–992.
CrossRef (https://doi.org/10.2527/1991.693985x)
PubMed (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=2061268)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Estimates%20of%20genetic%20parameters%20for%20live%20animal%20ultrasound%2C%20actual%20carcass%20data%2C%20and%20growth%20traits%20in%20beef%20cattle&author=JW.%20Arnold&author=JK.%20Bertrand&author=LL.%20Benyshek&author=C.%20Ludwig&journal=Journal%20of%20Animal%20Science&volume=69&pages=985-992&publication_year=1991)

Bennett, G.L., 2008. Experimental selection for calving ease and postnatal growth in seven cattle populations. I. Changes in estimated breeding values. Journal of Animal Science, 86, 2093–2102.
CrossRef (https://doi.org/10.2527/jas.2007-0767)
PubMed (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=18441073)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Experimental%20selection%20for%20calving%20ease%20and%20postnatal%20growth%20in%20seven%20cattle%20populations.%20I.%20Changes%20in%20estimated%20breeding%20values&author=GL.%20Bennett&journal=Journal%20of%20Animal%20Science&volume=86&pages=2093-2102&publication_year=2008)

Bennett, G.L., Thallman, R.M., Snelling, W.M. and Kuehn, L.A., 2008. Experimental selection for calving ease and postnatal growth in seven cattle populations. II. Phenotypic differences. Journal of Animal Science, 86, 2103–2114.
CrossRef (https://doi.org/10.2527/jas.2007-0768)
PubMed (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=18441079)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Experimental%20selection%20for%20calving%20ease%20and%20postnatal%20growth%20in%20seven%20cattle%20populations.%20II.%20Phenotypic%20differences&author=GL.%20Bennett&author=RM.%20Thallman&author=WM.%20Snelling&author=LA.%20Kuehn&journal=Journal%20of%20Animal%20Science&volume=86&pages=2103-2114&publication_year=2008)

Berry, D.P., and Crowley, J.J., 2013. Cell Biology Symposium: Genetics of feed efficiency in dairy and beef cattle. Journal of Animal Science, 91, 1594–1613.
CrossRef (https://doi.org/10.2527/jas.2012-5862)
PubMed (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=23345557)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Cell%20Biology%20Symposium%3A%20Genetics%20of%20feed%20efficiency%20in%20dairy%20and%20beef%20cattle&author=DP.%20Berry&author=JJ.%20Crowley&journal=Journal%20of%20Animal%20Science&volume=91&pages=1594-1613&publication_year=2013)

British Charolais Cattle Society. 2015. 2015 March British Charolais GROUP BREEDPLAN. abri.une.edu.au/online/images/ukch/breedplan/ukch-breed-trends-graphs.pdf (http://abri.une.edu.au/online/images/ukch/breedplan/ukch-breed-trends-graphs.pdf) Accessed: 12 May 2015.

Charolais-Charbray Herd Book de México, 2014. Sumario de sementales Charolais y Charbray, 2014. Evaluación genética con diferencia esperada de la progenie de toros. SAGARPA. 95 p. http://www.charolais.org.mx/SumarioSementalesCharolais2014.pdf (http://www.charolais.org.mx/SumarioSementalesCharolais2014.pdf) Accessed: 3 May 2015.

Eriksson, S., Näsholm, A., Johansson, K. and Philipsson, J., 2004. Genetic parameters for calving difficulty, stillbirth, and birth weight for Hereford and Charolais at first and later parities. Journal of Animal Science, 82, 375–383.
CrossRef (https://doi.org/10.2527/2004.822375x)
PubMed (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=14974534)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Genetic%20parameters%20for%20calving%20difficulty%2C%20stillbirth%2C%20and%20birth%20weight%20for%20Hereford%20and%20Charolais%20at%20first%20and%20later%20parities&author=S.%20Eriksson&author=A.%20N%C3%A4sholm&author=K.%20Johansson&author=J.%20Philipsson&journal=Journal%20of%20Animal%20Science&volume=82&pages=375-383&publication_year=2004)

FAO, 2007. The State of the World's Animal Genetic Resources for Food and Agriculture, (edited by Barbara Rischkowsky & Dafydd Pilling. Commission on Genetic Resources for Food and Agriculture Food and Agriculture Organization of the United Nations Rome).
Google Scholar (https://scholar.google.com/scholar?q=FAO%2C%202007.%20The%20State%20of%20the%20World%E2%80%99s%20Animal%20Genetic%20Resources%20for%20Food%20and%20Agriculture%2C%20%28edited%20by%20Barbara%20Rischkowsky%20%26%20Dafydd%20Pilling.%20Commission%20on%20Genetic%20Resources%20for%20Food%20and%20Agriculture%20Food%20and%20Agriculture%20Organization%20of%20the%20United%20Nations%20Rome%29.)

Garrick, D. J. and Golden, B.L., 2009. Producing and using genetic evaluations in the United States beef industry of today. Journal of Animal Science, 87, E11-E18.
CrossRef (https://doi.org/10.2527/jas.2008-1431)
PubMed (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=18849385)

Google Scholar (http://scholar.google.com/scholar_lookup?title=Producing%20and%20using%20genetic%20evaluations%20in%20the%20United%20States%20beef%20industry%20of%20today&author=DJ.%20Garrick&author=BL.%20Golden&journal=Journal%20of%20Animal%20Science&volume=87&pages=E11-E18&publication_year=2009)

Golden, B.L., Garrick, D.J. and Benyshek, L.L., 2009. Milestones in beef cattle genetic evaluation. Journal of Animal Science, 87, E3-E10.
CrossRef (https://doi.org/10.2527/jas.2008-1430)
PubMed (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=19028854)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Milestones%20in%20beef%20cattle%20genetic%20evaluation&author=BL.%20Golden&author=DJ.%20Garrick&author=LL.%20Benyshek&journal=Journal%20of%20Animal%20Science&volume=87&pages=E3-E10&publication_year=2009)

Jeyaruban, M.G., Johnston, D.J., Tier, B., and Graser, H.U., 2015. Genetic parameters for calving difficulty using complex genetic models in five beef breeds in Australia. Animal Production Science. doi: 10.1071/AN14571 (https://doi.org/10.1071/AN14571).
Google Scholar (http://scholar.google.com/scholar_lookup?title=Genetic%20parameters%20for%20calving%20difficulty%20using%20complex%20genetic%20models%20in%20five%20beef%20breeds%20in%20Australia&author=MG.%20Jeyaruban&author=DJ.%20Johnston&author=B.%20Tier&author=HU.%20Graser&journal=Animal%20Production%20Science&publication_year=2015&doi=10.1071%2FAN14571)

Mujibi, F.D.N. and Crews, D.H., 2009. Genetic parameters for calving ease, gestation length, and birth weight in Charolais cattle. Journal of Animal Science, 87, 2759–2766.
CrossRef (https://doi.org/10.2527/jas.2008-1141)
PubMed (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=19465493)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Genetic%20parameters%20for%20calving%20ease%2C%20gestation%20length%2C%20and%20birth%20weight%20in%20Charolais%20cattle&author=FDN.%20Mujibi&author=DH.%20Crews&journal=Journal%20of%20Animal%20Science&volume=87&pages=2759-2766&publication_year=2009)

Pravia, M.I., Ravagnolo, O., Urioste, J.I., and Garrick, D.J., 2014. Identification of breeding objectives using a bioeconomic model for a beef cattle production system in Uruguay. Livestock Science, 160, 21–28.
CrossRef (https://doi.org/10.1016/j.livsci.2013.12.006)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Identification%20of%20breeding%20objectives%20using%20a%20bioeconomic%20model%20for%20a%20beef%20cattle%20production%20system%20in%20Uruguay&author=MI.%20Pravia&author=O.%20Ravagnolo&author=JI.%20Urioste&author=DJ.%20Garrick&journal=Livestock%20Science&volume=160&pages=21-28&publication_year=2014)

Ríos, U.A., Velázquez, G.M., Tsuruta, S., Bertrand, J.K., Murillo, V.E.V. and Bermúdez, M.M., 2007. Estimates of genetic parameters for growth traits of Mexican Charolais cattle. Técnica Pecuaria en México, 45, 121–130.
Google Scholar (http://scholar.google.com/scholar_lookup?title=Estimates%20of%20genetic%20parameters%20for%20growth%20traits%20of%20Mexican%20Charolais%20cattle&author=UA.%20R%C3%ADos&author=GM.%20Vel%C3%A1zquez&author=S.%20Tsuruta&author=JK.%20Bertrand&author=VEV.%20Murillo&author=MM.%20Berm%C3%BAdez&journal=T%C3%A9cnica%20Pecuaria%20en%20M%C3%A9xico&volume=45&pages=121-130&publication_year=2007)

Sifuentes-Rincón, A.M., Puentes-Montiel, H. and Parra-Bracamonte, G.M., 2007. Assessment of genetic structure in Mexican Charolais herds using microsatellite markers. Electronic Journal of Biotechnology, 10, 492–499.
CrossRef (https://doi.org/10.2225/vol10-issue4-fulltext-12)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Assessment%20of%20genetic%20structure%20in%20Mexican%20Charolais%20herds%20using%20microsatellite%20markers&author=AM.%20Sifuentes-Rinc%C3%B3n&author=H.%20Puentes-Montiel&author=GM.%20Parra-Bracamonte&journal=Electronic%20Journal%20of%20Biotechnology&volume=10&pages=492-499&publication_year=2007)

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