

# **Competitiveness of North American Young Bulls Based on GMACE Evaluations on Other Country Scales**

**Brian Van Doormaal,  
Pete Sullivan & Gerrit Kistemaker  
Canadian Dairy Network (CDN)**

# North American Situation

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- **Canada and USA have always shared all genotypes via North American Consortium**
- **Through an InterContinental Genotype Exchange Agreement all Holstein male genotypes are also exchanged with Italy and Great Britain**
  - Therefore, all North American bulls have a genomic evaluation in at least these four countries
- **The GMACE evaluation from Interbull, expressed on all other country scales, would normally use the four gEBVs as input**

# North American Situation

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- **Canada decided to officially participate in GMACE services starting April 2014**
  - Publish the Interbull GMACE evaluations via CDN web site for foreign genomic young bulls on Canadian scale
  - Labelled as “International Genomic Index” (IGI) to reflect that genotype was not used directly
- **To date, United States has opted to not participate in GMACE services from Interbull**
  - gPTAs from USA have not been submitted
  - North American bulls are still included in GMACE via their genomic evaluations from Canada, Italy and UK

# North American Situation

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- **All North American A.I. organizations have assigned “Controlling Country” = USA**
  - Essentially all bulls got “Publication” status = “No”
  - Prevents Interbull from releasing the GMACE evaluation for all N.A.-owned bulls (for routine runs)
- **Main concerns expressed to CDN:**
  - Interbull policy stating that once a GMACE is published once, it **MUST** be included for all future releases
  - It was uncertain if N.A. young bulls would rank fairly in other countries based on their GMACE evaluation

# CDN Analyses

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- **CDN carried out two analyses to assess how well N.A.-owned genomic young bulls would rank on other country scales:**
  - APR in Australia (due to lower  $r_g$  with Canada/USA)
  - RZG in Germany (as an example from Europe)
- **Used the unofficial GMACE results from February 2014 on scales in AUS and DEU**
  - For AUS, the APR index was estimated based on the data available (not as easy to do as expected)
  - For DEU, CDN received a data file from VIT upon request

# APR in Australia

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- **APR formula easily accessible and well described for implementation, but...**
  - Temperament not evaluated in GMACE
  - Liveweight not evaluated in GMACE and unique to AUS
  - Daughter Fertility not evaluated in GMACE but three female fertility traits are
- **Used regression analysis as a solution**
  - ADHIS provided a data file for proven sires
  - Used Stature, Chest Width and Body Depth to predict Liveweight and got high R-Square of .993
  - Found best APR prediction using GMACE traits

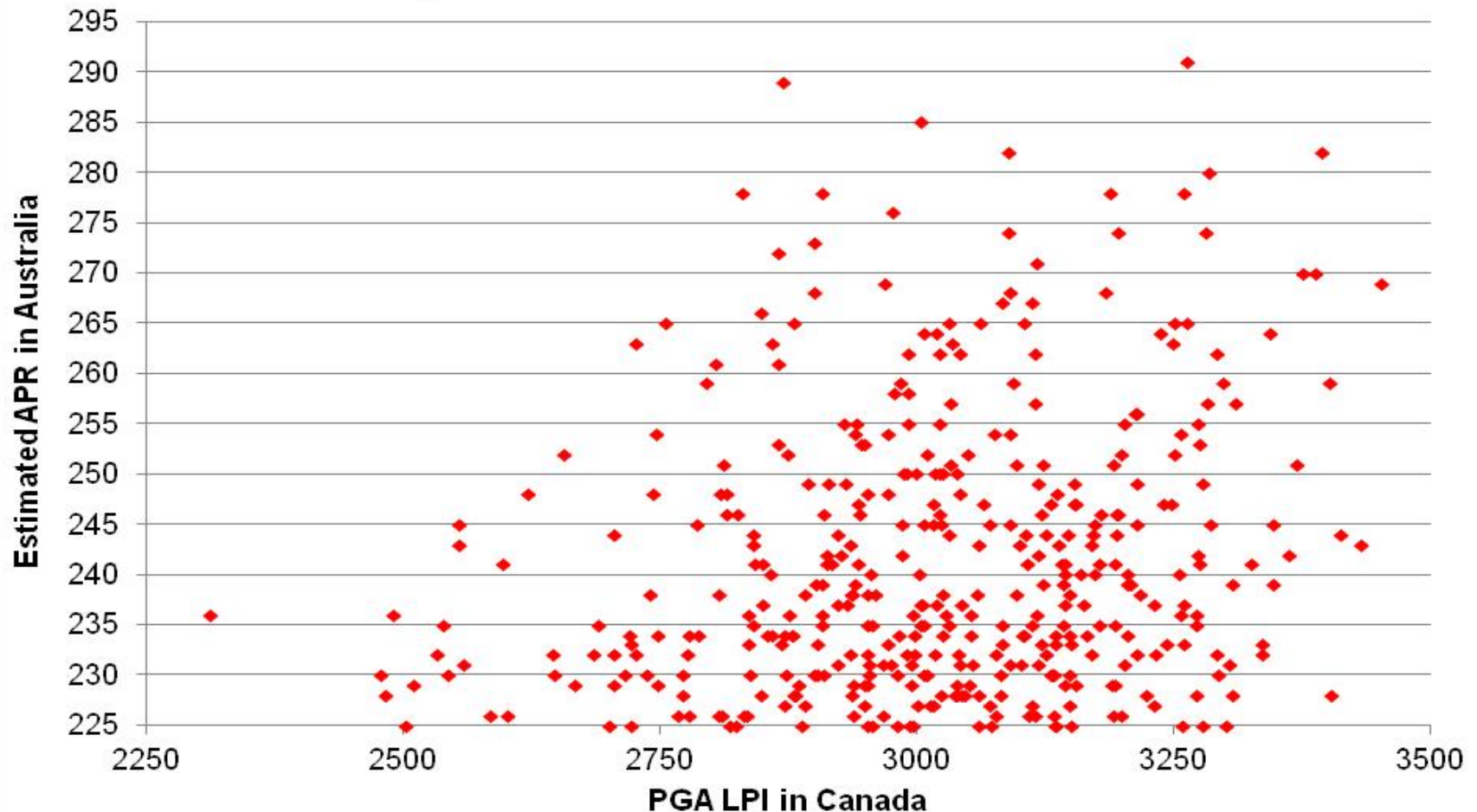
# RZG in Germany

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- **RZG formula not easy to rebuild**
  - Combines various sub-indexes
  - Specific weights not used to calculate RZG
  - Considers REL level and correlations
- **Regression analysis could have been used**
- **Instead, requested a data file including RZG from VIT, based on February 2014 GMACE Test Run results on German scale**
- **Requested the top 10,000 young bulls by RZG**
  - Matched with data at CDN to identify those genotyped by N.A. organizations

# GPA LPI in Canada vs APR in Australia

Figure 1: APR versus LPI for North American Owned Holstein Genomic Young Bulls with Minimum APR of 225 Based on GMACE





# Source of Top Proven Sires in AUS by APR - Apr'14

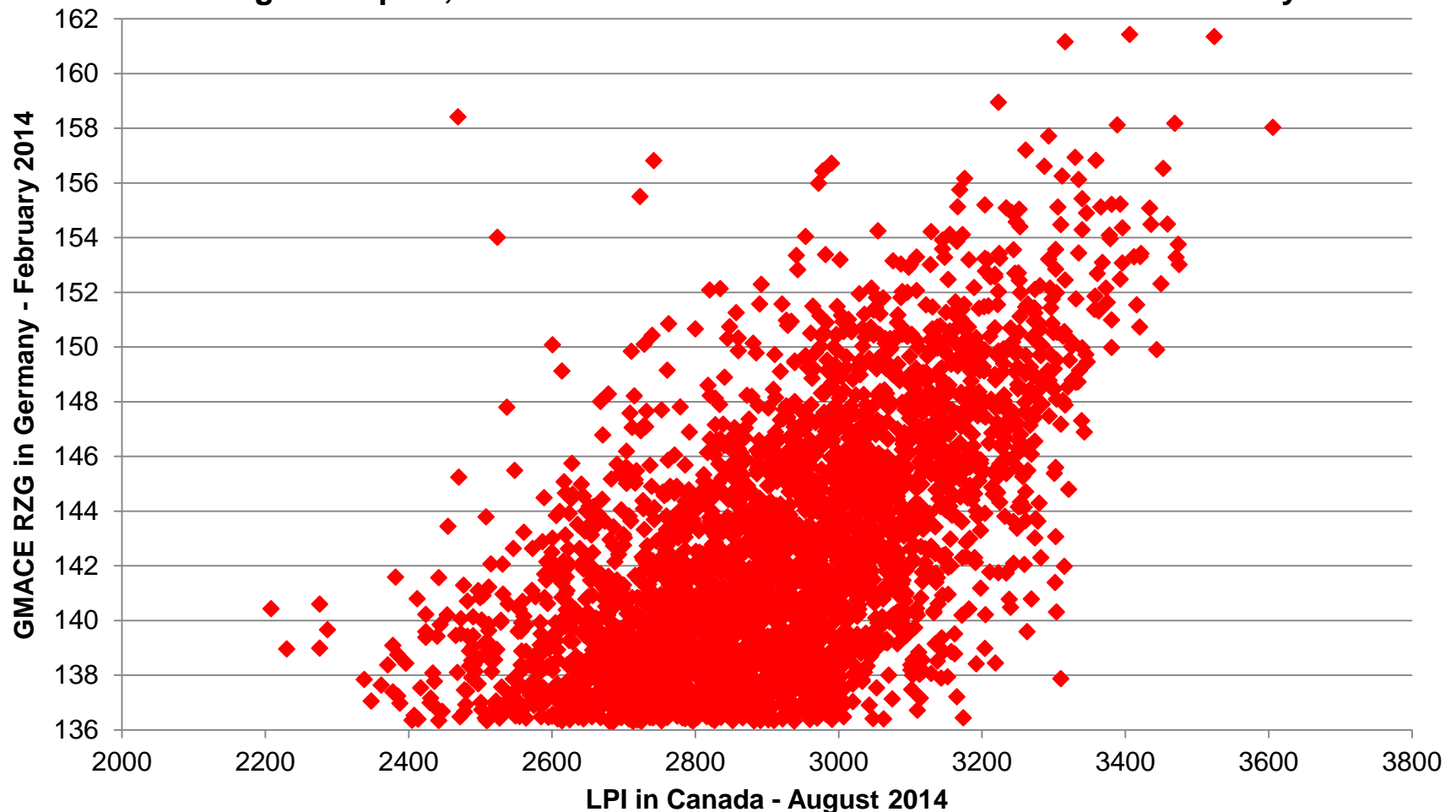
APR	Proven in AUS		Foreign Sires	Total	Cum Total
	AUS	Total			
348	1	1		1	1
337			1	1	2
312	1	1		1	3
305	1	1		1	4
299			1	1	5
296			1	1	6
295		1		1	7
292	1	1		1	8
290	1	2		2	10
287	1	1		1	11
284	1	1		1	12
282			2	2	14
276		1	1	2	16
275	1	1		1	17
274	2	3		3	20

# Rank of Top N.A.-Owned Genomic Bulls by APR

Estimated APR	N.A. Owned	Cum Total	Not Selected	Cum Total
300	0	0	1	1
291	1	1		2
289	1	2		3
285	1	3	1	5
282	2	5		7
280	1	6		8
278	3	9	1	12
276	1	10		13
274	3	13		16
273	1	14	1	18
272	1	15		19
271	1	16		20
270	2	18		22

# GPA LPI in Canada vs RZG in Germany

Figure 1: LPI versus RZG for North American Owned Genomic Young Bulls Among the Top 10,000 for RZG Based on GMACE Evaluations in Germany



# Rank of Top N.A.-Owned Genomic Bulls by RZG

RZG	German			NA Young Bulls		NA Candidates
	Proven	YB	Cum. YB	Count	Cum.	
165		1	1			
164			1			
163			1			
162			1			
161		3	4	3	3	
160			4		3	
159		2	6	1	4	
158		4	10	3	7	
157		9	19	6	13	
156		2	21	5	18	
155		7	28	13	31	2
154		6	34	17	48	2
153		11	45	30	78	7
152		13	58	36	114	13
151		19	77	60	174	14
150		26	103	90	264	25

# Conclusions

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- **GMACE evaluations on national scales in Australia and Germany suggest that N.A.-owned genomic young bulls will be ranked fairly for overall national selection indexes**
    - More re-ranking in AUS due to lower genetic correlations across countries and possible differences in genomic evaluation methods, etc.
    - May be an opportunity for A.I. to purchase young sires in N.A. targeted for APR in AUS
  - **Reports have been circulated to A.I. members of CDN and to CDCB for information purposes**
  - **Some North American A.I. organizations will be allowing publication of GMACE results in April 2015**

*Réseau laitier canadien*



*Canadian Dairy Network*

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**Thank You!**