Associations among Available Fertility Indexes and Reproductive Performance in Alberta Dairy Cows

M. Gobikrushanth[2], K. Macmillan[1], D. Hipkin[3], and M. G. Colazo[1]

[1]Livestock Research Section, Alberta Agriculture and Forestry, Edmonton, AB; [2]Department of Agricultural Food and Nutritional Science, University of Alberta, Edmonton, AB; [3]Alta Genetics Inc., Balzac, AB; E-mail: marcos.colazo@gov.ab.ca

BACKGROUND & OBJECTIVES

Producers have access to sire information including predicted transmitting ability (PTA) for daughter pregnancy rate (DPR) and cow conception rate (CCR), which are related to fewer days open and number of services.

The objectives of this study were to:

1) **Determine the relationships among Sire PTA for DPR and CCR with cows reproductive performance.**
2) **Determine the changes in DPR and CCR index and its relationship with cows reproductive performance over time in a herd that selects for fertility.**

MATERIALS & METHODS

- Study 1: 822 Holstein cows from 10 dairy herds in Alberta were retrospectively analysed.
- Study 2: cows in their first lactation from a single herd that selects for fertility were analysed over 3 years (Table 1).
- For both studies data were retrieved from DairyComp 305 for Sire PTA and cows reproductive performance, including: overall conception rate (OCR), conception rate for 1st AI (CR1), pregnancy rate every 21 d (PR21) and by 150 DIM (PR150), and pregnancy loss after 1st AI (PRL).

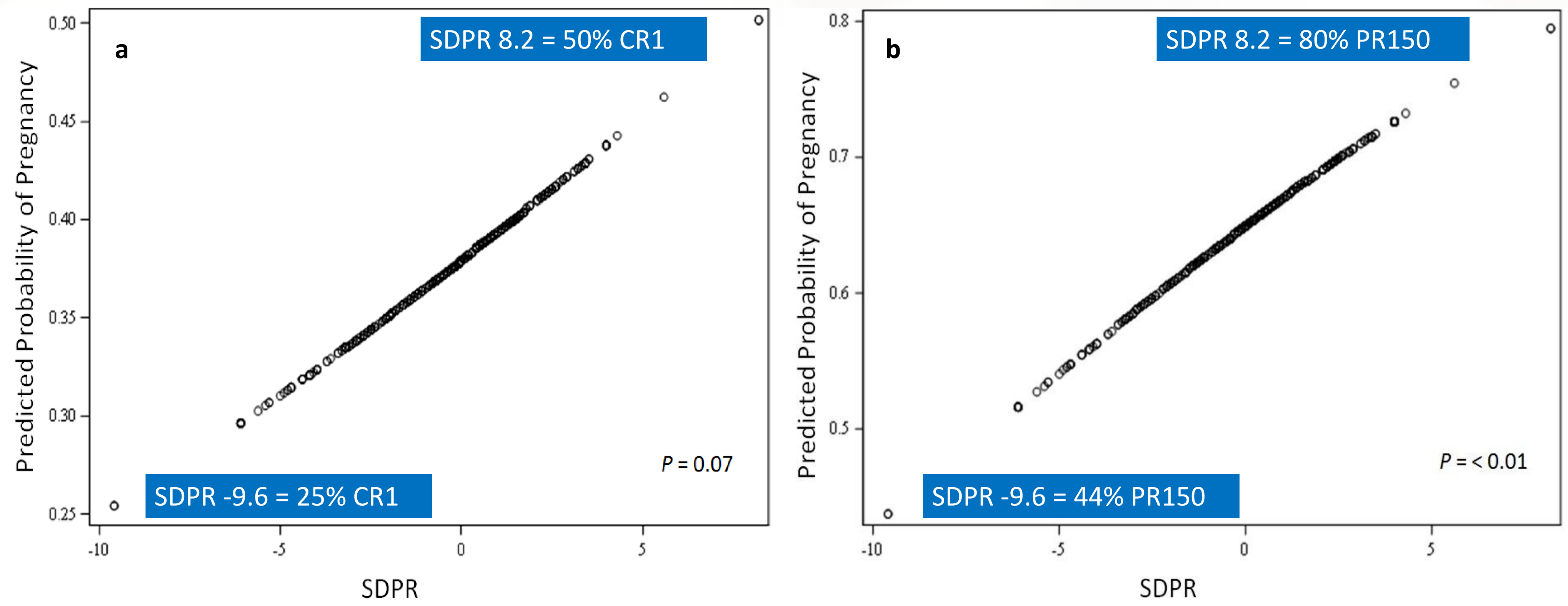
RESULTS

Study 1

- The overall CR1, PR150 and PRL was 38, 65 and 12%, respectively.
- Sire PTA for DPR ranged from -9.6 to 8.2 and was associated with CR1 and PR150 (Figure 1a,b).
- Sire PTA for CCR ranged from -9.9 to 7.4 and was associated with PR150 (Figure 1c).
- There was no association between Sire PTA for DPR or CCR and PR21 or PRL.

Study 2

- The average Sire PTA for DPR in first lactation cows increased from year 1 to year 3 (Table 1).
- The OCR and PR21 also increased from year 1 to year 3 in cows with Sire DPR above the average (Figure 2).



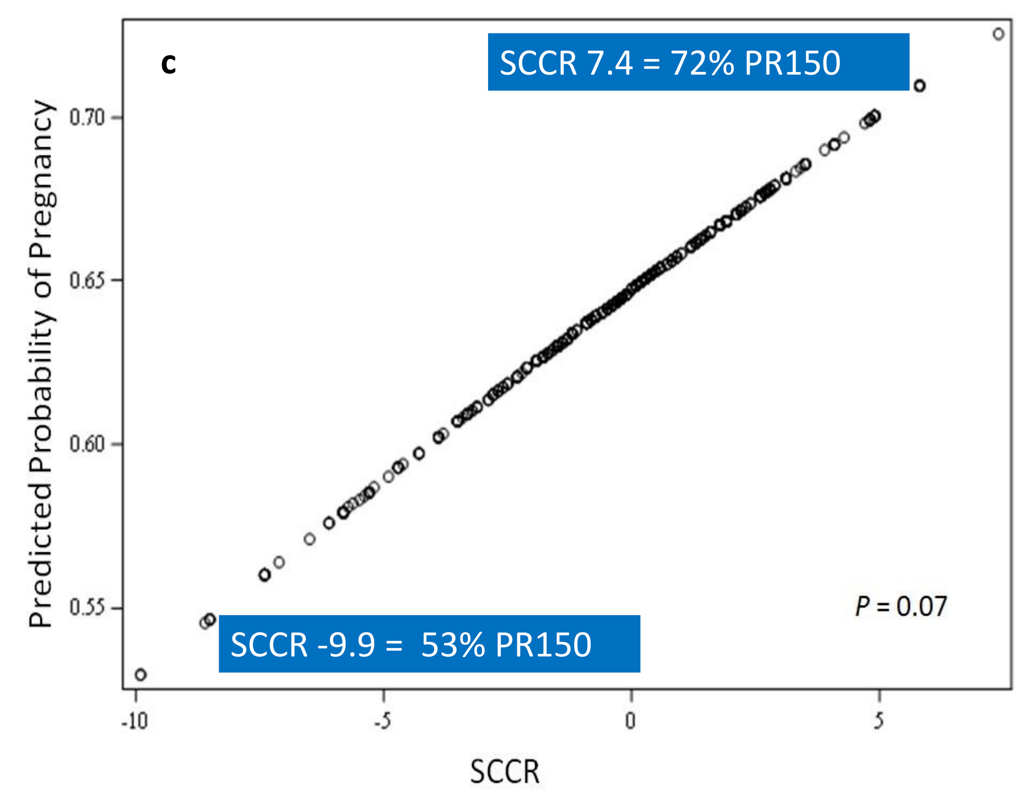


Figure 1. The association of sire PTA for daughter pregnancy rate (SDPR) with conception rate to the 1st AI (CR1; a) and pregnancy rate by 150 DIM (PR150; b), as well as the association of sire PTA for cow conception rate (SSCR) with PR150 (c) in Study 1.

Table 1. The number of sires and cows used and the average and range of Sire daughter pregnancy rate (SDPR) and Sire cow conception rate (SCCR) in Study 2.

Year	Sires	Cows	SDPR	SCCR
1	57	227	0.6 (-4.8 to 5.6)	0.7 (-6.1 to 7.4)
3	59	199	2.4 (-2.8 to 8.1)	3.0 (-2.2 to 8.5)

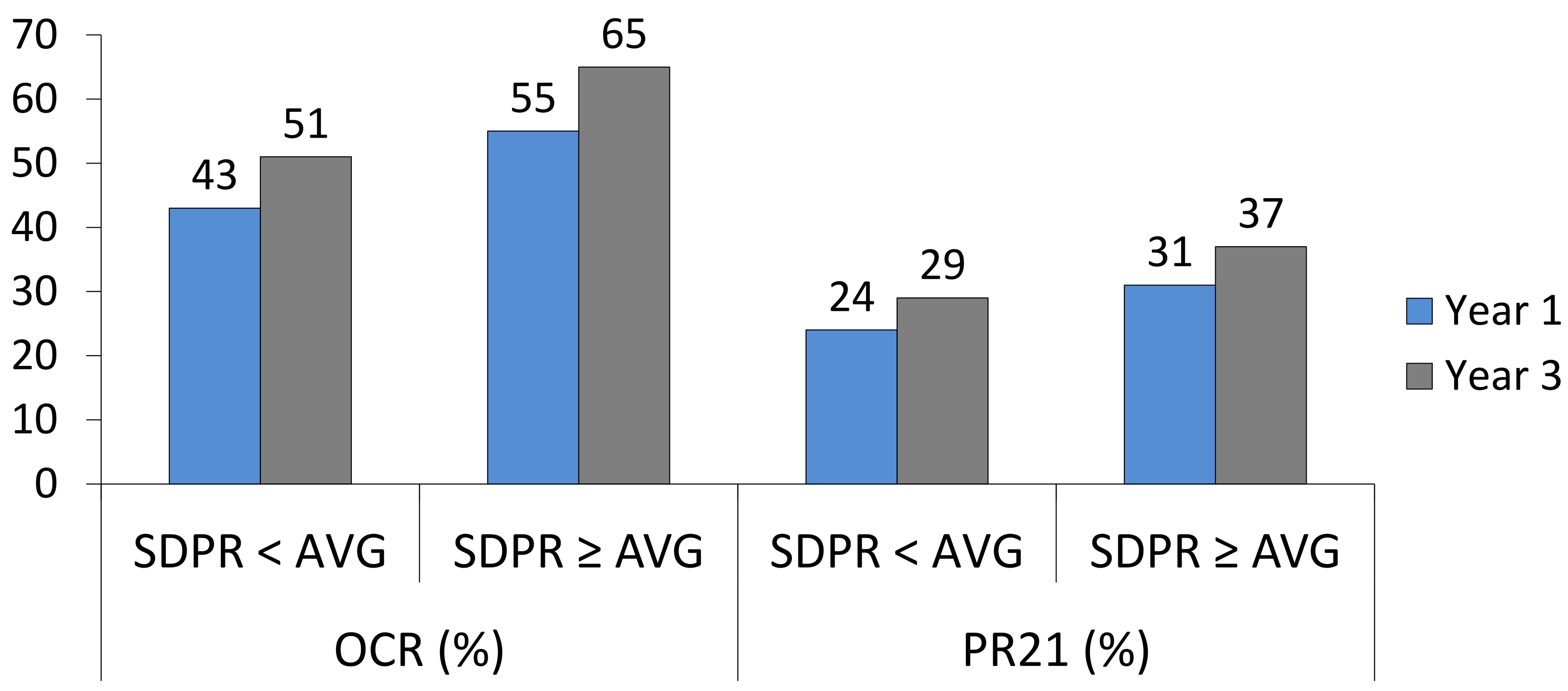


Figure 2. The overall conception rate (OCR) and pregnancy rate every 21-d (PR21) for sires below and above the average sire daughter pregnancy rate (SDPR) in Year 1 and 3 of Study 2.

TAKE HOME MESSAGE

- **Sire PTA for DPR and CCR are positively associated with improved reproductive performance.**
- **In a herd selecting for fertility, the average Sire PTA for DPR increased in 1st lactation cows over a 3-year period.**
- **Producers could improve dairy cow fertility though genetic selection using semen from sires with high PTAs for DPR and CCR.**

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