Selection indexes for dairy traits in Guzera breed in Brazil

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The aim of the present study was to obtain selection indexes including some milk traits for Guzera cattle. The economic values (EV) obtained for milk (MY), protein (PY) and fat (FY) yields up to 305 days was, respectively, US$ 0.28, US$ -0.24 and US$ 1.20 for system 1 (PS1), and US$ 0.30, US$ 0.07, US$ 1.38 for system 2 (PS2). Four selection indexes were evaluated, with different goals: MY as the single breeding goal (I_1); MY + PY (I_2); I_2 + FY (I_3) and I_3 + SCS (I_4). Test-day SCC were transformed to Somatic Cell Score (SCS) and average was calculated. Indexes were compared based on their economic response to selection (R), and expected genetic superiorities (Sg) for each trait. (Co)variance components were previously estimated (Carrara et al., 2021) using two-trait animal models applying restrict maximum likelihood method (REML). Selection indexes were obtained based on the methodology described by Hazel (1943). The weighting factors (*b*) obtained for PS1, in I_1 was 0.41 for MY, in I_2 was 0.37 for MY and 3.11 for PY, in I_3 was 0.41 for MY, 8.49 for PY and -5.90 for FY, and in I_4 was 0.42 for MY, 8.52 for PY, -5.71 for FY and 11.29 for SCS; and for PS2, in I_1 was 0.43 for my, in I_2 was 0.42 for MY and 3.15 for PY, in I_3 was 0.46 for MY, 9.44 for PY and -6.13 for FY, and in I_4 was 0.46 for MY, 9.48 for PY, -6.25 for FY and 12.60 for SCS. Positive values were obtained for R in all four selection indexes (I), for PS1, R_{I1}=US$ 68.55, R_{I2}=US$ 70.54, R_{I3}=US$ 70.45, R_{I4}=US$ 70.66, and for PS2, R_{I1}=US$ 76.62, R_{I2}=US$ 78.39, R_{I3}=US$ 78.68, R_{I4}=US$ 78.92, being lower for I_1, (only MY). All expected selection responses (R) were higher for PS2 when compared to those obtained for PS1, considering all studied selection indexes. Increasing values for Sg were obtained for MY, PY, and SCS, from I_1 to I_4 as more milk quality traits were added to the indexes, for PS1, Sg_{I1}= 214.06, 6.27, 0.017, Sg_{I2}= 224.66, 6.66, 0.021, Sg_{I3}= 229.38, 6.88, 0.028, Sg_{I4}= 230.03, 6.92, 0.041, respectively, and for PS2, Sg_{I1}= 209.47, 6.23, 0.016, Sg_{I2}= 224.68, 6.65, 0.021, Sg_{I3}= 229.39, 6.88, 0.028, Sg_{I4}= 230.03, 6.92, 0.041, respectively. For FY, Sg for PS1 was Sg_{I1}=7.35, Sg_{I2}= 7.75, Sg_{I3}= 7.69, Sg_{I4}= 7.71, and for PS2 was Sg_{I1}=7.20, Sg_{I2}= 7.75, Sg_{I3}= 7.69, Sg_{I4}= 7.71, however, Sg was higher for I_2, when MY and PY were included in the index. All results for Sg (all traits) and R were higher for I_4. The respective accuracy of selection index I_1, I_2, I_3 and I_4, for PS1, was 0.54, 0.56, 0.58 and 0.58, respectively; and for PS2, was 0.53, 0.56, 0.58, 0.58, respectively. Payment policies for milk in Brazil fluctuate throughout time and may vary according to industry and region, thus the economic values may reflect that, in special for FY. Feeding cost components are also variable in time, being highly influenced by the US$ currency. So, in spite of the negative EV for FY and considering that market and circumstances may change in the future, fat should not be neglected in selection indexes to be used in breeding programs involving Dairy Zebu herds in Brazil.

Keywords: animal production, bioeconomic models, dairy cattle, milk quality, selection objectives, zebu.