Selection Responses from Optimised Breeding Objectives for East-African Pastoralists Including Trypano-Tolerance

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Abstract

A major disease constraint on livestock productivity in Eastern Africa is trypanosomosis which directly affects the livelihood of poor livestock keepers. The objective of this study was to design a breeding goal including trypanosomosis to increase trypano-tolerance in cattle in pastoral, agro-pastoral and crop-livestock systems of selected sites in Kenya and Ethiopia. Based on the results from socio-economic surveys in the field (Narok district, Kenya), a breeding goal was designed for pastoralists which contained the most important traits in African cattle: milk yield (MY), calving interval (CI), weight gain (WG), trypano-tolerance and trick-resistance. Two selection indexes where constructed one with and the other without packed red blood cell volume (PCV) as a measurement of tolerance for the disease in the breeding program. The baseline selection index I (SI-I) contains traits that directly influence livelihood and income: MY, live weight and CI compared to selection index II (SI-II) that included PCV in addition to traits in SI-I.

According to the findings in the field the following population structure for pastoralists was assumed in this study: Number of cows is 200 over 10 age-groups with a replacement of 20 cows each year. The mating ratio of sires is 1:10 with 2 sires for each age-group. With a survival rate of 80 %, 160 offspring are produced per year.

With SI-II, an increase in MY and WG of 6.8 % (2.25 kg) and 5.0 % (2.01 kg) of the phenotypic standard deviation (SDP) per generation was estimated. This is 2.2 % less MY (0.05 kg) than with SI-I but 0.5 % more WG (0.01 kg). The CI increases with 0.5 % (0.5 days) of the SDP per generation for SI-II, 31.3 % (0.15 days) less compared to the results of SI-I. The trypano-tolerance and tick-resistance level increases by 3.7 % (0.13 less treatments) and 2.3 % (0.07 less treatments) of the SDP per generation with SI-II which is 11.8 % (0.057 treatments) and 1.3 % (0.001 treatments) better for trypano-tolerance and tick-resistance compared to the estimates of SI-I.

The results indicate a superiority of SI-II over SI-I, supporting the theory to use PCV as indirect selection criterion to improve disease resistance.

Keywords: Breeding objective, selection index, trypano-tolerance

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