Economic value for the trait tick count in Brangus cattle.

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Profitability of a beef cattle system may be significantly reduced by the effects of tick (*Rhipicephalus (Boophilus) microplus*). Authors estimated significant losses due to decreased productivity by parasitism, and deaths of cattle from diseases that are transmitted by ticks. Our objective was to estimate the economic value (EV) for the trait tick count in Brangus cattle. A stochastic bio-economic simulation model was developed to study effects of tick load on treatment costs and death losses due to infestation (e.g., tick borne diseases). Parameters for the model were based on data collected in an experimental herd of 330 Brangus dams over a 3-year period. Average tick load was 71.4 ticks on one side of the body. Number of ticks was modeled as an exponential distribution with $E(x)=1/\lambda$, where λ is 0.0140056. Probability of mortality as a function of tick load were 0.1; 0.5; 1; 2; 5; 10; 30; 70; 80; 90 and 100% for animals with >20 and <=30; >30 and <=50; >50 and <=100; >100 and <=150; >150 and <=200; >200 and <=300; >300 and <=400; >401 and <=500; >500 and <=600; >600 and <=800 and >800 ticks, respectively. Simulated mortality of individual animals was calculated based on the uniform (0 to 1) distribution using the threshold as just described. Seven scenarios were analyzed varying only the number of dams in the herd (200; 400; 500; 600; 1,000; 2,000 and 4,000). Each scenario was replicated 10,000 times. The EV was the marginal cost per dam. The estimated marginal cost of ticks was, on average, -5.51±0.30, ranging between -5.86 and -5.00. To demonstrate the sensitivity of the system to tick load, a second series of simulations was conducted with the average tick count reduced to 51.4 (λ = 0.0194552). The estimated marginal cost of ticks was between -3.92 and -3.07 ($\overline{EV}$ = -3.66±0.27), with reduced tick load. The EV of tick count was calculated as the difference in marginal costs between scenarios, and was relatively insensitive to herd size. It was also observed that as the number of dams was increased the standard deviation of the marginal cost and coefficient of variation for number of dead animals also decreased. These EVs indicate that the greater the tick load, the more important genetic improvement in resistances becomes, independent of herd size.

Key Words: breeding goal; cost; expenses; profit; selection criteria