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Genetic evaluation for goat breeds Saanen and Alpine Camosciata: Total Merit Index

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ABSTRACT

The difficulty to select breeding animals on the base of 5 separate indices (yield of milk, fat and protein and corresponding percentages) made it necessary to simplify the process by combining separate values into a single index that could be used for daily herd management. In response to requests by the breeders, the Associazione Nazionale della Pastorizia (AssoNaPa) has developed an aggregate genetic index, the "Indice di merito Totale Produttivo" (ITP). The index considers the various traits affecting milk quality with respect to cheese production and combines them into a single quantitative measure of genetic merit for protein and fat yield. The ITP is a genetic index that addresses the selection towards the animals producing milk that is ideal for cheese production. This index simplifies the process of within-herd selection and culling. It is calculated with different weights for yields of protein and fat, with the emphasis on each based on their relative contributions in cheese production. The index considers neither milk yield, as its correlations with fat and protein yield are high, nor percentages of fat and protein, as incorporation of these latter two traits can lead to errors. Previous studies (Barillet F. *et al*, 1996) have shown that the value associated to 1 σ (kg) of fat corresponds to 4 σ of protein, when accounting for milk quality in payment. The ITP is calculated based on estimated breeding values from a *Multiple trait Blup Animal Model* (MTJaa20 Misztal) and is available only for the animals with information for milk quality traits. The differences between the Saanen e Camosciata is practically negligible, so the same relative weights of 4:1 (protein:fat) are used for both. For a given goat i , the initial calculation is:

$$ITP_i = b_1 * EBVF_i + b_2 * EBVP_i$$

The estimated coefficients are $b_1=0.48259$ and $b_2=2.07117$, $b_1=0.48066$ and $b_2=2.06567$ for the Camosciata and Saanen breed respectively. The result obtained is then standardized and multiplied by the standard deviation of milk yield, which is 67.97 L for the Saanen and 67.87 L for the Camosciata. Thus, the final formula (for goat i) is:

$$ITP_i = ((ITP_i - \mu_{ITP}) / \sigma_{ITP}) * \sigma_{milk}$$

Where μ and σ are breed specific. The ITP is an important occasion to realize a synergy between AssoNaPa and the APA with the goal of providing breeders with a simple genetic index for daily use in flock management. It represents a decisive response to requests of breeders, specifically to provide a tool for selection of animals for cheese production.