# Selection Parameters and Production Traits

The members of the consortium agreed that the production traits upon which the selection parameters would be based would be:

- speed of growth. A rapid rate of growth was required in order that a commercially viable carcass might be produced in the minimum number of days. Extensive weight gain records were maintained to provide an objective basis for selection. Only females from the upper quartile of eight and twelve month weight recording were retained as replacement breeder does. Only males from the top five percent were held in the pool from which stud bucks were selected.

- improved fertility over herd average. To this end only females bearing and rearing at least twins survived the selection process thereby ensuring that a single gestation maximized the number of animals available for retention in the herd or for slaughter. The rationale for this approach is that a single female having a single offspring has put on the ground 20 kilograms of liveweight at fifteen weeks: a single female having twins (allowing for slightly lower birth weights and slightly slower rates of growth) has put on the ground 2 x 18 kilograms = 36 kilograms at fifteen weeks. The latter female is therefore infinitely more profitable.

- improved fecundity:early maturity. In New Zealand goats typically reach sexual maturity between eleven and fourteen months of age. Typically they are first bred at around eighteen months of age and have their first kidding at close to two years of age. This is the management program typically undertaken by New Zealand sheepfarmers and is replicated in the goat farming environment. By selecting for improved fecundity, the age of sexual maturity of the Kiko reared under natural conditions has been reduced to six to eight months for does and less than six months for bucks. This means that females can be brought into production at significantly earlier ages thereby reducing the management inputs and their associated costs before each female can become a profit center in her own right. Early maturity effectively gives the farmer an extra offspring during a period where usually there are substantial costs with the growing out of the immature doe to an age and size where conception can take place. Early maturity can also quite significantly reduce the generation interval, an important consideration where trait enhancement is the aim of the breeding program.

- improved fecundity: enhanced nutritional availability for offspring. Growth rate and development are inextricably tied to the female's ability to provide nutrition for her offspring. Mindful of the South African experience where there was a substantial infusion of Saanen blood into the ennobled Boer goat to enhance milking ability and to stabilize body ground colour, the consortium decided that nutritional availability could be substantially improved by recourse to New Zealand's world class dairy goat herd. By the selective use of males of dairy origin and by the selection of females exhibiting well above average nutritional and nurturing capabilities, enhanced growth rates for kids born and reared under range conditions were attained. No kids were ever artificially reared nor was any female ever assisted at kidding.

- improved fecundity: extended breeding season. Under New Zealand conditions goats generally breed in the months February through June. By selecting for enhanced fecundity, an extended breeding season was attained. The Kiko demonstrates an ability to breed through the months of December through August in the New Zealand environment. Where farming practice permits more intensive management, and in the more temperate parts of the country, eight monthly kidding is possible. Where twinning is the norm at parturition this effectively equates to triplets being raised annually.

- ease of maintenance: input minimization. Because agriculture in New Zealand is of an extensive pastoral nature and because goats are generally run on areas of less hospitable agricultural land, the ease of maintenance was a critical selection factor from the viewpoints of both management and cost. Accordingly, an ability to demonstrate resistance to roundworms (in particular haemonchus contortus) was a primary selection parameter. Typically in New Zealand goats may be treated monthly for internal parasites when they are run under pastoral conditions and every two months when run under range conditions. Kiko goats on range are typically treated only once a year and then on a prophylactic basis. Males which are selected on the basis of rate of growth undergo a secondary selection process based on their ability to withstand periods of nutritional stress, and a demonstrable resistance to infestation by internal parasites.

- soundness of feet. Any goat demonstrating abnormalities of the hoof or a propensity for footrot or footscald was rigorously culled.

- easy care kidding. No Kiko goat is ever shepherded at parturition and only those rearing two live kids are retained in the herd. In spite of minimal management inputs the base herd of Kiko does averages a kidding percentage prior to culling of close on two hundred per cent.

- enhanced male virility. Since the inception of the development program in 1978 only the superior males have been retained in the herd. Since the number of males maintained has been numerically low it has been of considerable importance to ensure that they are capable of covering the maximum number of females, particularly since the consortium has been using Kiko males as terminal sires over native goats as part of their meat production program. Accordingly, any male failing to exhibit superior libido or who has above average numbers of females within his mating group returning to service is culled. Where short cycle parturition is not required a single male can cover up to five hundred females in an extended season.

- rigid application of performance parameters. Since the inception of the program the consortium has rigorously applied its selection criteria. Because it was never intended that anything other than a modest base herd of 500 females be maintained (thereby enabling meaningful population scale while permitting rigorous culling) Goatex Group has annually culled over seventy five per cent of each year's production of female kids. In addition, ninety per cent of each year's production of male kids has been culled and only the top five per cent retained as a pool from which replacement stud males may be drawn.

By the considered selection of measurable and desirable production traits and the application of rigorous selection criteria, significant advances have been made in the performance of Kiko goats in the traits to which selection pressure has been applied.