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Dutch production index (INET)

▪ Introduction

In the world of cattle breeding, selection based on milk production traits, plays an important role. The tools used to assist the selection procedure are the cow and bull indexes for lactose, fat and protein. The breeding values for the number of kg of lactose, kg of fat and kg of protein are combined to create a single figure: the Dutch production index or Inet. The way in which these breeding values are combined to create the Inet rating is such that selection based on Inet leads to increased profitability in milk production per cow.

The Inet figure is calculated according to the following formula:

Inet 2015 = 0.3 * BV kg lactose + 2.1 * BV kg fat + 4.1 * BV kg protein

BV stands for breeding value in the formula. The figures 0.3, 2.1 and 4.1 are called the Inet factors. For example: Imagine a bull has the breeding values +10, +15 and +20 for kg lactose, kg fat and kg protein respectively. The Inet of this bull is equal to 0.3* 10 + 2.1* 15 + 4.1* 20 = 117 euro (to a round figure). The same formula is applied to cows.

▪ Significance of INET

In breeding the central focus is to produce more highly productive and profitable cows through selection. The Inet rating indicates what can be expected from the progeny in extra net yields per lactation if a certain cow is mated with a certain bull. To give an example, we will mate a bull with an Inet of 400 euro with a cow that has an Inet of 200 euro. A calf resulting from this match is expected to have an Inet of 300 euro, which is 100 euro more than its dam. In other words: the calf is expected to yield a net milk production income per lactation of approximately 100 euro more than its dam.
The Inet factors indicate the net yield per kg lactose, kg fat and kg protein provided through breeding the production per lactation for lactose, fat or protein is increased by one kg. A higher production of one kg of lactose per lactation through breeding, without a similar rise in the production of fat and protein, will increase the profit with 30 eurocents. Selective breeding that results in an increased production of one kg of fat will yield € 2.10, with € 4.10 for one kg of protein.

▪ Calculation model

The economic weighting factors are determined by calculating the difference in farm income, when a marginal increase in production per cow takes place, while all the other conditions remain unchanged. The situation (milk price) likely to apply in eight to ten years is taken as the basic assumption in this calculation. The marginal increase in production per cow is the result of the marginal increase of the genetic capacity of the cow for higher production. So, what does an increase in the breeding value of a cow of one kg lactose, fat or protein represent at a dairy farm?

When determining the new Inet it is important to consider what is likely to change in the coming years. Important factors are the milk price the farmer receives and the feed cost.

Costs for energy and DVE
The calculation model calculates the energy and protein required for milk, fat and protein. To produce lactose or fat, only energy is required, producing protein requires energy and protein. The feed costs kg lactose, fat or protein are calculated as (energy requirement)*price of energy)+(protein requirement/DVE)*(price of/DVE). Per kg lactose, fat and protein respectively 2.43, 5.9 and 3.0 kVEM energy is required and for 1 kg of protein 1.56 kDVE is required.
To calculate the feed costs, a price for medium-priced A-pellets of 18 euro/100 kg is assumed and a price ratio of 6 between kDVE and kVEM : 1. This results in a price of 1 kVEM of € 0.107 and a price of 1 kDVE of € 0.639.

Milk price in the future
The results of decisions made about breeding now, will only show in eight to ten years time, so when considering the significance of the Inet we have to estimate what milk will be worth eight to ten years ahead.

The average advance for 1 kg fat granted by FrieslandCampina in the period 2009/2010 was € 3.11, and € 5.43 for protein. The advance price is on average 95% of the final payment price, with that the average price for fat and protein totals respectively at € 3.27 and € 5.72. This corresponds to a milk price of 32 euro cent/litre with 4.2% fat and 3.4% protein.

In Flanders the payment method used by Milcobel differs slightly to the system in the Netherlands. No negative basic price is applied, but a fixed price ratio between fat and protein of 0.35:0.65 applies. This method of payment is not expected to change in the foreseeable future. The average price for 1 kg fat granted in the period 2009 -2010 was € 2.46, and € 4.56 for 1 protein. If in Flanders an identical milk price is expected per kg of milk, whereby the fat and protein contents are 4.30% and 3.50%, respectively, then the price for 1 kg of fat would be € 2.96 and € 5.50 for 1 kg of protein. The average price for 1 kg fat in the period 2010 was € 2.79, and € 5.18 for 1kg of protein.

The trends to be expected:
- the world's population will continue to grow, entailing a corresponding increase in the need for food;
- the economy will continue to grow in emerging countries - which also have booming populations;
- the average wealth of consumers will rise and thereby also the demands placed on food. The demand for dairy products rises in line with increasing prosperity;
- consumption of dairy produce will rise, partly due to a shift in eating patterns from vegetable-based protein to animal based protein. The long-term expectation is that the rise will be around 30% in developing countries and around 10% in developed countries;
- dairy production will rise approx. 2% per year until 2019;
- in the future the milk price will be subject to more fluctuation due to the many factors that influence the supply and demand;
- according to the IFCN the payment prices for fat and protein are expected to show less mutual discrepancy in the coming years. Subsequently the attention will probably shift to protein, resulting in a higher price for protein compared to fat;
- the higher fat price is partly caused by a different pattern of consumption in developing countries;
- greater attention for the environment, whereby reduction in the greenhouse gas emissions will become very important. One way of achieving this reduction in emissions per kg of milk is to produce milk more efficiently. This can be achieved by increasing the production per cow, for example.

In order to identify the expected models in the future consultation also took place with FrieslandCampina, Partico and Milcobel. The dairy industry indicates that it is, and remains, difficult to predict price forming for the future. However, certain trends are expected to appear. The dairy industry expects that milk protein will have a clear added value, but that in the future fat will be valued lower resulting in a lower payment price to farmers. What also plays a role here is that milk fat can more easily be replaced in other products by vegetable-based fat.

In view of the information above, the following points have been assumed in the calculation of the Inet factors:
- the milk price is 32 eurocent per kg milk, with 4.2% fat and 3.4 % protein
- the ratio for lactose : fat : protein price is 1 : 5 : 10
- this results in a price for 1 kg lactose of € 0.54, 1 kg fat of € 2.69, and € 5.38 for 1 kg protein.

▪ Results

Based on the energy consumption and the protein demand from feed to produce lactose, fat and protein, the feed costs are respectively 0.26, 0.63 and 1.32 euro per kg lactose, kg fat and kg protein.
The yield per kg of lactose, kg fat and kg protein is 0.54, 2.89 and 5.38 euro respectively.

If the (feed)costs are subtracted from the yields, the net yield is left:

Inet = 0.28 * BV kg lactose + 2.06 * BV kg fat + 4.06 * BV kg protein

After the rounding of the weightings, the Inet per April 2015 will be as follows:

Inet 2015 = 0.3 * BV kg lactose + 2.1 * BV kg fat + 4.1 * BV kg protein