

Production and diseases of dairy cows: genetics (cause) and management (effect)

The milk production of dairy cows has been increased during the last decades by animal-husbandry, improved feeding regime, extensive veterinary service and proper management. It can be assumed that this tendency will be continued in the future and herds with milk production of 10.000 – 12.000 kg per lactation are not unusual. Production > 15.000 kg of single cows has been reported. However, the incidence of diseases (production diseases) as ketosis, fat liver, general inflammation, suppression of the immune system, mastitis, lameness, metritis and disturbed fertility has been increased too, causes early culling and reduces lifelong production and economic merit of milk production. Recent publications have shown that up to 75 % of dairy cows are suffering from one disease per lactation. Most of the diseases exhibit a significant genetic correlation with milk yield. Furthermore, there is growing evidence that death rate of dairy cows is increasing too (? 6 % per year).

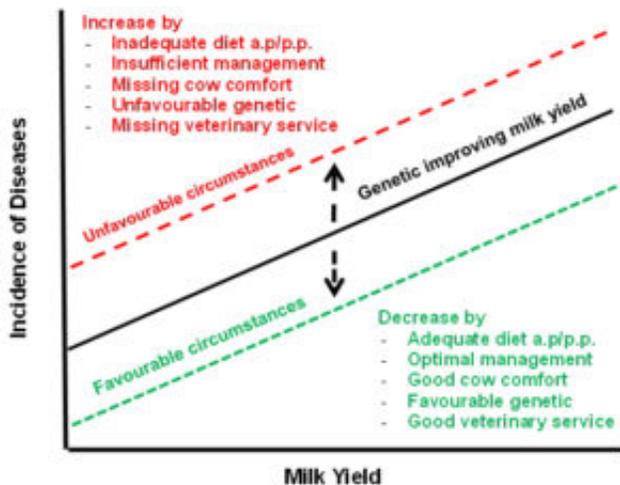


Fig. 1. Scheme of correlation (maybe not linear) between milk yield and incidence of diseases. This relationship exhibits a wide variation and hence, the incidence of diseases depends on the individual circumstances (genetic + management).

The pathogenesis of the diseases is – more or less - causally related to the metabolic load for milk production and predominantly caused by negative energy balance (NEB). The pronounced NEB over 2 – 3 months postpartum is a consequence of the negative genetic correlation between milk yield and feed intake in early lactation and hence, an effect of selection for high milk yield. The genetic dispositions and health risks are modulated by the management of dairy cows and both factors contribute to the large variation of diseases in practice (Fig. 1).

The analysis of the etiology of production diseases must therefore distinguish between the genetic disposition (cause) and the management (effect). It is suggested that the effects of the management are primarily determined by the genetic disposition (cause). But in practice, it is difficult to differentiate between cause and effects (except for severe failure of the management). However, most of the diseases are observed within the first month postpartum and therefore during NEB and corresponding metabolic load for milk production. Hence, the genetic disposition is suggested to be the dominant part in the pathogenesis of diseases during this period.

Nevertheless, the risk of diseases can significantly be diminished by favourable circumstances (Fig. 1). On the other hand it is neither the obligation of an optimal management nor of good veterinary service to compensate for genetic correlation between milk yield and diseases. In addition, all efforts to close the gap between output via milk and low input via dry matter intake have not been successful, because the two parameters are characterized by a negative genetic correlation: Selection for milk is not accompanied by adequate nutrient intake and will exacerbate NEB, metabolic load and health risks. Therefore, an effective improvement of the complex of production diseases includes the critical discussion of all aspects of the current breeding index for dairy cows.

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Publication

[Production and diseases of dairy cows: Viewpoint for discussion regarding the significance of genetics \(cause\) and management \(effect\)](#)

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Tierarztl Prax Ausg G Grosstiere Nutztiere. 2016 Aug 17