

1.0 INTRODUCTION

The technical development in the field of cattle reproduction has dramatically enhanced the possibilities of exchanging genetic material on a global scale by wide-spread use of mainly frozen semen and transfers of frozen embryos. The world trade with frozen semen has increased considerably during the last two decades and as a result many dairy cattle populations have rapidly incorporated genes from other populations, e.g. the wellknown increase of North-American Holstein genes in several of the European Friesian populations.

However, importing countries have been faced with a number of problems in choosing both the populations and individual bulls from the more or less world-wide gene pool when trying to select the most suitable breeding stock according to their own breeding goals and needs. Examples of such problems are:

1. The average difference in genetic merit for production and other traits between the actual populations has usually not been known.
2. Shortcomings in progeny testing or sire-evaluation methods including deficiencies in reliability of proofs (small progeny groups, non-AI proofs) and in number of important traits being evaluated (e.g. protein, fertility, growth rate).
3. Differences in methods of expressing genetic merit of individual bulls (BV kg, PD lbs, BCA-units, RBV in % etc.) including the extremely important question on which base sire proofs are compared to (fixed, stepwise, rolling or moving) and what years and populations that are included in bases.
4. Insufficient information on the above matters to customers for adequate interpretation of sire proofs for international use.

The comprehensive FAO (Food and Agriculture Organization of the United Nations) comparison in Poland of 10 Black-and-White strains of cattle (Stolzmann et al., 1981) threw considerable light on the first of these questions and provided facts for more rational decisions on populations of interest under various circumstances. As a result international exchange of genetic material within the Black-and-White populations continued to increase. Another FAO supervised trial in Bulgaria including 8 Red cattle breeds will hopefully provide valuable information on the relative genetic merits of these breeds.

Several efforts to standardize methods of expressing sire proofs have been made, e.g. by EAAP (European Association for Animal Production: Gaillard et al., 1977) and other organizations, but so far with little progress. Meanwhile, Group A12 of IDF (International Dairy Federation) worked out a formula to convert sire proofs in one country to correspond with the ways of expressing proofs in another country considering both differences in scales used and bases for evaluation (IDF, 1981). However, it assumed empirical knowledge on how bulls proven in one country rated in the other, and furthermore, that sire proofs being converted were estimated with high accuracy and that the ratio in variation among such proofs of both countries was known.

Due to the increased needs of international use of sire proofs further developments of formulas for conversion of proofs or ways of simultaneous prediction of breeding values for several countries have been proposed. At the same time a lot of experience and empirical data from progeny tests of the same bulls in many countries has been gathered and analysed in several countries. At a joint

IDF/EAAP symposium on 'Progeny testing methods in dairy cattle' held in Prague, September 1984, results were presented from a number of countries where sire proofs had been compared pair-wise between countries (**Lederer; Wilmink and Wismans; Swanson; Wickham; Averdunk and Schneeberger; Goddard, 1984**). Moreover, a linear method of predicting breeding values utilizing records of the same bulls from several countries was proposed by **Schaeffer (1984)**.

The objectives of the present report are to review and evaluate the results and methods for conversion of breeding values recently published and to give guidelines for the future work in the application of methods proposed as well as on areas needing more attention in research. In evaluation of the methods so far presented for conversion of proofs a simulation study was carried out.