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Dairy cattle breeding in New Zealand

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INTRODUCTION

The New Zealand dairy industry has undertaken a substantial amount of research and development on the economic, genetic, and reproductive aspects of cattle breeding. Much of this research has been conducted within Livestock Improvement and has not been widely published.

The purpose of this contract is to bring together a series of papers which provide a summary of the achievements in cattle breeding and identify challenges and directions for the future. They complement the Livestock Improvement lecture by Dr Michel Georges, in which he discusses the use of markers assisted selection as a potential tool to increase rates of genetic gain. The paper by Spelman *et al.*, reports the results of the first efforts to identify the contribution that this technology can make in New Zealand's dairy cattle breeding schemes.

Genetic gain depends on clear, relevant, and sound breeding objectives coupled with an animal evaluation system which identifies, with minimal error and without bias, those animals best suited to achieving the objective. The paper by Harris *et al.*, describes a major research effort which has resulted in new system for this purpose being implemented.

Rendel *et al.*'s research has focused on evaluating alternative breeding scheme designs and provides a rationale for making decisions on the adoption of new technologies as well as providing an indication of the potential value of future technologies. These methods are being used by

Livestock Improvement as the basis for its major decisions on breeding scheme design.

The papers by Winkelman *et al.*, and Grosshans *et al.*, address the biological control of traits of potential value in cattle breeding. Breeding for specific milk proteins provides an opportunity for better matching production to meet processing and marketing needs. Evidence from New Zealand supports overseas findings of a negative genetic correlation between milk production and fertility. The implication being that the set of traits which make up fertility need to be given serious consideration for inclusion in future breeding objectives.

Vishwanath *et al.*, describes the major achievements made in semen technology and identifies areas where further research is indicated. These technologies provide Livestock Improvement with the ability to achieve selection differentials on the male to female pathway which are the highest in the world.

Xu *et al.*, summarise developments in our understanding of dairy cow fertility and have identified that there is substantial scope for improvements in female fertility in New Zealand dairy herds.

In combination, the papers making up this contract demonstrate the major contribution being made by dairy cattle breeding research and indicate some of the future developments which will ensure the research efforts provide major benefits to the efficiency of dairy production in New Zealand.