

New Zealand Society of Animal Production online archive

This paper is from the New Zealand Society for Animal Production online archive. NZSAP holds a regular annual conference in June or July each year for the presentation of technical and applied topics in animal production. NZSAP plays an important role as a forum fostering research in all areas of animal production including production systems, nutrition, meat science, animal welfare, wool science, animal breeding and genetics.

An invitation is extended to all those involved in the field of animal production to apply for membership of the New Zealand Society of Animal Production at our website www.nzsap.org.nz

[View All Proceedings](#)

[Next Conference](#)

[Join NZSAP](#)

The New Zealand Society of Animal Production in publishing the conference proceedings is engaged in disseminating information, not rendering professional advice or services. The views expressed herein do not necessarily represent the views of the New Zealand Society of Animal Production and the New Zealand Society of Animal Production expressly disclaims any form of liability with respect to anything done or omitted to be done in reliance upon the contents of these proceedings.

This work is licensed under a [Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License](http://creativecommons.org/licenses/by-nc-nd/4.0/).



You are free to:

Share— copy and redistribute the material in any medium or format

Under the following terms:

Attribution — You must give [appropriate credit](#), provide a link to the license, and [indicate if changes were made](#). You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.

NonCommercial — You may not use the material for [commercial purposes](#).

NoDerivatives — If you [remix, transform, or build upon](#) the material, you may not distribute the modified material.

<http://creativecommons.org.nz/licences/licences-explained/>

E-Genetics. The role of the internet in genetic improvement

P. LINDSAY

AgResearch Invermay, PB50034, Mosgiel, New Zealand

ABSTRACT

This paper reviews trends in the use of the Internet and e-commerce and outlines how this important new technology when coupled with modern Internet accessible databases will provide powerful new decision making tools to breeders and commercial farmers.

Keywords: Internet; e-commerce; new economy; SIL; genetic evaluation

INTRODUCTION

There is a dramatic change underway which is profoundly effecting world economies. In fact, this change is of such magnitude that it is being called "the new economy". It is the development of the Internet. While this technology is just beginning to be seen in the rural sector, it has the potential to bring revolutionary changes in the way that farmers will work, react to market signals and make decisions.

The fundamental characteristics of this technology (and the new economy) are that it provides reach (which means that potential customers are both easy to communicate with and large in number) and richness (which is the technology's ability to provide a depth of service offering). This technology has the potential to engage farmers in new value propositions in a highly efficient manner.

Consider traditional farm advisors. They generally have a rich offering of advice and guidance, however any individual farm advisors ability to interact with more than a few tens of farmers is limited. This means that individual advisors specific solutions, no matter how good, are limited to a small audience. On the other hand, a publication like the Rural News has a very high reach, but due to the generic nature of the information that can be provided, it has a low richness of content.

Internet based services such as SIL (the new National Sheep database) can achieve high reach and using information technology can encapsulate knowledge into decision support tools which can be tailored for a range of specific situations, thus achieving a high richness of content. Coupled with a high degree of responsiveness (almost real-time) these tools will provide the basis for delivery of a range of new and sophisticated services to farmers, over the next few years.

NZ and International Trends

In order to fully appreciate the impact of the Internet on business today and into the near future it is only necessary to look at some of the statistics related to its growth [Table 1]. While many of these statistics are International, with the rate of growth of the Internet in NZ being higher than in the U.S., the same type of trends are likely to occur here.

While reliable figures relating to Internet access by New Zealand farmers, are not available, last years Kellog survey and a survey carried out by AgResearch late last year indicate that well over 20% of farms have Internet access.

A more significant figure however, is of those farmers with computers (60%); most would embrace Internet based systems if it offered facilities of value to their farming operation.

Over the last few months the industry has seen the introduction of several e-commerce facilities aimed at farmers and as the number of business offerings in this area increases, we will see accelerated uptake of the technology as has been observed in other business sectors.

The SIL System

Early in the planning process of this system, the decision was made to have the SIL database as an Internet accessible system. The key reasons behind this decision were that, a) service providers would need a cost-effective and widely available method of accessing the SIL system and b) looking to the future it was generally agreed that wider accessibility to the SIL database was desirable. Examples of two types of access are by breeders directly to their own information and access by commercial farmers to view ram information and select animals according to their criteria. This type of access raises a number of business issues. Figure 1 provides a schematic diagram of the SIL system that shows the major components responsible for Internet interactions.

The SIL System Structure

The SIL System essentially consists of five main components (see Figure 1):

- the database, which stores data about flocks, animals, animal measurements and breeding values,
- the genetic engine, which calculates the animal breeding values based on genetic analysis,
- the application, or user interface, which is the means by which users submit data and request reports,
- the report generator and ancillary components, which generate the report files and send them to the user,
- the administrative utilities, which allow the system administrators to control the operation of the system.

Apart from the genetic engine which uses specialised mathematical software, the bulk of the rest of the system is written using the New Zealand-developed JADE product, an object-oriented database and application development tool. The JADE system provides an efficient mechanism whereby the user can interact with the central database over the Internet in real time to browse their data, submit new data files and make requests for information. As far as the

user is concerned, the SIL System application operates like any other program they use on their computer. It is easy to use and is accessible by anyone who has a modem and the appropriate authorisation. However, because of the amount of information involved, and the time it takes to generate the reports, the report requests are processed at a later time on the server and the output is sent to the user by e-mail when ready. This means the user doesn't have to stay online waiting while the report is being generated. It also provides a fair way for many users to make requests and not have any one user monopolise the system resources. The turn-around time for most reports is less than 24 hours and may be considerably quicker than that (e.g. half an hour) depending on what the user has requested and whether the system has a lot of other pending requests.

The database currently contains some 6 million individual animals, from around 2000 flocks (700 active) with tens of millions of breeding values calculated and is presently some 30 giga-bytes in size. The information on animal pedigree is all inter-linked, so that animals from one flock may be referenced by another flock without duplication of data. Rigorous checking is done at data submission time to ensure only valid information goes into the database and access to confidential flock information is strictly controlled and is only available to authorised users.

TABLE 1: Some key Internet uptake statistics

- 275 million people online in Feb. 2000 (less than 5% populations) – up from 14 million in 1995.
- IDC¹ predict 500 million people online by 2003.
- The Internet has acquired the reach in 5 years that took Television 13 years.
- US\$1.8 trillion has been added to US stock market in last 4 years as a result of the Internet.
- Online consumer spend in 1999 was US\$25b (IDC), UK was US\$190m and Europe US\$770m.
- US\$700b – US\$900b predicted to be transacted online in 2002 (90% in B2B).
- US surveys predict that nearly 33% of online users are currently transacting online.
- US Internet penetration approximately 30%, Australian 29% and NZ 34%.
- NZ Internet penetration in world top 10.
- 54% of New Zealanders over 10 years of age now claim they have access to the Internet (AC Neilson:Netwatch).
- In the home market, 37% of households now have Internet connections – 45% of all business.
- 50% of businesses with Internet have gone online in the last 12 months.
 - An additional 16% say they intend to join the Internet in the next 6 months (CM Research: Consumer Market Monitor) .
- NZ Online market currently estimated at between US\$43m and US\$108m and predicted to grow to US\$47m by 2002 (IDC).
 IDC – International Data Corporation, B2B – Business to business e-commerce

FIGURE 1: Schematic diagram of the SIL system.

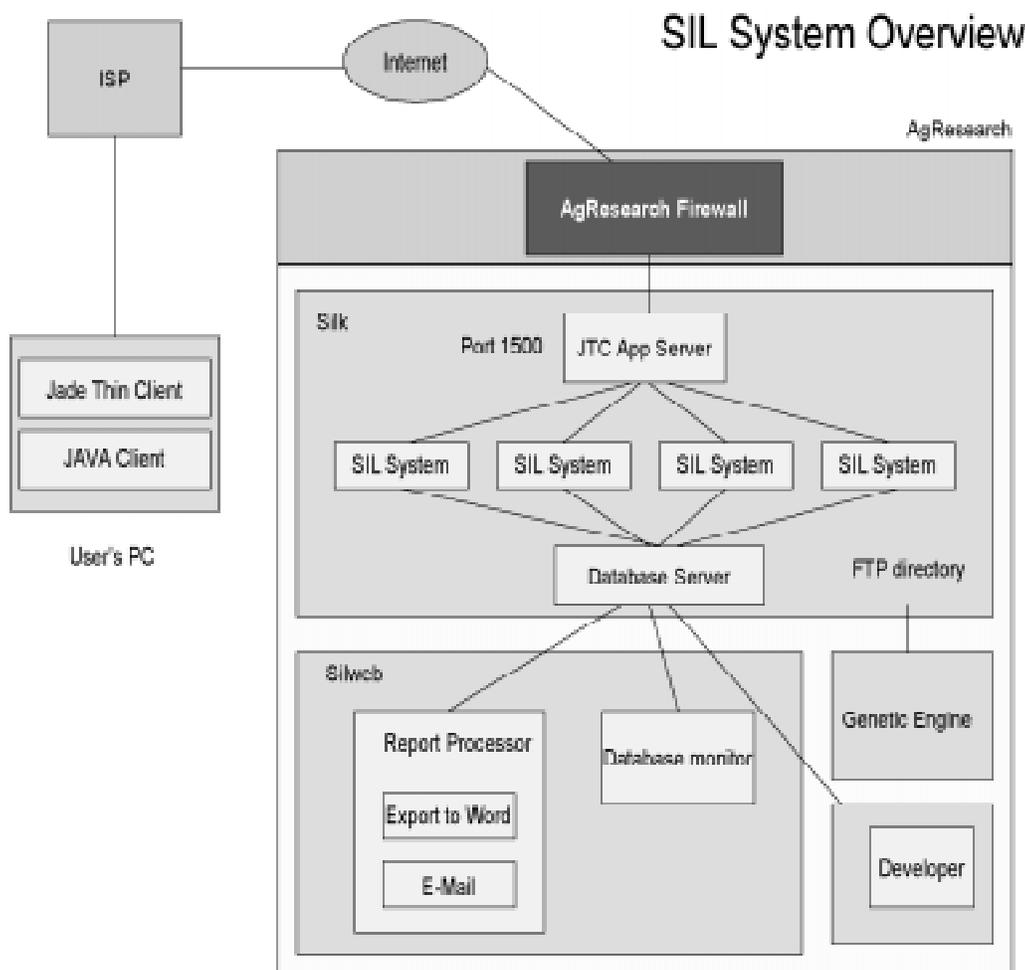


FIGURE 2: Screen cut of ram selection application

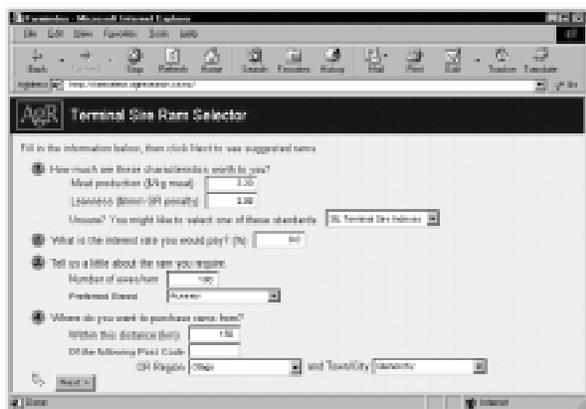
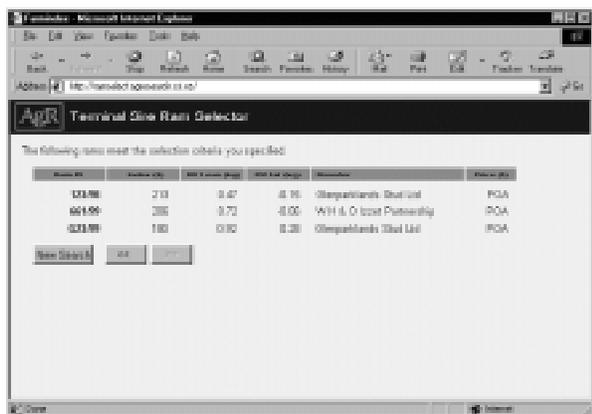


FIGURE 3: Schematic of Internet linked farmer databases.



Future Internet based Services

Two examples of potential “added-value” applications that are Internet based and may link with SIL are described.

Example 1

Subject to breeder’s approval and other business issues being resolved, direct access to breeding value information will provide an extremely valuable means for commercial farmers to select animals or alternatively for a breeder to advertise animals for sale. The consistency of breeding value calculation available through a single national database such as SIL means that individual animals can be selected using a range of desired traits and national rankings of animals meeting a particular set of criteria. Figure 2 shows screen cuts of a system that allows the selection of animals on this basis.

Example 2

The second example is more complex and seeks to demonstrate the real power of the Internet to not only provide access but to also allow the integration of data from a number of different databases to allow the breeder to select superior animals. This particular example demonstrates the identification and selection of elite animals using actual on-farm and in-processor performance and combines farmer records, processor records, DNA information and SIL information. In future DNA profile information will enable key aspects to be extracted without pedigree recording. This example is outlined in Figure 3.

CONCLUSION

This paper has examined key trends in the development of the Internet and considered several examples of where this important technology could leverage information in the SIL, National sheep database. There are many other opportunities to combine information and support improved processes for the selection of desired traits. Clearly there are a number of key business decisions which need to be addressed before such applications can be provided but perhaps the biggest hurdle in exploiting this new technology are not these nor technical issues. Rather they are political issues that need to be identified and resolved so all parties can benefit.