New Zealand
Agricultural
Engineering
Institute

news

Lincoln College, Canterbury, New Zealand.

1981 N.Z. Agricultural Fieldays Edition

Spreading the word

The New Zealand Agricultural Engineering Institute was established in 1963, and is based at Lincoln College. The main functions of the Institute are:

- Research and development connected with agricultural engineering problems of importance to New Zealand.
- Testing of agricultural equipment and the provision of a consulting service.

Main research activities include:

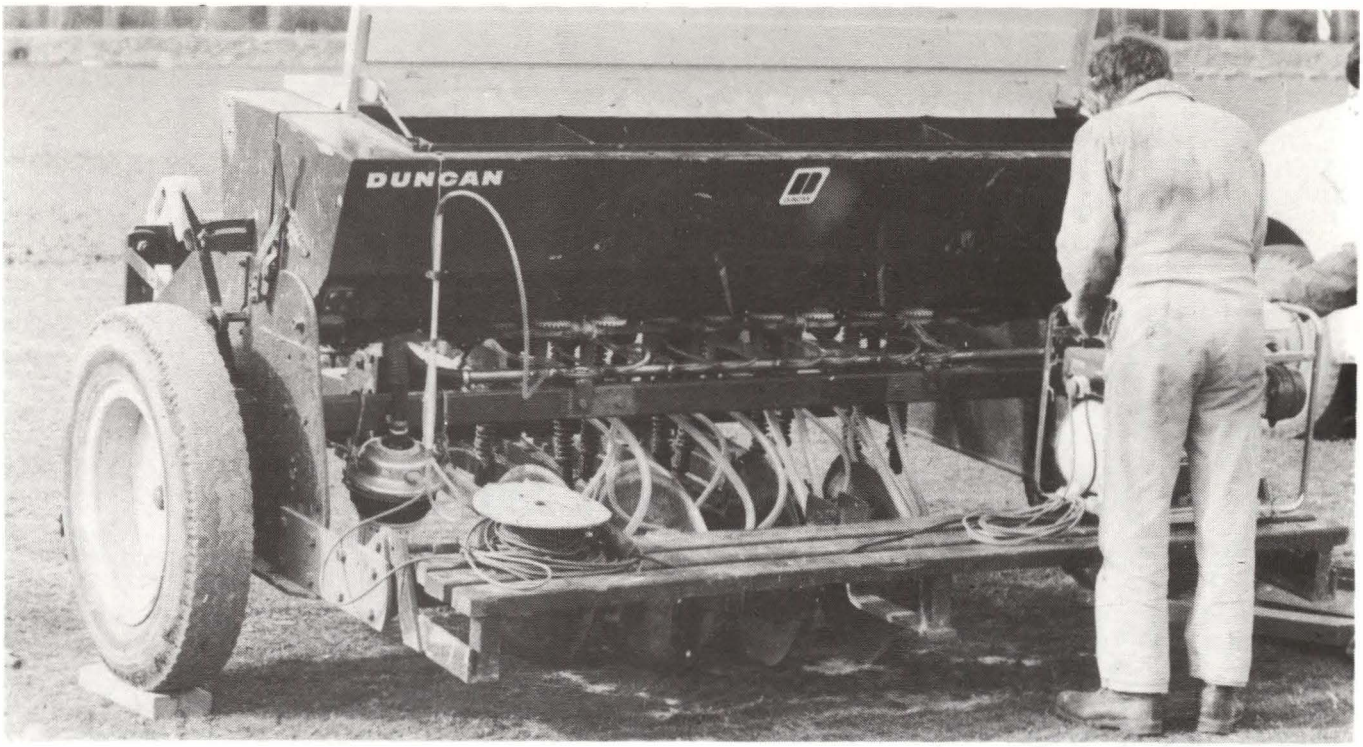
- Water resources
- Farm water supplies
- Crop mechanisation
- Energy farming
- Farm structures
- Tractor safety frames
- Fruit harvesting
- Irrigation
- Drainage
- Spraying techniques
- Topdressing
- Farm wastes
- Alternative fuels
- Agricultural aviation

An important function of the Institute is to pass on the results of research findings to the farming industry. During the final quarter of 1980, Institute staff contributed to more than 20 separate shows, conferences, or field days. In addition, three radio and newspaper interviews were given, and a T.V. feature on diesel fuel conservation was made at Lincoln.

A major extension activity was the running of two courses on Pesticide Application Technology. The first was held at Lincoln College in November and repeated at the Forest Research Institute at Rotorua. A wide range of equipment was assembled for use and study during the courses, which were well supported by the major chemical companies and suppliers of spraying equipment.

Photo shows:-:- Participants at the spraying technology course held at Lincoln watch a spraying helicopter demonstrate its capabilities.





Experimental drill with blower for air assisted conveyance of seed and fertilizer

Direct Drilling Trials

Field trials in the direct drilling of crops have been carried out in a joint project with the Ministry of Agriculture and Fisheries.

Eight coulter types have been used in the trials which took place near Ashburton.

Three of the machines being developed by the Institute are:

- A Newcastle coulter which consists of a large concave disc with attachments for trash handling and depth control.
- The Roto-drill, a modified rotary cultivator which cuts slots in the ground. Seed and fertiliser are fed into the slots directly behind the rotor blades.
- An A-blade coulter which sows two lines of seed, with both seed and fertilizer delivery air assisted.

Crops were sown in September under good field conditions with all machines performing well.

However, substantial differences were apparent in the three-week emergence counts. Percentage emergence counts were:

Rotodrill 75; multiseeder with hoe coulter 71; full cultivation 71; KKK tine coulter 69; Cocks coulter (farmer) 69; Newcaster coulter (single disc) 56; multi-seeder triple disc 47; Scottish I.A.E. A-blade 26.

Wheat trials at Gore, using the Roto-drill, triple disc, Aitchison 2000 and KKK tine, were sown in mid-October and have shown no difference in three-week counts.

The Roto-drill was also taken to Rotorua for re-grassing trials of run-out pasture in association with the M.A.F. Research Division.

ROTO-DRILL PERFORMS WELL

The importance of adequate weed spraying before direct drilling was shown plainly at the Ashburton trials. A complete kill was not achieved, and some plots which were not well established were smothered by vigorous weed growth.

This trial which revealed a deficiency of some direct drills, also demonstrated an advantage of the roto-drill which sows the seed in slots behind the rotor blades. The roto-drilled plots grew strongly, with no weed competition.

In wheat drilling trials at Gore, the roto-drill again gave the best looking crop.

In Southland, swedes are normally sown in ridges, but in this year's trials, the dry weather killed off the swedes which were sown in ridges after the normal full cultivation, but the direct drilled plots grew well - especially the roto-drilled ones.



The Roto-drill slot seeding high-producing grasses into poor native tussock land

The Rotodrill Goes Commercial

Mr Richard Speight, of Wether Hills, Ohai, has bought the first commercial prototype of the Roto-drill, developed by the Institute at Lincoln.

His decision to buy the Roto-drill followed a 16 hectare trial at Wether Hills by NZAEI researcher Mr Russell Horrell.

Mr Speight has about 800 hectares of tussock country at altitudes between 330 and 600 metres which could be rotodrilled. He plans to use his normal oversowing mixture of cocksfoot, ryegrass, and white clover.

Manufactured by Henry Engineering Ltd of Loburn, the Roto-drill is a modified Gallagher Dreadnought rotary hoe with an 80-inch Connor Shea seedbox.

Mr Newton Henry says the machine is now commercially available and he provides setting-up and back-up service.

The Roto-drill was born through the dissatisfaction of a Palmerston farmer, Mr Leighton Coutts, with the effectiveness of existing overdrilling machinery on his upland tussock and browntop country in North Otago.

Mr Coutts modified a Howard rotary hoe and added a seed and fertiliser box so that seed dropped into cultivated strips about 10 cm wide at 25 cm centres.

His work with this machine over several years convinced Mr Coutts he was getting good value for money.

In 1977, his machine was lent to the NZAEI for trials in other areas.

These trials showed the machine was much superior to surface broadcasting on rocky, exposed ground and to a single-disc drill on level ground.

The NZAEI team then set about producing its own machine. A Howard seedavator was modified, and two new coulter types were made.

One was a rigid tube through the back plate of the hoe; the other a tube attached to a double-disc opener.

Tests proved them about equal in efficiency, but the tube coulter is the cheaper. The addition of a press wheel to consolidate the soil in the slot has improved establishment in dry, fluffy soils.

The trials have shown that the Roto-drill often performs better than tine and disc drills, particularly in drier conditions.



Protective cab mounted on the front of a tractor for use in orchards. The cab was designed and constructed by NZAEI staff at Rukuhia.

Rukuhia Report

Since January 1980, the Institute has had a North Island sub-station based as the M.A.F.'s Rukuhia Research Station in Hamilton. There are a total of five Institute staff at the sub-station, and one of the main areas of work there is concerned with spray application techniques and spray protection equipment. It has always been important to use the correct equipment properly calibrated with the appropriate chemical, and for the operator to use appropriate protective equipment while spraying. With the development of Ultra Low Volume application equipment these aspects are becoming even more important, however. Much of the project work in spraying at the Rukuhia sub-station relates directly to these aspects.

One other interesting project under way is in evaluation of one of the first commercially available electrostatic sprayers. Other work at the sub-station includes design aspects of horticultural structures as well as providing local support for some of the projects which originate from the Institute headquarters at Lincoln.

NEW ENERGY CONTRACT

The Liquid Fuels Trust Board has recently awarded to Lincoln College a contract for research into the processing of beet into fuel alcohol. The NZAEI will be heavily involved in the project in which the study of waste and by-products will be important.

The contract formally commences in April 1981 for a two-year period, but preparations are already in hand for construction of a plant.

The new contract complements another L.F.T.B. contract for the study of beet harvesting and storage. The NZAEI has been busy with this work for most of 1980, harvesting about 1,500 tonnes of beet for processing and storage trials.

It was in 1966 that the Institute first began working with fodder beet, which at that time was a useful, but little known stock feed. It has been grown and studied by the NZAEI for several years, and this experience has given the energy farming project a valuable start.

This year about 700 tonnes was put into clamps for storage trials to study the effects of beet species, topping method, conditions at harvesting time, and clamp cover. Temperature within the clamps are being monitored, and samples removed to measure the sugar yield and keeping quality of the beet.

Requests for information should be addressed to:

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