NZAEI NEWS

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EDITORIAL

If you would like to comment on any of the items appearing in the Newsletter, or on the work of the Institute, please write to:

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The Information Officer will also handle address changes and requests for the Newsletter or other NZAEI publications.

TUSSOCK AND HILL COUNTRY OVERSOWING

Preparations are well advanced for this year's spring trials which will start next month. The project has been expanded to include other types of machine, and there will be comparisons between the roto drill, tine drill and a disc drill. Trials have been arranged at the following sites:

Hunua, North Canterbury
Holbrook, Mackenzie Basin
Streamlands, Mackenzie Basin
Tara Hills, Mackenzie Basin
Hawea Flat, Otago
Millars Flat, Otago (two sites)
Mt Possession, Mid Canterbury

The Tara Hills, Hawea Flat and Millars Flat trials are in conjunction with the MAF Research Division, and the Mt Possession trial with the Forest Research Institute.

HARVESTING

Apples

Samples of Granny Smith apples stored at room temperature for two weeks after harvesting with the cam-operated rig were analysed for damage, with the following results.

Unmarked fruit complete	25%
Unmarked fruit with stem pulls	60%
Fruit with bruises less than 1 cm^2	13%
Fruit with large bruises, greater than 1 cm^2	2%
Punctures	0.6%
Retained spurs	2%

The results are most promising but may not be representative of what will happen when a fully laden canopy, trained to the latest specification, is harvested.

Raspberries

Construction of the Mark 2 raspberry harvester is progressing at a steady rate and most of the design changes have been completed. Tests of the hydraulic transmission have begun.

Garlic

Three hand-assisted garlic planters have been observed working in the recent planting season. Variation in performance was due more to the skill and interest of the operators than to the design of the machines. The rate of working of all three machines was low.

AGRICULTURAL AVIATION

Emergency Dumping of Lime

A number of tests have been made with full sized hoppers and the results so far confirm the predictions made from shear tests. For the type of lime we are using mass flow should occur from the hopper with the rate of flow being determined by the outlet dimensions. Naturally, this may not be the case with lime of higher moisture content, and we are now examining

that aspect, along with the effects of vibration, hopper orientation and outlet size.

After strengthening and propping, we can support a fully laden hopper (total weight approximately 1400 kg) from the roof of the Still Air Laboratory. This allows us to record the discharge rate using a load cell, a bridge, and a chart recorder.

FENCING

Durability Trials

The Rotorua and Puketaha sites were visited during June, and rotten, untreated pine posts at both sites were replaced with hardwood stakes. At Rotorua one type of barbed wire that had failed because of corrosion was also removed.

Accelerated Corrosion Trial

This trial has been completed and an Internal Report describing the corrosive effect of timber preservative residues on galvanised, aluminium clad, and aluminium magnesium alloy wire is in preparation.

In the trial, samples of the three types of wire were held in contact with pinewood blocks. These blocks had been treated with two different types of copper chrome arsenate (CCA) timber preservatives, and also 5% pentachlorophenol (PCP) in oil. The wire samples were examined after one, two, three and six months' exposure to a humid atmosphere.

The galvanised wire in contact with the blocks treated with CCA preservatives was most severely affected. In some cases almost ninety percent of the zinc galvanising had been removed and there was corrosion of the base steel. PCP residues had little effect, the loss of zinc being similar to that lost from wire in contact with untreated control blocks.

The Internal Report connects the results from the accelerated corrosion trial with those arising from the Institute's fence material durability trials, and suggests that in most of inland New Zealand the use of fence posts treated with CCA preservatives and galvanised wire is still a useful fencing combination.

On the other hand, care should be exercised in environments where the durability trials have shown that the rapid corrosion of ungalvanised wire takes place, such as on the coast and particularly in the sulphurous atmosphere at Rotorua. If durable fences are to be built in such areas using CCA treated posts and galvanised wire (each, individually, an excellent fencing material) means should be employed to keep the two from coming into contact with one another.

Electric Fencing

The fences on four farms in Canterbury have been chosen for the installation of test insulators made from the six types of polymer which may prove to have better insulating characteristics. Two are on the coast and insulators have already been installed in several fences; the other two sites are inland and are in the winter snow belt. On all of these sites insulators are being installed in fence lines that are already part of electric fence systems.

STOCK SCALES

The quest for procedures to eliminate the "noise" signal when weighing live animals has virtually concluded. A microprocessor able to apply this technique and present the weight of the animal in a digital display to the required degree of accuracy has been developed. The software is now being designed.

ORCHARD SPRAYERS

Work has started on measuring air velocity profiles around the fan perimeter on a blast sprayer. Little information seems available on this, even though it is important in the efficient operation of the sprayer. The project is the first step in a more comprehensive look at air blast sprayer performance.

ETHANOL FROM CROPS

The results from the tower fermentation studies have shown very high efficiencies of sugar to alcohol conversion, and reasonably good residence time which influences plant size. The results for Yellow Daeno beet were obtained before the fermenter was closed down while demonstrations were being carried out at National Farm Field Days. Since restarting the fermenter, work is being done on the Monoblanc variety, which has a higher sugar concentration. A contribution to the

agronomic aspects of the project was made by a joint NZAEI/MAF survey of fodder beet yields from nineteen farms in the Mid-Canterbury region. The sugar content and gross yields were obtained from sampling at each farm. The survey encountered four main varieties and a large variation in yield but represents the most up to date source of data for local conditions at present.

The Catchpole sugar beet harvester imported from England in 1964 for the South Otago trials has been used successfully on the NZAEI crop of Monoblanc fodder beet. The beet was harvested cleanly and the accuracy of topping was good.

The current shortage of diesel fuel has provided an impetus for studies in agricultural fuel use both in the conservation aspects as well as the alternative fuel aspect. The Institute's new fuel flow meter has been an invaluable tool in short term trial studies on reducing fuel use in cultivation. The recent visit by an engineer from Perkins Diesel has generated further interest in methods of using alternative liquid fuels in diesel engines.

ENVIRONMENTAL CONTROL

The first unit to be made is still installed in the MAF poultry house at Templeton. No results have been obtained during the colder months because the heat from the number of birds housed has been sufficient to overcome the heat losses from the building. The ventilating system has therefore been closed for the whole period. The improved proportional controller has been completed and successfully tested in the laboratory. A search for the most suitable actuators for the blinds is being made. Arrangements have also been made to install the unit in a commercial poultry shed housing 13,000 birds.

HERE AND THERE

A brief evaluation has been made of a bulk fertiliser transport bag being developed commercially.

John Dunn and Geoff Warren acted as judges in machinery and fencing respectively at this year's National Field Days.

As recorded in an earlier report, the Institute assisted the Wool Research Organisation by taking high speed movie photographs of the behaviour of the needles and yarn on a carpet tufting loom. A patent has been taken out on a redesigned needle and this should result in substantial savings to the industry.

IRRIGATION

A new type of water motor has been developed for the moving sideroll irrigator and a prototype unit is undergoing a durability test. The end feeding mechanism has been completed and is ready for field testing. An improved hose tensioning device has been fitted to the hose reel trailer.

Statistical analysis of the catch-can efficiency data seems to suggest that while significant losses can be accounted for by the predicted effects of climatic factors some unexplained variation remains. Refinement of the analysis is continuing. The most important result is that a significant part of the *apparent* losses in sprinkler irrigation can be explained by the inefficiency of the measurement technique rather than the inefficiency of the irrigation system.

An interesting problem in the design of sprinkler frost protection for kiwifruit has been solved by extensively modifying the existing computer programme. Since the crop is grown in narrow blocks between high shelter belts, the design procedure developed for the normal orchard layouts could not be directly applied.

STAFF

Dr Dale Vanderholm, an Agricultural Engineer of the University of Illinois, Urbana, Illinois, United States of America, will arrive in New Zealand on 29 August for an eleven month sabbatical leave appointment at the Institute. His time, while here, will be devoted to the production of a manual for the treatment of farm wastes.

PAPERS BY NZAEI STAFF

Bidwell, V.J.
Field Drainage Guide.
Project Report P/16. Second Printing.

Painter, D.J. and Jones, M.W.
Shelter Fences for Orchards.
New Zealand Farmer, Vol. 100, No. 5.

Henderson, C.
Ethanol from Crops.
New Zealand Farmer, Vol. 100, No. 7.

Horrell, R.
Sowing Prairie Grass.
New Zealand Farmer, Vol. 100, No. 11.

Steele, P.E.
Economising on the Use of Tractors and Cultivation Equipment.
Proceedings Cash Cropping Conference, North Otago Federated Farmers and Ministry of Agriculture and Fisheries, Oamaru, 31 July 1979.

Steele, P.E.
Big Bales and Buggies.
Straight Furrow, 40(7), April.

Steele, P.E.
Stockhandling to Post Driving.
Straight Furrow, 40(7), April.

Steele, P.E.
Harvesting Blackcurrants.
New Zealand Journal of Agriculture, 138(6), June.



Pointing the way to the NZAEI exhibit at the Fieldays.

NZAEI EXHIBIT AT THE 1979 FIELDAYS

This year we concentrated on a single theme for our Fieldays exhibit and engaged professional assistance to promote it. The professional approach coupled with a topic concerning many people - the fuel crisis - combined to produce the best attraction we have yet had. Crowds of sixty or seventy people in the display tent were common and the display later had the notable distinction of being referred to in Parliament.



The tractor which ran on ethanol. The only visible modification was the ducting of hot air from the jacketed exhaust pipe to warm the ethanol which has a higher temperature of evaporation than petrol. Other modifications raised the compression ratio, enlarged the jets, and changed the type of spark plug and coil.

The heart of the exhibit was a working demonstration of the production of ethanol from fodder beet. Beet, taken from a stockpile on a trailer outside the display tent, was sliced, and then boiled to extract the sugar. The sugar solution was fermented to transform the sugar into ethanol and then distilled to isolate the ethanol. Then came the trump card - a MF 135 tractor running on pure ethanol. The tractor was connected to a PTO dynomometer so that people could see (and hear) that the tractor not only ran on ethanol but produced more power.

Having the fermentation and distillation processes successfully producing ethanol while people watched proved very successful.

The display this year was organised by Trevor Pratt with the ethanol production being the responsibility of Carl Henderson.