NZAEI NEWS

NO.13 *An informal account of current activities* JUNE 1979

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:

The Information Officer
NZAEI
Lincoln College
Canterbury

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

TUSSOCK AND HILL COUNTRY OVERSOWING

Three trial sites have now been assessed by the Tussock Grassland and Mountain Lands Institute staff with encouraging results. The method adopted used a 20 cm square sampling frame to measure the amount of introduced grass. At the sites on Haldon and Clayton Stations comparisons were made between the Institute machine and the conventional triple disc drill, with the following average results:

Site	Method	% of frames with grass	% grass within frames
Haldon	Institute machine	76.5	34
Haldon	Triple disc drill	28.5	10
Clayton	Institute machine	72.0	44
Clayton	Triple disc drill	30.0	10

The trials at a third site, at Holbrook Station, investigated variations in machine operation. The results indicate that slightly more grass was established in the coarser tilth produced at slow rotor speeds than in the fluffy tilth produced at higher rotor speeds. There appears to be no significant difference between the disc and the tube coulters.

At all three sites applying nitrogen gave insufficient extra grass to warrant the additional cost.

The Institute machine is now being fitted with press wheels to improve establishment under dry conditions. Further trials are planned, in co-operation with Ministry of Agriculture staff, at Alexandra.

HARVESTING

Apples

A simple cam-operated harvesting rig, using hydraulic services originally built on to the Ford 3000 tractor for the tomato harvester, has been tried on canopied rows of Splendour, Golden Delicious and Granny Smith apples. Different forms of impactor have been used and samples of fruit have been taken for damage assessment. Good progress has been made during the harvest period but a full evaluation of the harvesting system is unlikely until the young trees being trained to the canopy on line wires come into fruit.

A start has been made on changing the older trees from a netting support to plain line wires. This will effect a considerable saving in canopy establishment costs.

Grapes

The original raspberry harvesting rig mounted on a small tractor was used on a short length of 'H' canopy trained vines in the Lincoln College Horticultural Research Area and individual grapes were removed cleanly and without juicing.

On the first year vines the bunches

of fruit were not very well placed for harvesting but this should improve by next year.

EMERGENCY LIME DUMPING

Most of the laboratory work has been completed on this project. Equipment, modified for use in shear testing samples of lime, has shown reasonable results, but there is still some difficulty in interpretation. A sample of lime and of hopper wall material has been sent to the University of Wollongong, Australia, for analysis on Jenike test equipment. The results will be compared with tests done here.

Work has begun on the full sized hoppers. The first few trials using a hopper from a Pawnee aircraft showed that flow of lime from the hopper alternated between mass and funnel flow.

Working drawings for a cine camera mounting on a Fletcher aircraft have been completed and sent to Civil Aviation for approval. When installed the mounting will allow close-up cine film to be obtained of the hopper outlet during actual dumping.

FENCING

Durability Trials

All the North Island trial sites, as well as those at Wither Hills and French Pass in the South Island, have been inspected recently.

At Te Paki, where the protective coatings of the wire are abraded by wind borne sand, both the imported and locally made 4.0 mm diameter galvanised wire are still in good condition, but the New Zealand made high tensile galvanised wire is deteriorating. The aluminium clad wire still appears to be in 'mint' condition.

At French Pass all the galvanised wires are still in good condition. There is some corrosion of the base steel of the aluminium clad wire where the aluminium coating has suffered mechanical damage where it passes through a staple. At Makara all the ungalvanised samples have been replaced with Japanese and Australian made galvanised wire. At Wither Hills and Makara all the untreated pinus radiata control posts have failed and have been replaced with hardwood stakes.

High Country Fence

A recent visit to the high country trial on Mount Somers saw all seven different fencing systems under test in good condition.

Accelerated Corrosion Trial

Testing of the aluminium clad wire, removed from the accelerated corrosion trial after three months, is now completed. The percentage loss of aluminium (nine percent maximum) from this wire where in contact with multi-salt treated timber is far less than for zinc coated wire (approximately ninety percent).

However, the corrosion occuring on the aluminium clad wire is of a different type and could result in a reduction in the overall life of the wire.

Electric Fencing

Plastic insulators of six different polymers have been installed at each of the North Island durability trial sites, and at Wither Hills, French Pass and Ashley Dene in the South Island.

At Lincoln three small test fences have been set up incorporating the various types of wooden stakes that are now commercially available for use without insulators in electric fences. Measurements are being made of the effective insulation provided by each type of post under different weather conditions.

IRRIGATION

Modifications are being carried out on the moving sideroll irrigator in preparation for next season's field evaluation. They include a method of supplying water to the end of the sprayline instead of the centre, the use of readily available diaphragm cylinders for the water motors, improved hosereel details, and the addition of a petrol-motor hydraulic-drive for moving when not irrigating.

In the catch-can efficiency study no simple calibration relationship has been found from the single-climatic-factor evaluations. A more complex statistical analysis is now being carried out with the aim of obtaining relationships between water-loss and multiple-climatic-factors.

SOIL MOISTURE MEASUREMENTS

The preliminary field and laboratory testing of the two types of capacitive soil-moisture measuring equipment has been completed. The laboratory tests of the probe-type device indicate that most of the problems have been overcome and that the very comprehensive series of tests to fully evaluate the performance of the probe can proceed with confidence. The field tests on the twin-lead device showed that this technique is also promising. However, problems of controlling soil-moisture levels in the field mean that laboratory calibration is required. A test programme has been planned and equipment is being constructed.

DRAINAGE

A series of trials have been conducted to evaluate the performance of a mole plough fitted with wing attachments. The attachments are fitted just above the mole torpedo and are intended to improve soil structure during the mole ploughing operation.

ETHANOL FROM CROPS

The tower fermentation studies are continuing with fresh beet from the current season as feedstock. Fermentation trials are being conducted on the varieties, Yellow Daeno, Monoblanc, and sugar beet, with different types of yeast. Tests have been completed on one Yellow Daeno-yeast combination which show a very good efficiency of conversion of sugars to ethanol, but a lower rate of production than was expected. The use of other yeast varieties may improve the rate.

On the agronomic aspects of beet production, an extensive literature survey of the mechanised harvesting and handling of beet is in progress. A report on beet harvesting techniques is in preparation. The NZAEI fodder beet harvester and an early model sugar beet harvester have been returned to the Institute for overhaul. Both machines will be used to supply beet feedstock from the Institute crop. Several meetings have been held with other organisations interested in co-ordinating research into the agronomic aspects of growing beet for ethanol production.

In preparation for the beet-ethanol display at the Farm Field Days at Hamilton this year, a Massey Ferguson 135 tractor has been modified to run on ethanol by installing a modified earlier model Massey Ferguson petrol engine. A second tower fermenter has also been constructed for demonstration at the Field Days.

ELECTRIC DRIVES FOR AGRICULTURAL IMPLEMENTS

The inverter and associated control circuitry for the electric variable speed drive has been successfully tested on the mains supply. The equipment will be installed on the Ford 3000 tractor when this machine has completed its current work on the apple harvesting project.

ENVIRONMENTAL CONTROL

The construction of an improved proportional controller for installation in a commercial poultry house is almost complete and will be tested shortly.

STOCK SCALES

Preliminary measurements have been made of the frequencies resulting from breathing and the effects of the random movements of sheep during weighing. Techniques for filtering low frequency noise, when sampling times are of the same order as the period of the noise, are being investigated.

PUBLICATIONS

Bidwell, V.J.
The moving sideroll irrigator
N.Z. Farmer, Vol. 99, No. 17

Henderson, C.
Ethanol from crops
N.Z. Farmer, Vol. 100, No. 7

Carran, P.S.
Overhead sprinkler systems for frost fighting
N.Z. Farmer, Vol. 100, No. 9

Milne, J.
Nuts and bolts
N.Z. Farmer, Vol. 100, No. 3

Watson, E.M.
Testing
N.Z. Farmer, Vol. 100, No. 5

Steele, P.E.
Developments in Livestock Handling at the South Island Field Days.
Christchurch Press, 30 March 1979.

Woodhead, I. M.
12 - 230 V Inverter with overload protection
Electronics Australia, Vo.40, No.11.

STAFF

Mr M Jones has resigned his position as technician.

Mr F Lees returned to work in April after sick leave.

HERE AND THERE

●As a result of an article by Ian Woodhead in "Electronics Australia", describing a 12 to 230 volt inverter developed at the Institute, about eight enquiries have been received for further information.

●In his own time Stephen Hirsch has designed and built a computer with capabilities similar to a PDP8 but smaller in size and with reduced power consumption. The design could have application in several projects now being considered.

●Graham Garden served on the organising committee for the Fifth Biennial Conference of the Acoustical Society of New Zealand and presented a paper entitled "Problems Associated with Testing of Noise in Tractor Cabs".

MECHANICAL AIDS IN PLANTING AND HARVESTING GARLIC

Garlic can be a profitable crop and there are many parts of New Zealand where it will grow well. However, its culture has been limited, falling well short of its commercial potential.

One of the main disincentives, even in Blenheim where most garlic is grown at present, has been harvesting. The bulbs must be dried before they can be gathered, and up to now they have been pulled by hand and laid out in rows to dry in the field. When dry they must be picked up and the tops screwed off before bagging.



A garlic planting aid constructed by Michael Bailey of Ellesmere Spit.

This work has never been particularly attractive, and of recent years labour has not been easy to obtain. In addition, natural drying has limited the crop to Marlborough where the weather is relatively reliable.

Now, however, the crop can be dried artificially. The way is open for it to be mechanically harvested and grown in other parts of New Zealand. In Marlborough alone it is estimated that the area in garlic could increase from about 90 ha to some 360 ha if mechanical harvesting was possible.

The Institute has been asked to suggest any method or machine which might prove suitable, and to observe and report on any trial mechanical harvesters.

In January, on the recommendation of the Institute, a Danish twin belt vegetable harvester was tried out in a commercial crop. The results were so promising that the grower lifted and topped several hundred tonnes of garlic.

With mechanical harvesting and artificial drying more than just a possibility an interest in mechanical aids to planting has arisen. The Institute has, so far, suggested two possible planters and has observed other, farmer designed machines, at work. One of these was constructed and successfully used by Michael Bailey of Ellesmere spit. It is shown in the photograph.