Your No.1 Rural Newspaper

Countryleader

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COPETON: Storage 70,268 megalitres; distance below TWL 52.33m; 4 per cent of capacity; elevation 520.31; inflow 38 megalitres a day; discharge 32 megalitres a day.
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BOFFINS BOOST WOOL INDUSTRY

By MARTIN RASINI

CANBERRA – Breeding plants for desirable characteristics is one of the oldest tricks known to man.

Consciously and unconsciously, over the centuries mankind has developed food crops and fruits by planting the seeds of those within the species which have the most desirable characteristics.

Plant breeding programs this century have actively sought to produce varieties which are fungus and virus resistant, tolerate more extreme conditions, produce greater amounts of seed or fruit, and more desirable types of seed or fruit.

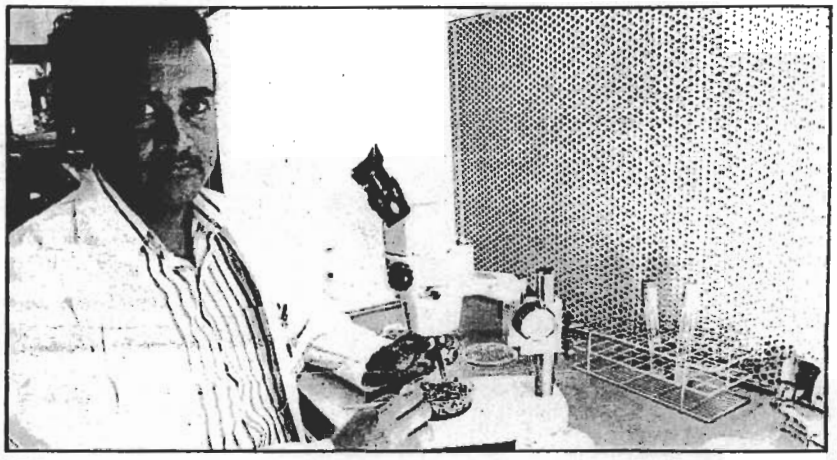
The extent and impact of plant breeding programs becomes apparent when one considers that there are now estimated to be more than 40,000 and perhaps as many as 45,000 wheat varieties.

But genetic engineering, the technique to actually transform plants and animals, to alter their genetic structure so that they produce different proteins and compounds, is new.

It is the key which will enable scientists to transform the landscape in the long term, to make plants and animals which not only better serve the needs of mankind, but which also are better adapted to cope with the rapid rate of change being imposed on the planet by mankind.

Working at the cutting edge with this technology, scientists at the CSIRO's Division of Plant Industry in Canberra have genetically altered subclover using a gene from the sunflower plant so that the sub-clover produces a substance which spurs sheep to grow wool.

And equally as importantly, the scientists say, the breakthrough has given them the tool to transform sub-clover in other ways to confer resistance to virus infections, improving its productivity and thus the productivity of grazing industries.



CSIRO scientist Dr Rafiq Khan carries out tissue culture experiments on subterranean clover as part of research to insert a sunflower gene into the plant.

Dr Don Spencer, a senior research fellow with the CSIRO division and member of an eight-member research team headed by Dr "TJ" Higgins whose research has been supported by the Wool Research and Development Corporation, Department of Industry Technology and Commerce, and South Australia's seedgrower cooperative Seedco, says the story began about 1985 when scientists were studying legume seed proteins.

"It was noticed that some of the minor proteins were rich in sulphur-amino-acids (SAA)," he said.

"In conversations with animal nutritionists we became aware that increased supplies of SAA increased wool growth.

"They had discovered about 20 years earlier that if they could deliver SAA into a sheep's bloodstream it would increase wool production by up to 50 per cent."

Dr Spencer said the problem was that, when sheep ate pasture plants, the ingested proteins were converted by the rumen into microbial protein, with a significant loss of SAA.

From the rumen the microbial protein is carried to the sheep gut from where it is assimilated for all forms of nourishment.

"Simply put the plant was higher in SAA than the microbial protein into which it was broken down while in the rumen," he said.

"So what we had to find was a dietary protein rich in SAA which would not be broken down in the rumen.

"Instead we wanted the protein to survive the rumen and then to be broken down in the true stomach so that the SAA could be assimilated by the bloodstream to increase wool growth.

"We did experiments on various SAA-rich seed proteins to find ones which were stable and did not break down in the rumen.

"We saw that if we could cause pasture plants to make these proteins we could improve the efficiency of wool production.

"We found that a protein from sunflower seed was the richest in SAA. The average SAA content of proteins from pasture plants is three or four per cent, while in this seed protein from sunflowers it is as high as 23 per cent.

"It was at this point that it became a genetic engineering problem."

Dr Spencer said the team of scientists had taken the DNA which codes sunflower for the SAA-rich protein and had transferred it into sub-clover.

"It was a bit of hunt," he said.

"But we isolated the gene in the sunflower seed which codes for the protein and successfully transferred it across."

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