LEFT: Dr Peter Ingham, section manager of science and technology at AgResearch, says it is now possible to "produce well-protected wool carpets with no insecticide component."

# BEATING MOTHS THE CLEAN WAY

Our New Zealand correspondent **Wendy Mill** begins a special report on three major breakthroughs in the use of wool at the research organisation AgResearch, with a look at how mothproofing can be achieved with minimal impact on the environment.

In these days of increasing awareness of the importance of environmentally-friendly processing, it is essential to strike a balance between the needs of industry and the impact of manufacturing on the environment. Mothproofing is the number one problem for wool processors in the UK and Europe and although the previous permethrin broad spectrum treatments have resulted in only a small amount of insecticide entering the water system, tightening regulations and a greater commitment to environmentally-friendly processes have prompted scientists to work towards the aim of zero discharge.

Dr Peter Ingham, section manager of science and technology at AgResearch Limited near Christchurch, along with his team have been working on finding such a solution. Through initial funding from Meat & Wool New Zealand, the team at AgResearch began looking for suitable insecticides which would overcome environmental problems in the UK. The result was Mystox MP, a new generation pyrrole insecticide which is highly effective against moths and beetles and has a low aquatic environmental impact. It has been shown to be up to 30 times less toxic to fish and aquatic organisms than permethrin-based insect resist agents.

ABOVE: Finding a means of protecting wool from insect damage has been a significant breakthrough for AgResearch.

AgResearch worked with Catomance Technologies in the UK, who formulated and marketed the product which was launched earlier this year. "We see the main market for it being the UK because that is where there is huge financial pressure on companies to meet strict environmental regulations," Dr Ingham said.

Of the millions of insect species in the world, there are only around six which can attack wool. These include two to three moths and three beetles, whose larvae eat wool. In the early stages of research, Dr Ingham and his team discovered that permethrin, the material which traditionally protected wool, was losing its effectiveness on beetle larvae. Work continued with funding from Wool Research NZ Inc. (WRInc) and Meat & Wool NZ, and the AgResearch team have now discovered an agent which is very effective against beetle larvae and also greatly increases the effectiveness of permethrin against moth larvae. "This should have far reaching benefits for the treatment of wool," Dr Ingham said, "with the much lower levels of treatment meaning a much lower environmental impact."

In another development, the team are working on an insecticide-free method of preventing insect attack. "There is a lot of interest in organic wool processing and this development fits the criteria very well. We can now produce well-protected wool carpets with no insecticide component," Dr Ingham said. He explained that in this new process, two biodegradable chemicals are exhausted into the wool in the dye bath with an uptake rate of at least 99%. The treatment also acts as a good dye bath levelling agent and so the dual requirements of protection and dye levelling are achieved. They are readily biodegradable, so there is minimal effect on the environment.

"There is a growing demand also for 'green' carpets as more and more consumers are uncomfortable with the idea of insecticide in wools, and we envisage this specialist treatment will also help satisfy that preference," Dr Ingham said.