Chemical kings have the golden touch

Rhône-Poulenc is not a household name yet its products can be found in every house. It makes silicas for use in Colgate, Signal, Crest and Aquafresh toothpastes. It is one of the world's leading producers of xanthane, guar and locust bean gum emulsifiers and stabilisers, which are used to make ice-cream. And it is a leading producer of polyamide yarn for stockings and tights made by companies such as Pretty Polly. Rhône-Poulenc is also one of the leading manufacturers of agricutural chemicals and is the latest company to take out golden key membership of the BIGGA Education and Development Fund. But who are they and how do greenkeepers benefit from other parts of the business? *Greenkeeper International* went to Essex to find out...

Researchers at Rhône-Poulenc have more chance of winning the National Lottery than discovering a new active ingredient for their chemical products. Even if that's not quite true statistically, it must seem that way to the 300 chemists and scientists at the company's UK research centre in Ongar, Essex.

Every year they help produce 10,000 potential active ingredients which are tested on the world's major weeds and crops. They're looking for ingredients that have an effect on the weeds but not on the rice, cotton, wheat or maize. When an active ingredient shows potential, the crop and weed spectrum is widened, taking in second level crops such as potatoes and beans. But from the 10,000 potential herbicides that go through the initial screening, only about 150 get to be tested at commercial dose rates. And from these 150, on average only 20 of the original potential candidates proceed into field studies.

The tests these ingredients are put through are as tough as in any industry because of their potential impact on the environment. Environmental studies trace what happens to the chemicals in soil, water and living things. Laboratory tests show how the chemical breaks down and what it breaks down into, how it reacts to ultra-violet light etc, measuring things in parts per trillion – the equivalent of 0.2 of a second in the average human lifetime. Field trials are conducted in a variety of soils and climates in up to 13 different countries including Brazil, Japan, the United States, France and the UK.

"So strict is the legislation governing the potential development of an active ingredient that from the 10,000 potential candidates per year, the industry average for approval is only one new active ingredient every ten years – or one from 100,000," says Jonathan Hill, product manager at Rhône-Poulenc Environmental Products.

At the Ongar research centre they have been doing much better than this, having developed three new chemical families of worldwide importance in the last ten years. These are a herbicide for cereal crops, a herbicide to control bracken and an insecticide that works on a wide range of pests.

So the odds are better than those given by Camelot, but the outlay is far greater than any jackpot prize.

Rhône-Poulenc, the world's third largest agricultural chemicals company, spends £600 million on research each year. Nearly £100 million of this goes on agro R&D.

Rhône Poulenc's John Arthur receives Golden Key acknowledgement from BIGGA president Viscount Whitelaw at this year's BTME

Rhône-Poulenc has two other research centres: at La Dargoire in France, which concentrates on fungicides, and at the Research Triangle Park in North Carolina, USA, which looks mainly at insecticides. Each centre tests active ingredients developed at other centres – just in case it has potential in another area. In fact an insecticide invented in Ongar is now being developed in North Carolina.

With research being so expensive, the only way Rhône-Poulenc and other chemical companies can see a return is if they succeed in developing a new product that works wonders in paddy fields, cotton plantations or cereal farms. The amount of weed killer greenkeepers spray on their fairways or the fungicide they use on their greens does not pay for the initial research.

"The amenity turf market wouldn't support research for a complete new active," says Hill. "An agrochemical company needs at least one major breakthrough every ten years to compete and to generate revenue for further research."

But once an active ingredient has been found and approved, then Rhône-Poulenc Environmental Products starts testing it on grass. Fortunately grass has a lot in common with cereal crops.

Spearhead, which was launched last year as "a powerful new weapon for the control of weeds in turf", is a prime example of this. The active ingredient diflufenican (DFF) was discovered at Ongar in 1979. It was approved in the UK in 1986 for the use on cereals and has gone on to become the number one choice for winter wheat farmers, generating annual sales in excess of £60 million. Knowing it was particularly effective against weeds such as speedwell, in 1987 Rhône-Poulenc Environmental Products took DFF and started mixing it with other known and approved active ingredients. The researchers were looking for a broad-spectrum turf selective herbicide. They found it quite quickly but it took a further eight years of turf specific research to

Potential active ingredients are tested in a 750m totally computer controlled glasshouse. The temperature inside is 22°C and the air is changed six times per hour

gain approval for the product Spearhead. In the agro chemical industry you not only have to get approval for the active ingredient but for every individual product. Researchers had to gather all the data on efficacy and safety from five years of field trials before the new selective herbicide could be submitted to the Ministry of Agriculture, Food and Fisheries in 1992. MAFF then took two years to evaluate the data (which is normal) and give it MAFF approval before it was launched last September.

As you can see, developing an active ingredient is only half the story. The active ingredient must be turned – either alone or in combination with other approved actives – into a product that is stable in storage, can demonstrate efficacy in its use area, is available to the user in a format which enables effective application and passes all the relevant tests.

Products destined for golf courses are tested on golf courses. Spearhead, for example, was tested at The London Golf Club in Kent among others. The problem with tests though is that you have to have a "control" area, an area that is untreated. Most course managers and head greenkeepers don't mind someone coming onto their course and spraying, but they're not willing to let part of a green get rife with fusarium patch and other diseases.

At Ongar there is 65x25m trial site which is sown with some great seeds – and then totally mis-managed. One strip with bent and fescue grasses is fed so much nitrogen it almost glows. Fusarium patch, not surprisingly, develops quite quickly. And just to make sure it does, infected cuttings are also put on the turf. The strip next to it is sown with meadow grass and fescue and mis-managed again to bring on fusarium patch. Other strips are sown with pure bents and slender creeping red fescue and starved of nitrogen to bring on red thread. When the disease has got hold, each metre square of the plot is sprayed with a different formulation and the results are monitored.

The final strip on the trial site is divided into five sub-blocks – pure bent, chewings fescue, creeping fescue, smooth stalk meadow grass and ryegrass. When a formulation shows promise it is applied here to show there is no damage to the turf at double and triple rates of application.

About 20 years after discovering a new active and spending at least £20 million developing it, a new product is launched.

"R&D is the key. Fortunately Rhône-Poulenc Environmental Products is part of a huge company which is investing millions in research in a whole variety of areas, especially agriculture. We are able to ride on the back of that research," says Hill.

Toothpaste and tyres, to fungicide and herbicide

Rhône-Poulenc Environmental Products, previously known in the UK as May & Baker with whom they started working in the 1920s, is part of the multi-national Rhône-Poulenc Group, which has an annual turnover of £10 billion.

The group, which returned to the private sector in November 1993, has developed an enormous range of products that helps enhance everything from toothpaste and tyres to tights, ice-cream, rubber balls and video cassettes. It also has a hand in things we hope we don't see – airbags. Rhône-Poulenc makes the silicone coating that keeps the folded fabric from sticking together during storage in Fords and Renaults. It also produces the flame-resistant fibres used in protective clothing for firefighters.

For greenkeepers it has a range of 30 herbicides, fungicides, insecticides and growth regulators. It also offers the Guardian range of fungicide and polymer film coated grass seed mixtures. Leading herbicides include Clovotox, Dicotox Extra, Supertox 30, Vitesse and Spearhead. Among its top fungicides are Rovral Green and Mildothane Turf Liquid. Insecticides include Castaway Plus and Crossfire.

Rhône-Poulenc employs more than 80,000 people worldwide, of which nearly half work in France. The products are manufactured worldwide too, with two of the plants in England at Norwich, Norfolk and Belvedere, Kent. Most of the herbicides are manufactured in the UK. The fungicides come from France and the insecticides are made here and in the USA.

"Rhône-Poulenc Agriculture Limited is not just a British business, but a world centre of growth," states its publicity blurb. And now it is investing in another growing organ – the British and International Golf Greenkeepers Association Education and Development Fund.

● Casual burning or burial of empty pesticide containers is not possible without specific consent from the National Rivers Authority and/or HM Inspectorate of Pollution or from the Environmental Health Department of your local authority.

To assist users of professional pesticides dispose of empty containers correctly, Rhône-Poulenc Environmental Products is offering vouchers which give up to £75 off the cost of a three-year disposal contract with Envirogreen Limited. Tel: 01277 301115.