

What's over the horizon for weed management in Australia – science outcomes to benefit Australian growers from the Bayer/GRDC partnership

Marco Busch

Bayer AG, Crop Science Division, Industriepark Hoechst, 65926 Frankfurt / Main, Germany

Summary Weeds are the single most important reason for crop losses globally, causing high management costs and threatening food security. Increasing weed resistance adversely affects crop production in various parts of the world, decreasing average yields for most of the crops significantly. In Australia, herbicide resistance started around 30 years ago with the rapid evolution of resistant weeds such as ryegrass, wild radish and others threatening Australian wheat production.

In order to cope with this problem screening and monitoring needs to reflect regional requirements and as such adapted strategies regarding greenhouse testing mirrored by a corresponding strategy for field testing. New tools such as novel herbicidal molecules with resistance-breaking properties are therefore urgently required. In June 2015 the Grains Research & Development Corporation (GRDC) and Bayer signed their *Herbicide Innovation Partnership* (HIP), an innovative cooperation model to jointly discover next-generation weed control solutions.

In order to meet the challenges of increasing productivity and sustainability in crop production and to best match Australia's need for innovative weed control solutions the herbicide screening cascade for new active ingredients at Bayer's global Competence Center for Weed Control in Frankfurt, Germany has been revised accordingly. This refers to the infrastructure use, set-up of individual test levels as well

as the representation of Australian key weeds. The new cascade from Early Phase to Profiling covers all nominated Australian weeds, including specific resistant biotypes. Provision of high quality seed material matching specification (batch quantity and germination rate fulfilling automation needs) partly proved to be of utmost importance. Furthermore greenhouse follow-up tests with focus on e.g. resistance-breaking properties, formulations, selectivity etc. have been adapted. New herbicidal actives are being tested through the modified testing cascade allowing early assessment of delivery on Australian farmer needs.

These greenhouse activities are complemented by tailor-made field screening in Australia. The field screening in Australia with its unique models (e.g. with resistant weeds) strongly improved our ability of recognising the fit of new candidates for the Australian markets at a very early stage of our R&D process.

As a third pillar of this integrated approach a total of 33 post-doctoral researchers from Australia and New Zealand are participating over the entire period of the partnership in this global effort at Bayer's global Competence Centre for Weed Control in Frankfurt allowing for deep education in cutting-edge life-science research in a truly cross-functional set-up. As fully integrated members in multidisciplinary project teams they are contributing to various promising new research projects in order to identify new active ingredients for weed control.