

## **Dr. Anton Kraus**

*Bayer CropScience, Monheim, Germany*

[anton.kraus@bayercropscience.com](mailto:anton.kraus@bayercropscience.com)

### **Perspectives of Crop Protection Chemistry for Sustainable Agriculture in Japan and Germany**

#### **ABSTRACT**

The quality of food production, environment, conservation of resources, economic viability, and the quality of life of farmers and society are bound to the development of sustainable agriculture. Amongst the most important factors for this development are the chemical and biological research for crop protection chemistry and the transfer of this technology to the local conditions and markets. The transfer of technology requires as prerequisite the build-up of expertise, training, and cooperative partnership with international perspectives in agriculture, industry, and society. This paper will outline, how the crop protection industry can contribute to the global development of sustainable agriculture particularly by the research and the development of new, safer, environmentally friendly active ingredients, safe products and application technologies. New research technologies like the high throughput screening technique are utilized to meet the increasing demand and requirements at acceptable cost. New active ingredients and chemistry are developed to improve the quality and the yield of agricultural crops, to protect against damage from pests and diseases, and to achieve significant reductions of dosages and input per area and crop.

This paper will review the different requirements of the crop protection markets in Japan and Germany, and highlight the use of new active ingredients developed in both countries for innovative crop protection against destructive insects, diseases, and weeds. As examples for successful research and transfer of technology are discussed the improvements resulting from the uses of the chemical class of Chloronicotinyles in the insecticides segment, in the fungicides segment from the classes of Triazoles, Methoxyacrylates and others, and in the herbicide segment from the new class of Oxyacetamides. As a result, the contribution from this new crop protection chemistry to sustainable agriculture appears significant and creates opportunities to replace old chemistry in the crop protection markets in both of the countries.

Recent developments in the application technology improved the safety of crop protection products, economizing the use rates and reducing the exposure of operator and environment. As examples the seed treatment technology and the seedling box application in rice with insecticides and fungicides are discussed. Also, the trend to labor-saving applications of rice herbicides in Japan, and to low volume spray techniques in Germany are illustrated.

The integration of research-based crop protection concepts into the development of sustainable agriculture will be summarized with a view of opportunities for international collaboration in both of the countries.

Keywords: sustainable agriculture, crop protection, research and development, new active ingredients, insecticides, fungicides, herbicides, seed treatment.