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WEED SCIENCE - Ecology, Genetics and Management

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Integrated weed management system is necessary not only in agriculture but also in rural and urban areas. In addition to native weed species, invasive alien weeds and herbicide-resistant biotypes of weeds have arisen as new problems in recent years. We are studying the ecology and genetics of weeds at the individual, population and community levels, to provide a scientific basis for rational weed management. (http://www.weed.kais.kyoto-u.ac.jp/)

Will Your Herbicide Work Next Year ?

Herbicide resistance, the most recent adaptation in weeds, is a real threat to agriculture today. We are employing both field and molecular tech-niques to elucidate the genetic mechanism of resistance as well as the route and pattern of gene spreading.

Roots of resistant (left) and susceptible (right) biotypes of a paddy weed *Monochoria vaginalis* grown in sulfonylurea herbicide solution. Such resistant genotypes are increasing in paddy fields which received solely sulfonylurea herbicides for years.

Herbicide-resistant weeds have become so ubiquitous in the grain belts of the world, that their seeds are arriving in Japan in a large quantity as grain contaminants. We are pursuing the fate of those weeds and their resistant genes in Japan.

Evolving with Crops

"Companion weeds" are inhabitants of fields of specific crops. They inform us not only about themselves but also the story of crop evolution.

Darnel (*Lolium temulentum*) contaminates wheat and barley harvests, and causes human poisoning. Owing to mimicry, its seeds escape seed cleaning and are sown with crop seeds. Our recent study revealed that geographical genetic variation in darnel parallels those of wheat and barley.

In West Africa, it is virtually impossible to eliminate weed-type pearl millet (right) from fields of pearl millet (left). Via pollen contamination, a large number of weed-type plants emerge from crop seeds. This means that they share a common gene pool.

Our range of scope (in addition to above-shown subjects)

Research sites
Paddy, orchard, grassland, public spaces, river terrace, forest

Research fields
Taxonomy, physiological ecology, control of specific weeds, total vegetation management

Species under research
Andropogon, *Avena*, *Imperata*, *Juncus*, *Lindernia*, *Lolium*, *Sagittaria*, *Veronica*, *Zoysia* etc.

Key words

Weed, plant invader, herbicide resistance, ecology, genetics, integrated control, vegetation management

Recent publications

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