



## Editorial

### Finding solutions for biological control of weeds in European crop systems

Biological control of weeds is the deliberate use of arthropods and pathogens to reduce the population density or biomass of a target weed below its economic threshold level. Biological control, which is inherently narrow-spectrum, is generally applied as an integrated component of an overall pest management strategy.

Single introductions of control organisms from the weed's native range have been used most successfully against invading plant species (mainly environmental, aquatic or rangeland weeds) threatening endangered ecosystems. On the other hand, weeds of arable crops have been considered poor targets for this classical, inoculative approach. Clearly, to achieve successful control of weeds in crops, biological control strategies have to be adapted to the highly disturbed, homogenous and species-poor agro-ecosystem. In addition, the control process needs to be enhanced to achieve the effective and fast control needed relative to the short duration of the cropping season.

European researchers from 14 countries (together with a research group from both Israel and Egypt), representing the public and private sector, and both universities and institutions doing applied research, have teamed together in a six-year research action to tackle the complex issue of biological control of weeds in crops. This research initiative has been carried out within the framework of COST (European Co-operation in the Field of Scientific and Technical Research), which is principally an R&D co-operation, allowing the co-ordination of nationally funded research projects. COST further supported exchange of researchers, working group meetings, workshops and symposia to discuss topics relevant to all working groups.

COST-816 has concentrated on five key weed complexes in arable crops (*Amaranthus* spp, *Chenopodium album* L., *Senecio vulgaris* L., *Convolvulus arvensis* L./*Calystegia sepium* (L.) R.Br., and *Orobancha* spp.), and this special issue of *BioControl* reports on the achievements of the five working groups, centered around these target weeds. The five review papers are prefaced by an introductory paper describing the objectives and general

achievements of the action as well as future research directions, and followed by an “outsider’s” expert view on the general significance of the findings of COST-816 for integrated pest management and modern agro-ecology. This final paper also constitutes an excellent review on the type, extent and outcome of weed biocontrol projects by means of pathogens that have been carried out so far.

Although no practical control has yet been achieved for any of the five target weeds, potential solutions have been clearly identified. Substantial progress was also made in the development of methods and strategies for biological control of weeds in arable crops, particularly the bioherbicide and system management approach. Furthermore, through specific training and education schemes, a substantial base of “new” experts has been established. Besides the basic knowledge derived, this is probably the most significant “product” of this research programme (for further details please consult our web-page at <http://www.unifr.ch/plantbio/cost816>).

I would finally like to take the opportunity to express my thanks to the well over 100 participants of COST-816; it was a great adventure, scientifically, culturally and socially! Your enthusiasm and continuous support, despite your many other commitments was an important determinant of the overall success of this action and made the coordination of this research project a great pleasure. After this Action, I am even more convinced of the great future of biological control, especially in the light of the ongoing biodiversity restoration schemes in agricultural ecosystems, the increasing demand for sustainable pest management in most European countries, and the growing demand of consumers for agricultural products produced in an environment-friendly manner.

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Guest Editor of this Issue