

**EUROPEAN CO-OPERATION
IN THE FIELD OF
SCIENTIFIC AND TECHNICAL RESEARCH**

Brussels, 11 June 1993

COST 252/93

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COST
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Secretariat

NOTE

Subject: Memorandum of Understanding for the implementation of a European Research Action on the biological control of weeds in Europe (COST Action 816)

Delegations will find attached hereto the text of the abovementioned Draft Memorandum of Understanding as finalized by the Legal/Linguists Working Party.

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MEMORANDUM OF UNDERSTANDING
FOR THE IMPLEMENTATION OF A EUROPEAN RESEARCH ACTION
ON THE BIOLOGICAL CONTROL OF WEEDS IN EUROPE
(COST ACTION 816)

The Signatories to this Memorandum of Understanding, declaring their common intention to participate in a European Action in the field of the biological control of weeds, have reached the following understanding:

SECTION 1

1. The Signatories intend to co-operate in an Action to promote research into the field of the biological control of weeds (hereinafter referred to as the "Action").
2. The main objective of the Action is to:
 - (1) co-ordinate current national and European activities in the field of biological weed control,
 - (2) initiate new research projects and evaluate their potential in Europe,
 - (3) draw up a general protocol for biological weed control in Europe,
 - (4) strengthen basic research for a better understanding of herbivore/pathogen-weed interactions, and
 - (5) propose realistic solutions for the biological control of target weed species of economic importance.
3. The Signatories hereby declare their intention of carrying out the Action jointly, in accordance with the general description given in Annex II, adhering as far as possible to a timetable to be decided by the Management Committee referred to in Annex I.

4. The Action will be carried out through concerted action, in accordance with the provisions of Annex I.
5. The overall value of the activities of the Signatories under the Action is estimated at approximately ECU 10 million at 1992 prices.
6. The Signatories will make every effort to ensure that the necessary funds are made available under their internal financing procedures.

SECTION 2

Signatories intend to take part in the Action in one or several of the following ways:

- (a) by carrying out studies and research in their technical services or public research establishments (hereinafter referred to as "public research establishments");
- (b) by concluding contracts for studies and research with organizations (hereinafter referred to as "research contractors");
- (c) by contributing to the provision of a Secretariat and/or other co-ordinatory services or activities necessary for the aims of the Action to be achieved;
- (d) by arranging for inter-laboratory visits and by co-operating in a small-scale exchange of staff in the later stages.

SECTION 3

1. This Memorandum of Understanding will take effect for five years on its signing by at least five signatories. This Memorandum of Understanding may expire on the entry into force of an agreement between the Community and the non-Community COST member countries having the same aim as that of the present Memorandum of Understanding. This change in the rules governing the Action is subject to the prior agreement of the Management Committee referred to in Annex I.
2. This Memorandum of Understanding may be amended in writing at any time by arrangement between the Signatories.
3. A Signatory which intends, for any reason whatsoever, to terminate its participation in the Action will notify the Secretary-General of the Council of the European Communities of its intention as soon as possible, preferably not later than three months beforehand.
4. If at any time the number of Signatories falls below five, the Management Committee referred to in Annex I will examine the situation which has arisen and will consider whether or not this Memorandum of Understanding should be terminated by decision of the Signatories.

SECTION 4

1. This Memorandum of Understanding will, for a period of six months from the date of the first signing, remain open for signing, by the Governments of the countries which are members of the COST framework and also by the European Communities.

The Governments referred to in the first subparagraph and the European Communities may take part in the Action on a provisional basis during the abovementioned period, even though they may not have signed this Memorandum of Understanding.

2. After this period of six months has elapsed, application to sign this Memorandum of Understanding from the Governments referred to in paragraph 1 or from the European Communities will be decided upon by the Management Committee referred to in Annex I, which may attach special conditions thereto.

3. Any Signatory may designate one or more competent public authorities or bodies to act on its behalf in respect of the implementation of the Action.

SECTION 5

This Memorandum of Understanding is of an exclusively recommendatory nature. It will not create any binding legal effect in public international law.

SECTION 6

1. The Secretary-General of the Council of the European Communities will inform all Signatories of the signing dates and date of entry into effect of this Memorandum of Understanding and will forward to them all notices which he has received under this Memorandum of Understanding.

2. This Memorandum of Understanding will be deposited with the General Secretariat of the Council of the European Communities. The Secretary-General will transmit a certified copy to each of the Signatories.

CO-ORDINATION OF THE ACTION

CHAPTER I

1. A Management Committee (hereinafter referred to as "the Committee") will be set up, composed of not more than two representatives for each Signatory. Each representative may be accompanied by such experts or advisers as he or she may need.

The Governments of the countries which are members of the COST framework and the European Communities may, in accordance with the second subparagraph of Section 4(1) of the Memorandum of Understanding, participate in the work of the Committee before becoming Signatories to the Memorandum without, however, having the right to vote.

When the European Communities are not a Signatory to the Memorandum of Understanding, a representative of the Commission of the European Communities may attend Committee meetings as an observer.

2. The Committee will be responsible for co-ordinating the Action and in particular, for making the necessary arrangements for:
 - (a) the choice of research topics on the basis of those provided for in Annex III, including any modifications submitted to Signatories by the competent public authorities or bodies; any proposed changes to the Action framework will be referred for an opinion to the Committee of Senior Officials on Scientific and Technical Research (COST);

- (b) advising on the direction which work should take;
- (c) drawing up detailed plans and defining methods for the different phases of execution of the Action;
- (d) co-ordinating the contributions referred to in subparagraph (c) of Section 2 of the Memorandum of Understanding;
- (e) keeping abreast of the research being done in the territory of the Signatories and in other countries;
- (f) liaising with appropriate international bodies;
- (g) exchanging research results among the Signatories to the extent compatible with adequate safeguards for the interests of Signatories, their competent public authorities or bodies and research contractors in respect of industrial property rights and commercially confidential material;
- (h) drawing up the annual interim reports and the final report to be submitted to the Signatories and circulated as appropriate;
- (i) dealing with any problem which may arise out of the execution of the Action, including those relating to possible special conditions attached to accession to the Memorandum of Understanding in the case of application submitted more than six months after the date of the first signing.

3. The Committee will establish its rules of procedure.

4. The Secretariat of the Committee will be provided at the invitation of the Signatories by either the Commission of the European Communities or one of the Signatory States.

CHAPTER II

1. Signatories will invite public research establishments or research contractors in their territories to submit proposals for research work to their respective competent public authorities or bodies. Proposals accepted under this procedure will be submitted to the Committee.
2. Signatories will request public research establishments or research contractors, before the Committee takes any decision on a proposal, to submit to the public authorities or bodies referred to in paragraph 1 notification of previous commitments and industrial property rights which they consider might preclude or hinder the execution of the Actions of the Signatories.

CHAPTER III

1. Signatories will request their public research establishments or research contractors to submit periodical progress reports and a final report.
2. The progress reports will be distributed to the Signatories only, through their representatives on the Committee. The Signatories will treat these progress reports as confidential and will not use them for purposes other than research work. In order to assess better the final data on the Action, the Signatories are invited, for the preparation of the final report, to state the approximate level of spending at national level arising from their involvement in the said Action. The final report on the results obtained will have much wider circulation, covering at least the Signatories' public research establishments or research contractors concerned.

CHAPTER IV

1. In order to facilitate the exchange of results referred to in Chapter I, paragraph 2(g), and subject to national law, Signatories intend to ensure, through the inclusion of appropriate terms in research contracts, that the owners of industrial property rights and technical information resulting from work carried out in implementation of that part of the Action assigned to them under Annex II (hereinafter referred to as "the research results") will be under an obligation, if so requested by another Signatory (hereinafter referred to as "the applicant Signatory"), to supply the research results and to grant to the applicant Signatory or to a third party nominated by the applicant Signatory a licence to use the research results and such technical know-how incorporated therein as is necessary for such use if the applicant Signatory requires the granting of a licence for the execution of work in respect of the Action.

Such licences will be granted on fair and reasonable terms, having regard to commercial usage.

2. Signatories will, by including appropriate clauses in contracts placed with research contractors, provide for the licence referred to in paragraph 1 to be extended on fair and reasonable terms, having regard to commercial usage, to previous industrial property rights and to prior technical know-how acquired by the research contractor insofar as the research results could not otherwise be used for the purpose referred to in paragraph 1.

Where a research contractor is unable or unwilling to agree to such extension, the Signatory will submit the case to the Committee, before the contract is concluded; hereafter, the Committee will state its position on the case, if possible after having consulted the interested parties.

3. Signatories will take any steps necessary to ensure that the fulfilment of the conditions laid down in this Chapter will not be affected by any subsequent transfer of rights to ownership of the research results. Any such transfer will be notified to the Committee.
4. If a Signatory terminates its participation in the Action, any rights of use which it has granted, or is obliged to grant, to, or has obtained from, other Signatories in application of the Memorandum of Understanding and concerning work carried out up to the date on which the said Signatory terminates its participation will continue thereafter.
5. The provisions of paragraphs 1 to 4 will continue to apply after the period of operation of the Memorandum of Understanding has expired and will apply to industrial property rights as long as these remain valid, and to unprotected inventions and technical know-how until such time as they pass into the public domain other than through disclosure by the licensee.

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GENERAL DESCRIPTION OF THE ACTION

1. INTRODUCTION

1.1. Why a new action on Biological Control of Weeds in Europe?

During the past four decades, weed research has been oriented strongly towards herbicide use, which has partially contributed to the decline of good husbandry practices and almost complete dependence on herbicide use in European agriculture. Yield has been greatly increased during this period, but subsequent difficulties in controlling problem weeds, and increasing environmental contamination have obliged governmental authorities in many European countries to impose severe limitations on herbicide use. Satisfactory alternative control methods, however, are not yet generally available.

Biological control of weeds - the deliberate use of natural enemies and pathogens to reduce the population density of a target weed below its economic injury level - has traditionally been used, with some spectacular successes against weeds in pastures and aquatic habitats. Recently, fungal pathogens have been developed, registered and marketed as inundative control agents, i.e. mycoherbicides. They can be used in combination with other pesticides and mainly have been developed to control weeds in crops.

Up to now, most European researchers have been involved in biological control projects against plants of European origin, that have become problems elsewhere ("classical" or inoculative approach). The main Institutes and Organizations involved in such studies are IIBC (International Institute of Biological Control), United Kingdom and Switzerland; CSIRO (Commonwealth Scientific and Industrial Research Organization) and USDA-ARS (United States Department of Agriculture - Agricultural Research Service), France and ETHZ (Swiss Federal Institute of Technology Zürich), Switzerland. Very few and only regional projects have been set up to study the potential for biological control of weeds in Europe. Only one current research programme using the classical approach, the biological control project on bracken (*Pteridium aquilinum*) in the UK, is at an advanced stage. Recently, an application has been made to the UK Department of the Environment for the release of the noctuid moth *Conservula cinisigna*, and a further application is planned for a second moth species. With regard to the inundative approach, work has been mainly concentrated on the use of endemic fungi, due to regulatory problems for introducing foreign agents. In the Netherlands registration of a mycoherbicide (*Chondrostereum purpureum*) for the control of *Prunus* spp. in forests was applied for in 1991. Several projects are also well underway at the Long Ashton Research Station, Bristol, United Kingdom. Hence, great interest has been expressed repeatedly in co-ordinating activities on biological weed control in Europe by members of the Working Group on "Biological Control of Weeds", a main subject area of the "European Weed Research Society" (EWRS).

Biological control offers an environmentally benign weed control strategy and has an excellent track record for safety, efficacy and cost efficiency. It is a strategy which is basic to integrated pest management programmes.

1.2. Reasons for carrying out this new Action in the framework of COST co-operation

- Although most European countries are nowadays faced with the need for pesticide reductions, satisfactory alternatives have not yet been developed. Co-operation to avoid duplication in research on biological control and to extend the range of ecological conditions studied is essential.
- Herbicide resistance is being reported increasingly from most European countries, illustrating well the need for concerted actions to develop new control strategies.
- Few scientific undertakings are more interdisciplinary and international than biological control of weeds. Many weed species are widespread and biological control strategy involves the exchange of their natural enemies. International co-operation is therefore a prerequisite.
- Biological control projects require long term research and only co-operative, concerted efforts allow effective completion of projects within a reasonable period of time.
- Biological control (especially the classical approach) is akin to provision of a public or collective good. As only a small fraction of its economic benefits can generally be recouped by the providers (those who introduce and/or release the agents), public funding is needed, at least at the beginning of the programmes. Its benefits can easily be shared among most European countries.

- The Action complements related ongoing international programmes, especially the EC Framework Programmes on "Agricultural and horticultural production systems" and "Input for crop protection". Biological weed control is a basic tool for non- or low-chemical, as well as economically and ecologically sustainable, production systems.

Hence, co-operation through a COST Action provides an ideal framework for co-ordinating research in biological weed control.

2. AIMS OF THE NEW ACTION

2.1. General objectives

- to gather together European institutions which intend to co-operate in investigating the potential of biological weed control in crops;
- to promote a programme for scientific research and exchange. Four principal weed species in European crops, which are economically important and suitable targets for biological control, have been selected for detailed studies. These are 1) *Amaranthus* species (*Amaranthaceae*) (*A. retroflexus* L., *A. hybridus* L., *A. cruentus* L. and *A. bouchonii* Thell.), 2) *Chenopodium album* L. (*Chenopodiaceae*), 3) *Convolvulus* spp. (*C. arvensis* L. and *C. (Calystegia) sepium* L.) (*Convolvulaceae*) and 4) *Senecio vulgaris* L. (*Asteraceae*). The study of the underlying principles of biological weed control, especially investigations on agent-weed population dynamics will be of primary importance. This involves studies on the impact of the agents at the level of

individual plants, populations and communities. So far, research by physiologists and ecologists has been very limited in this area, but a better understanding is greatly needed to render biological control more predictive;

- to draw up a general protocol for biological weed control in Europe, with regard to research procedure, production and commercialisation of bioherbicides, and importation of foreign agents into Europe and their establishment in various European countries.

2.2. Secondary objectives

- to integrate biological control into general weed management strategies. This involves the co-operation of scientists from private industry, universities and research stations working in areas such as plant population biology, genetics, physiology, weed science, agronomy, pathology and entomology, as well as formulation and fermentation chemistry;
- to establish a protocol to resolve potential conflicts of interests. Assessment of the status of a particular plant species may differ between government agencies, pastoral, agricultural and recreational associations, and individuals. In recent decades such conflicts increasingly have entered the legal and political arena. Public responses need to be invited on proposed biological control programmes, in order to allow decisions which are in the common interest;
- to establish a list of further European weed species with potential for biological control, including grass species such as *Alopecurus myosuroides* Hudson and *Bromus sterilis* L., and to help to establish new projects.

3. TOPICS FOR INTERDISCIPLINARY CO-OPERATION

Working groups and special meetings may be organized on all the topics listed below, but they should always be concentrated on one or several of the selected target species. Questions on legal and political procedures should, however, be addressed in a more general framework.

A. Target weeds

Based on an extended survey on weed frequency, abundance and economic importance of the most harmful weed species in each of the 10 major crops, covering most (31) European countries, and taking into account the characteristics that are known to be important in determining the suitability for biological control of a given weed species and the approach to apply, the following weed species have been considered as the most suitable targets and have been selected for the initial phase of this project. These target weed species allow application of three different approaches of biological weed control and should be considered as parts of the same project.

1. *Amaranthus* species (*A. retroflexus*, *A. hybridus*, *A. cruentus* and *A. bouchonii*). These annuals possibly all originate from South America, but have now an almost global distribution.

Problem in vegetables, vineyards, maize, sugar beet, potatoes, rape and other cruciferous crops, as well as waste land and set-aside land, usually on fertile soils.

Resistant against Atrazine.

Biocontrol strategy: classical and inundative.

2. *Convolvulus* spp. (*C. arvensis* and *C. (Calystegia) sepium*)

These perennials originate from S-Europe/W.-Asia and now have nearly worldwide distribution.

Problem in maize, berries, vineyards, orchards, set-aside land and railway tracks, and other open urban sites.

Biocontrol strategy: inundative (possibly also classical).

3. *Chenopodium album*

An annual with a nearly worldwide distribution.

Problem in vegetables, especially cruciferous crops, vineyards, maize, sugar beet and potatoes, as well as waste and set-aside land, usually on fertile soils.

Resistant against Atrazine.

Biocontrol strategy: inundative.

4. *Senecio vulgaris*

An annual of S-European origin, now with global distribution.

Problem in vegetables, summer crops, ornamental and tree seedling nurseries, usually on freshly disturbed sites and on fertile soils.

Resistant against Simazine.

Biocontrol strategy: inundative (possibly also augmentative).

B. Biological control approach

1. Classical approach

2. Inundative approach

3. Cultural approach (augmentation of native agents)

C. Types of biological control agents in study

1. Pathogens
2. Insects
3. Others, i.e. nematodes or mites.

D. Scientific research procedure

Typically the research phase of a biological control programme can be divided into four steps:

1. Studies in problem area (habitat, crop, country of introduction); Background work to establish the present status of the weed and its suitability for biological control; identify transitions in the life cycle of the weed to which equilibrium density is most sensitive, genetic structure of populations and mating systems;
2. Field surveys of the natural enemies attacking the weed (including its native range for exotics), involving the distribution, abundance and herbivore/pathogen load of the agents, as well as their antagonists;
3. Experimental investigation of the genetic structure (variation), detailed life history, host specificity (screening), impact and formulation (for mycoherbicides) of the agents; primary risk assessment and environmental impact studies.
4. Agent release and follow-up studies: Release, distribution/augmentation and monitoring. Careful verification of predicted potential host range after establishment of control agents; integrate biological control into general weed management techniques, develop predictive cumulative stress models including additional agents, cultural control methods and herbicides.

E. Legal and political procedures (general considerations)

1. Establish a protocol, by which conflicts of interest can be resolved;
2. Work on European and national regulations for importation and distribution of biological control agents.

4. DURATION, ORGANISATION AND MANAGEMENT OF THE ACTION

The proposed research action will extend over at least 5 years. Although knowledge of the weeds and their natural enemies is partially available, biocontrol programmes are major undertakings that inevitably require long term research.

A detailed timetable, possible formation of projects and responsibilities, frequency of workshops and conferences, as well as arrangements for publication will be discussed and determined during the first meetings of the Management Committee.

5. ECONOMIC DIMENSION OF THE ACTION

The total number of man-years will be 40, which corresponds to around ECU 10 million for the planned five year period of this category B action.
