

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

**Brussels, 20 July 1993**

**COST 266/93**

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**COST**  
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**Secretariat**

NOTE

Subject: Memorandum of Understanding for the implementation of a European Research Action on population studies of airborne pathogens on cereals as a means of improving strategies for disease control (COST Action 817)

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

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MEMORANDUM OF UNDERSTANDING  
FOR THE IMPLEMENTATION OF A EUROPEAN RESEARCH ACTION  
ON POPULATION STUDIES OF AIRBORNE PATHOGENS  
ON CEREALS AS A MEANS OF  
IMPROVING STRATEGIES FOR DISEASE CONTROL  
(COST ACTION 817)

The Signatories to this Memorandum of Understanding, declaring their common intention to participate in a European Research Action on population studies of airborne pathogens on cereals as a means of improving strategies for disease control.

## SECTION 1

1. The Signatories intend to co-operate in an action to promote research on population studies of airborne pathogens on cereals as a means of improving strategies for disease control (hereinafter referred to as the "Action").
2. The main objective of the Action is to co-ordinate national research on improving integrated strategies for use of host resistance genes supplemented by fungicides to control pathogens spread by wind throughout Europe. Thus it supports European agriculture in its attempt to produce healthy and high quality cereal crops at a low input and aims at changing agricultural practice towards environmentally safer production.
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 22,7 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

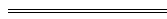
1. In order to facilitate the exchange of results referred to in Chapter I, paragraph 2(g), and subject to national law, Signatories intend to ensure, through the inclusion of appropriate terms in research contracts, that the owners of industrial property rights and technical information resulting from 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.





## GENERAL DESCRIPTION OF THE ACTION

### 1. BACKGROUND

The major airborne cereal diseases in most of the European cereal growing areas are powdery mildews and rusts. These diseases can be controlled in an economic and ecologically safe manner by cultivation of resistant varieties. However, as successful varieties become widely grown, populations of the mildew and rust pathogens adapt to them. This may lead to heavy attack by disease, which then needs to be controlled by fungicides. The present extensive use of fungicides may present an environmental hazard, and involves large and unpredictable expenditure by farmers. If we were able to understand the behaviour of the mildew and rust populations better, and could therefore make better predictions as to the performance of resistant varieties and fungicides, we could reduce the need to use fungicides to control these diseases. This would reduce both environmental hazards and farmers' costs.

At present, the same resistance genes and fungicides are used in many European countries and, since mildew and rust fungi are easily spread across Europe by wind, Europe-wide selection in favour of virulent and fungicide resistant fungal genotypes takes place. National survey programmes have been set up in many European countries in order to monitor changes in virulence frequencies and fungicide sensitivity. The main aim of these programmes is to ensure an effective use of resistance genes and fungicides on the national scale. There is a need to improve and co-ordinate the efforts made in the national programmes because of the Europe-wide scale of the issue, as well as to provide a rapid flow of information among the countries. Further, the information from the surveys is at present insufficient on a European scale due to the lack of generally accepted differential cultivars and standard methods for analyses of fungicide sensitivity.

In addition to monitoring the pathogen population, there is a need for reliable and comprehensive information on the presence of resistance genes in commercial varieties in order to help breeders to select the most efficient combination of resistance genes and farmers to grow the most resistant varieties. Further, the improvement of strategies for Europe-wide use of resistance genes, integrated with the use of fungicides, will increase the time period of successful use of resistance genes and fungicides, while reducing the environmental load of cereal production.

To achieve these goals, a detailed knowledge of pathogen populations across Europe is required concerning among other things: how the fungal spores are spread; which selection forces influence the pathogen populations; how these selection forces can be changed by better strategies for the use of resistance genes and fungicides; the frequency of mutations and sexual recombination in the pathogen; how these mechanisms influence the appearance of new pathotypes and how molecular markers can be used for improving our understanding of the genetics of host plant resistance and of pathogen virulence, aggressiveness and fungicide sensitivity. In addition, improved knowledge of the host populations is required, including: identification of the resistance genes present in pre-competitive lines and commercial varieties of barley and wheat and analysis of non-race-specific resistance. Research and development is taking place on these subjects in the countries involved in this project and this research, in many cases, has a worldwide reputation.

The present Action will have contact with the few international initiatives concerning co-ordination of pest control in general such as:

- 1) The European and Mediterranean Plant Protection Organization, EPPO, which is mainly concerned with quarantine questions and with guidelines for testing and use of pesticides and not directly involved in co-ordinating research;
- 2) The International Organization of Pest Resistance Management, IOPRM, which is promoted by the United States, but not finally established; this initiative focuses on pest management in non-industrial countries and mainly involves people from government and industry. The present Action is much more specific and concentrates on co-ordinating research activities and on controlling major European cereal pathogens; and
- 3) The European Cereal Rusts and Powdery Mildews Foundation, which is a small, private organization, with no finances, offices or staff. Some of the results of the action are intended to be published in the Bulletin published by this organization and to be presented at the conference which it organizes every fourth year.

## 2. OBJECTIVES OF THE ACTION

The action aims at co-ordinating national research on improving integrated strategies for use of host resistance genes supplemented by fungicides to control pathogens spread by

wind throughout Europe. Thus, it supports European agriculture in its attempt to produce healthy and high quality cereal crops at a low input and it aims at changing agricultural practice towards environmentally safer production. The action concerns the major cereal pathogens in Europe, powdery mildews and rusts, and has the following objectives:

- to co-ordinate national surveys on virulence and fungicide resistance as well as analyses of pathogen population data;
- to compare and, where necessary, to standardize methods, e.g. assessment of virulence, aggressiveness, fungicide sensitivity and definition of DNA markers, so that results from different laboratories can be integrated;
- to co-ordinate definitions and national monitoring of host resistance genes;
- to improve strategies for management of host resistance genes supplemented by fungicides and co-ordinate national recommendations;
- to establish regular expert meetings and an information system to ensure a rapid and effective exchange of information to scientists, breeders and farmers.

The co-ordination is expected to be built up during a five-year period with two main tasks, surveys and comparison tests. National surveys take place every year and in the first year results from these can simply be put together. Based on discussions of sampling strategies and studies of population structure, a European sampling strategy may be defined, and by the end of the project a procedure for regular reports on changes in the

European pathogen populations should be defined. Along with this should go reports on the use of host resistance genes and fungicides, including the use of diversification schemes such as variety mixtures. Finally, based on mathematical models, attempts will be made to predict changes in the pathogen populations. The data will be communicated adequately, e.g. by the Bulletin of the European and Mediterranean Cereal Rusts and Mildews Foundation or by other journals of relevance for science and practice.

In addition to studying the response of pathogen populations to different strategies of using resistance genes and fungicides, the studies of pathogen populations will be used to optimize strategies for the use of host resistances and fungicides. An obvious example is in the prediction of which variety mixtures will be most appropriate for a particular region at a particular time.

Comparison tests will take place for the major pathosystems at least twice. Selected isolates will be exchanged among laboratories for testing, together with seed of differentials. The results will be collected and analysed and definition of methods and genes should be agreed on. An important part of this is to define appropriate differential sets for assaying virulence genes and to compare and, where necessary, standardize methods for measuring aggressiveness and fungicide sensitivity. If possible, the results of such tests should be published in scientific journals.

### 3. ORGANIZATION AND MANAGEMENT

The Management Committee (MC) will meet two to three times each year, preferably in local laboratories, to treat the subjects relevant to the objectives of the action. Preferably, one delegate from each country should participate in all MC meetings to promote continuity and successful co-ordination. The second delegate could vary depending on the main subject of a particular MC meeting.

Further, one person for each major pathosystem and trait, preferably an MC member, should be chosen for a specific period as responsible for the co-ordination and the reporting of the results.

Two or three workshops will be held where the research of importance for the project is presented and the results of the co-ordination can be discussed in a broader forum.

#### 4. ECONOMICS

Country	Man-years/year	Cost (ECU) *
Czech Republic	6	225 000
Denmark	10	400 000
France	13	575 000
Germany	12	530 000
Norway	1	50 000
Poland	4	165 000
Slovakia	5	205 000
Sweden	3	140 000
Switzerland	16	640 000
The Netherlands	5	200 000
United Kingdom	18	750 000
Finland	1,5	75 000
	94,5	3 955 000

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\* Personnel cost is according to an average figure given by the COST secretariat with three cost categories of ECU 60 000, 40 000 and 25 000 respectively.

The overhead cost is set at 15% as a standard (approximately ECU 593 000). This includes co-ordination and travelling expenses and the costs connected with such items as conferences, seminars, translation, publication and workshops.

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