EuroWheat.org: a new research-based website supporting integrated disease management in wheat

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From Science to Field
Wheat Case Study – Guide Number 3

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Information for advisers, breeders and industry

Wheat is the most important cereal crop in Europe. However, grain yield and quality is often restricted by disease epidemics, which may be managed through deployment of resistant varieties, fungicide applications or farming practices in general. A new website is assisting farmers and advisors in disease management practices.

EuroWheat.org collates data and information on disease management practices from several countries and aims at analysing and displaying this information in a European context. Bringing together existing information from national programmes and ensuring that data are in a format which can be readily understood trans-nationally, the website is expected to provide significant added value on a European scale.

The information is targeted at local advisers, plant breeders and industry engaged in disease management in wheat, and supports Integrated Pest Management (IPM) practices. The website includes sections regarding fungicide resistance and links to fungicide resistance platforms.

Fungicides

The platform gives an overview of which fungicides are authorised where, as well as information about efficacy and resistance. It features:

> Fungicide efficacy ranking in eight wheat diseases by several different countries
> A review of problems related to fungicide resistance and links to fungicide resistance platforms
> A list of fungicide trade names in several different countries.

Decision support

Control thresholds are important tools when deciding when to apply a fungicide in an IPM programme. The methods used for monitoring and the specific thresholds used in different countries are summarised for six wheat diseases. The website features:

> An overview and links to wheat decision support systems in Europe
> Disease thresholds for six diseases including control recommendations for several countries.

Right: Control thresholds for powdery mildew in eight countries.
Monitoring for diseases in wheat

For the diseases eyespot, yellow rust, brown rust, powdery mildew, septoria leaf blotch and tan spot, the user selects the icon \( \Box \) to change information on the right hand of a dedicated web page. On the previous page is an example of the information available for powdery mildew.

**Cultural practice**

To minimise disease problems, several cultural measures have been recognised and described. General principles for IPM are given. It features:

- Specific information on cultural measures that have an impact on seven diseases
- References to the information described can be extracted from the pages.

**Pathogens**

Pathogen characteristics such as virulence and aggressiveness play a significant role for evaluating the risks of disease epidemics in varieties possessing various sources of disease resistance. Since many of the most damaging pathogens, such as rusts, may be spread by the wind across national borders, updated information about pathogen features in neighbouring countries serve as an ‘early warning’ for farmers. It features:

- Frequency of pathotypes of yellow rust across Europe
- Historical information about virulence structure and race dynamics in yellow rust is shown. This information is used to assess risk of yellow rust epidemics in currently grown varieties (see table below).
- *Fusarium* head blight: which *Fusarium* species produces which mycotoxins and how to minimise attack and mycotoxins
- *Fusarium* head blight: Ranking of cultivar disease resistance in three groups, with data from five different countries.

**Varieties and yield gains**

The cultivars grown vary to a great extent between countries. Grain yield may vary significantly across varieties and environments due to genetic yield potential and environmental stresses, including climate and disease load. It features:

- Links to national variety databases
- Yield levels in wheat and estimated yield losses from specific diseases in different countries
- Survey on pesticide use and yield responses to fungicides in EU countries.
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Summary
The EuroWheat research platform has been developed as a collaboration between Aarhus University and its ENDURE partners. The platform contains information about disease management in winter wheat in the areas of fungicide efficacy, fungicide resistance, yellow rust virulence, cultivar susceptibility to *Fusarium* head or ear blight, control thresholds, decision support systems, cultural methods for disease control and impact on grain yields. National data from several countries have been collected and shared. Bringing together existing information from national programmes in a common format will benefit advisers, plant breeders and the scientific community.

The EuroWheat partner institutions are:
> Institut national de la recherche agronomique (INRA), France
> Association de coordination technique agricole (ACTA), France
> ARVALIS - Institut du vegetal, France
> Julius Kuehn Institute - Federal Research Centre for Cultivated Plants, Germany
> Rothamsted Research (RRES), United Kingdom
> National Institute of Agricultural Botany (NIAB), United Kingdom
> Plant Breeding and Acclimatization Institute (IHAR), Poland
> Aarhus University, Faculty of Agricultural Sciences (AU), Denmark
> Danish Agricultural Advisory Service (DAAS), Denmark
> Jordbruksverket (SJV), Växtskyddscentralen, Sweden.
> Servizio Fitosanitario - Emilia-Romagna Region (SFRER), Italy
> Szent István University (SZIU), Hungary
> Agroscope Changins-Wädenswil (ACW), Switzerland

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Partnership in EuroWheat.org is not restricted to ENDURE members. If you are interested in contributing your own data or information please contact: LiseN.Jorgensen@agrsci.dk

About ENDURE
ENDURE is the European Network for the Durable Exploitation of Crop Protection Strategies. ENDURE is a Network of Excellence (NoE) with two key objectives: restructuring European research and development on the use of plant protection products, and establishing ENDURE as a world leader in the development and implementation of sustainable pest control strategies through:
> Building a lasting crop protection research community
> Providing end-users with a broader range of short-term solutions
> Developing a holistic approach to sustainable pest management
> Taking stock of and informing plant protection policy changes.

Eighteen organisations in 10 European countries are committed to ENDURE for four years (2007-2010), with financial support from the European Commission’s Sixth Framework Programme, priority 5: Food Quality and Security.

Website and ENDURE Information Centre:
www.endure-network.eu

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