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

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Distribution of yellow rust pathotypes (races) in Europe. Each colour refers to a unique race. © www.eurowheat.org.
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Information for advisers, breeders and industry

Winter 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 advisers in disease management practices.

EuroWheat.org collates data and information on disease management practices from several countries and aims to analyse and display 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 provides 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 fungicides, decision support, pathogens, cultivars and yields, and general information on disease management as shown in the following examples. They can also be found on the website: www.eurowheat.org.

EuroWheat has developed a concept and method that makes it possible for selected pages and tools to be integrated into national information systems and in the local language. This has been done to try and overcome barriers for dissemination to end-users.

Fungicides

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

- Fungicide efficacy ranking against eight wheat diseases in 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 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 identified 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 in evaluating the risks of disease epidemics in cultivars possessing various sources of disease resistance. Since many of the most damaging pathogens, such as the 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
> A summary of pathogen virulence characteristics for wheat yellow rust pathotype (‘race’) distribution in six European countries since 2000
> 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.
> Fusarium head blight: which Fusarium species produces which mycotoxins and how to minimise attack and mycotoxin development.
> Fusarium head blight: Ranking of cultivar disease resistance in three groups, with data from five different countries.

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<tr>
<th>Fungicide efficacy</th>
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<td><strong>Select</strong></td>
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<tr>
<td><strong>Powdery Mildew</strong></td>
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<td>(Blumeria graminis f. sp. tritici)</td>
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<td>Germany</td>
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<td><strong>Septoria Leaf Blotch</strong></td>
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<td>(Mycosphaerella graminicola)</td>
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<td>Germany</td>
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<tr>
<td><strong>Brown Rust</strong></td>
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<td>(Puccinia graminis)</td>
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<td>Germany</td>
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<tr>
<td><strong>Yellow (Stripe) Rust</strong></td>
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<tr>
<td>(Puccinia striiformis)</td>
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<td>Germany</td>
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<td>Triazoles</td>
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<td>Flutriabiol</td>
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EuroWheat site provides efficacy ranking against eight wheat diseases in five different countries

Cultivars and yield gains

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

> Links to national cultivar 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 yield. 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) Växtskyddcentralen, Sweden.
- Servizio Fitosanitario - Emilia-Romagna Region (SFRER), Italy
- Szent István University (SZIE), Hungary
- Agroscope Changins-Wädenswil (ACW), Switzerland

For further information please contact:

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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