

# The national program for the evaluation of genetic resources in cereals (EVAII) – a model for a public private partnership



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# Development of EVA II



## Situation before the year 2000:

- Large amounts of characterization and evaluation data existed that had been recorded by the predecessor institutions of the Federal Center for Breeding Research on Cultivated Plants (BAZ<sup>1)</sup>)
  - in different years
  - in experiments with changing standards
  - on different media and were thus
  - not comparable over years and experiments
  - and not accessible online.
- Policy had decided to shut down the Braunschweig Genetic Resources Collection which ran an ORACLE based multi-crop PGR information system able to record characterisation and evaluation data
- Instead EVA I, the predecessor of EVA II was initiated with the objective of establishing a dynamic online information system at ZADI-IGR<sup>2)</sup>

1) BAZ was merged into the Julius Kühn-Institute in 2008

2) ZADI-IGR was merged into BLE. IGR became IBV

# Development of EVA II

## In 2001 launch of EVA II, the National Evaluation Program for Cereal Plant Genetic Resources, with the following objective:



- Establishment of an institutional network for the evaluation of wheat and barley PGR, and if capacities will allow for rye, oat and triticale
- Generation of scientifically more meaningful resistance data by
  - Evaluation of identical sets of germplasm at different locations
  - Use of standard methods and standard genotypes
- *Composition of catch assortments of genotypes with defined resistances and integration into the network to facilitate virulence analysis of the main air-borne pathogens*
- *Integration of molecular genetic markers linked with resistance genes into the evaluation program*
- Development of a dynamic information system for recording, analysis and provision of the data generated by the network

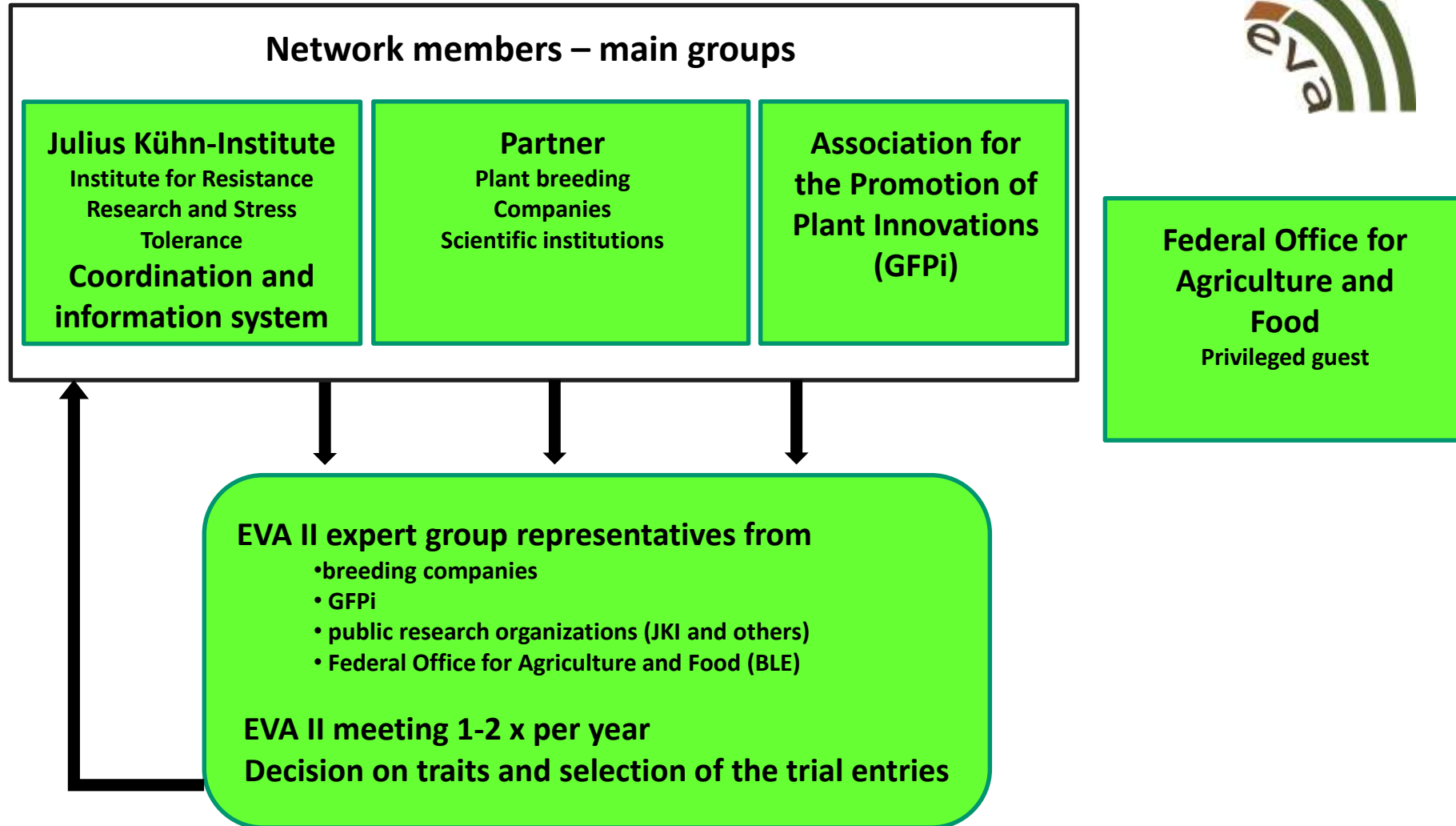
# Development of EVA II

## **EVA II agreement negotiated in 2001 and signed by 20 partners**

- Content in alia
  - § 1 Indefinite duration, self-sustained network after a funding period of 3 years
  - § 2 Tasks of the partners and mode of operation
  - § 3 Coordination
  - § 4 Evaluation data delivery, public access embargo limited to three years
  - § 5 Public access via BIG (still under construction)
  - § 6 Extinction of use rights
  - § 7 IP
  - § 8 Non-disclosure
  - § 9 Affiliation of new partners (significant add on value required)
  - § 10 Liabilities
  - § 12 Duration
  - § 13 Final clause



# Development of EVA II



# Workflow : evaluation & documentation



- **Genebank material (focus of evaluation)**
  - Search in databases (e.g. GRIN)
  - Publications
  - Genebank collections (e.g. IPK, ICARDA, CIMMYT)
- **Varieties**
  - Proposals of the partners
  - Publications
- **Material from research projects, e.g.**
  - Lines with new resistance genes
  - Lines with combined resistances



# Workflow: evaluation & documentation



- Selection of interesting germplasm by the EVA II expert group
- Ordering, multiplication and primary evaluation of the genotypes (coordinator)
- Dispatch of the composed trial entries along with the SMTA to partners
- Coordinator generates, database assisted, list for evaluation data recording and provides partners with the lists
- Assessment of the susceptibility on small-scale plots (1 plot x n locations)
- Documentation of results in Excel tables and upload of the completed lists by partners
- Import into the database, plausibility control by the coordinator and release of the results



# EVAII partners



- 1** Pflanzenzucht SaKa GmbH & Co. KG
- 2** KWS LOCHOW GMBH
- 3** Saaten-Union GmbH
- 4** Limagrain GmbH
- 5** Syngenta Seeds GmbH
- 6** Strube Research GmbH & Co. KG
- 7** W. von Borries-Eckendorf GmbH & Co. KG
- 8** RAGT 2N
- 9** Nordsaat Saatzuchtgesellschaft mbH
- 10** Deutsche Saatveredelung AG
- 11** Saatzucht Streng-Engelen GmbH & Co. KG
- 12** Saatzucht Josef Breun GmbH & Co. KG
- 13** Pflanzenzucht Oberlimpurg Dr. Peter Franck
- 14** SECOBRA Saatzucht GmbH
- 15** Saatzucht Bauer GmbH & Co. KG
- 16** Ackermann Saatzucht GmbH & Co. KG

- 1** Julius Kühn-Institut, Quedlinburg
- 2** Bayerische Landesanstalt für Landwirtschaft, Institut für Pflanzenbau und Pflanzenzüchtung, Freising
- 3** Landessaatzuchtanstalt der Universität Hohenheim
- 4** Landwirtschaftliche Lehranstalten Triesdorf





# Information system for EVA II

## History of the system

- Establishment of EVA I (1996 – 1999) to record retroactively resistance data on 8000 IPK barley accessions by ZADI-IGR (Harrer, 1999)
- Establishment of EVAII (2000 – 2003) to record new data by ZADI-IGR (macromedia cold fusion as web-technology) -> loss of operability a few years later
- Shift of task from BLE-IBV to JKI. Redesign and re-implementation (2009 – 2011) by company itemis
- Requirement analysis based on the AVEQ <http://aveq.jki.bund.de/aveq/> and EADB <http://eadb.jki.bund.de/eadb/>
- EVA II is online since 2012:  
<http://eva2.jki.bund.de/site/index>



# Information system for EVA II

## Support functions

- Facilitates the information flow between partners within the network
- Partners can search information by year, crop, disease or location or a combination thereof
- Facilitates sharing of results among network partners and allows immediate use of those data relevant to the specific program of a breeding company
- After 3 years, the data get part of the public domain



# Workflow : evaluation & documentation

Management of the test set. Import of the genotype data in the multi crop passport descriptor format (FAO & EURISCO)



Subprojects Templates Evaluation

Assortment list winterwheat\_16 - PROPOSAL | Type: Proposal | Current state: Open

Name	Accession number	Institute	Quantity	Proposed by	Proposed on	Reason	D - Mark	SPTA
CIMMYT_2015_38	STEMRRSN_6021_2014	Centro Internacional de		eva2coordinator (eva2.c.	2015-07-08T11:09:06		0 (Keine Bewertungen)	
CIMMYT_2015_117	STEMRRSN_6104_2014	Centro Internacional de		eva2coordinator (eva2.c.	2015-07-08T11:09:06		0 (Keine Bewertungen)	
CIMMYT_2015_64	STEMRRSN_6048_2014	Centro Internacional de		eva2coordinator (eva2.c.	2015-07-08T11:09:06		0 (Keine Bewertungen)	
CIMMYT_2015_93	STEMRRSN_6078_2014	Centro Internacional de		eva2coordinator (eva2.c.	2015-07-08T11:09:06		0 (Keine Bewertungen)	
CIMMYT_2015_139	STEMRRSN_6118_2014	Centro Internacional de		eva2coordinator (eva2.c.	2015-07-08T11:09:06		0 (Keine Bewertungen)	
CIMMYT_2015_138	STEMRRSN_6128_2014	Centro Internacional de		eva2coordinator (eva2.c.	2015-07-08T11:09:06		0 (Keine Bewertungen)	
CIMMYT_2015_7	SEPTON_5261_12	Centro Internacional de		eva2coordinator (eva2.c.	2015-07-08T11:09:06		0 (Keine Bewertungen)	
CIMMYT_2015_25	STEMRRSN_6307_2014	Centro Internacional de		eva2coordinator (eva2.c.	2015-07-08T11:09:06		0 (Keine Bewertungen)	

Accession number:  Save New proposal

REPO Zusatzattribute Mehrere Begründung Alle Bewertungen Experten

Accession name: CIMMYT\_2015\_38  
Genus: Triticum  
Species: aestivum  
Subspecies:   
Institute: Centro Internacional de

Accession number: STEMRRSN\_6021\_2X  
Collecting number:   
Collecting Institute:   
Common crop name: winter wheat  
Country of origin: ME

Location of collection:   
Breeding institute:   
Biological status:   
Collecting/origin:   
Remarks:

Bewertungstabelle nach Merkmal für EVA II

Accession	Accession	Genus	Species	Subspecies	Instanz	Instanz	Instanz	Instanz	Instanz	Instanz	Instanz
1375	1375	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM
1376	1376	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM
1377	1377	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM
1378	1378	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM
1379	1379	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM
1380	1380	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM
1381	1381	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM
1382	1382	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM
1383	1383	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM
1384	1384	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM
1385	1385	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM
1386	1386	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM
1387	1387	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM
1388	1388	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM
1389	1389	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM
1390	1390	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM
1391	1391	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM
1392	1392	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM
1393	1393	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM
1394	1394	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM
1395	1395	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM
1396	1396	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM
1397	1397	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM
1398	1398	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM
1399	1399	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM
1400	1400	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM	TRITICUM

Scoring lists are generated, can be downloaded and later be imported into the database via a web-interface.

# Workflow : evaluation & documentation



Year	Wheat	Barley
2005	Drechslera tritici-repentis (DTR); Septoria; Fusarium	Physiological leaf spots
2007	Leaf rust	Rhynchosporium
2009	DTR (tan blotch)	Barley yellow dwarf virus (BYDV)
2010	Septoria; DTR	Leaf rust; Rhynchosporium
2011	Septoria; DTR	Leaf rust; Rhynchosporium
2012	Stripe rust	BYDV; Rhynchosporium; net blotch

**Rhynchosporium secalis - SB**

spring barley

Testdesign: 19x10 (10x5)

The screening for resistance is delivered by field experiments in main plots as full plots without replications. For the common disease standard comparisons are included: non-inoculated, black selection and best processing are carried out as described below.

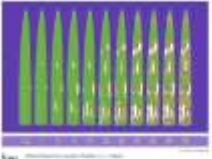
Inoculation: standard method: natural infection

Rating: At heading (BBCH 31) repeated estimations of infested leaf area are carried out weekly over the complete disease period. These estimations at weekly intervals might be the optimum.

Rating trait: Systemic expression as percentage of infested leaf area

additional traits: 1. Yield; 2. Straw; 3. Developmental stage (anthesis/flowering and seed)

Standards: Westminister, Lenka



## Standardized evaluation methods

**Puccinia hordei-WB**

spring barley

Testdesign: 19x10 (10x5)

The screening for resistance is delivered by field experiments in main plots as full plots without replications. For the common disease standard comparisons are included: non-inoculated, black selection and best processing are carried out as described below.

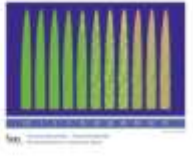
Inoculation: standard method

Rating: At heading (BBCH 31) repeated estimations of infested leaf area are carried out weekly over the complete disease period. These estimations at weekly intervals might be the optimum.

Rating trait: Systemic expression as percentage of infested leaf area

additional traits: 1. Yield; 2. Straw; 3. Developmental stage (anthesis/flowering and seed)

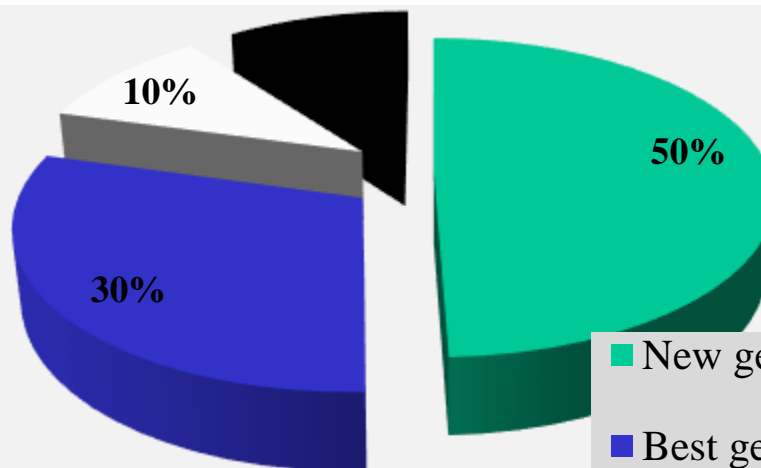
Standards: Westminister, Lenka



# Workflow : evaluation & documentation



Number of genotypes / testing collection / year ~ 50 genotypes



- New genotypes
- Best genotypes of the previous year for anew evaluation
- Genotypes with inconsistent results
- Further genotypes

subsets	genotypes	entries
springbarley	563	9898
springwheat	251	11617
winterbarley	417	11617
winterwheat	653	32770
<b>total</b>	<b>1884</b>	<b>65902</b>

# Workflow : evaluation & documentation



## Evaluationrelea

1. Sortiment auswählen  
keine Auswahl

10. Akzession(en) auswä  
Akzessionsname

Nur die Filter in dieser Liste werden in den Auswertungen berücksichtigt

Sortimen / Akzession(en)  
Grummes

## Evaluationreleases

1. Sortiment auswählen: keine Auswahl

2. Merkmal auswählen: Erst Sortiment/Akzession wählen

3. Ort(e) auswählen:  Alle Orte akzeptieren

4. Jahr(e) auswählen:  Alle Jahre akzeptieren

10. Akzession(en) auswählen: Akzessionsname

Note: 1-3, Prozent: 0-100

Nur die Filter in dieser Liste werden in den Auswertungen berücksichtigt

Sortimen / Akzession(en)	Merkmal	Ort(e)	Jahr(e)
Sommergerste	Mehltau_WB (Note = 5)	Dyngby	2006
<input checked="" type="checkbox"/> Grummes		<input checked="" type="checkbox"/> Grummes	<input checked="" type="checkbox"/> Grummes

Filter speichern, Filter laden, Filter übernehmen, Ergebnisse anzeigen

Zeige 1-32 von 32 Einträgen

Akzessionsname	Akzessionsnummer	Sortiment	Ort(e)	Jahr(e)	Mehltau Avg Note	Mehltau Min Note	Mehltau Max Note	Mehltau Anzahl
ALEXIS	ALEXIS	Sommergerste	Dyngby	2006	1.0	1.0	1.0	1
AMALFI	AMALFI	Sommergerste	Dyngby	2006	1.0	1.0	1.0	1
AMARBELL	AMARBELL	Sommergerste	Dyngby	2006	5.0	6.0	5.0	1
APEX	APEX	Sommergerste	Dyngby	2006	1.0	1.0	1.0	1
				2006	3.0	3.0	3.0	1
				2006	1.0	1.0	1.0	1

<http://eva2.jki.bund.de/site/index>  
Export to Excel

