



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

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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**
- **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

EVAII partners

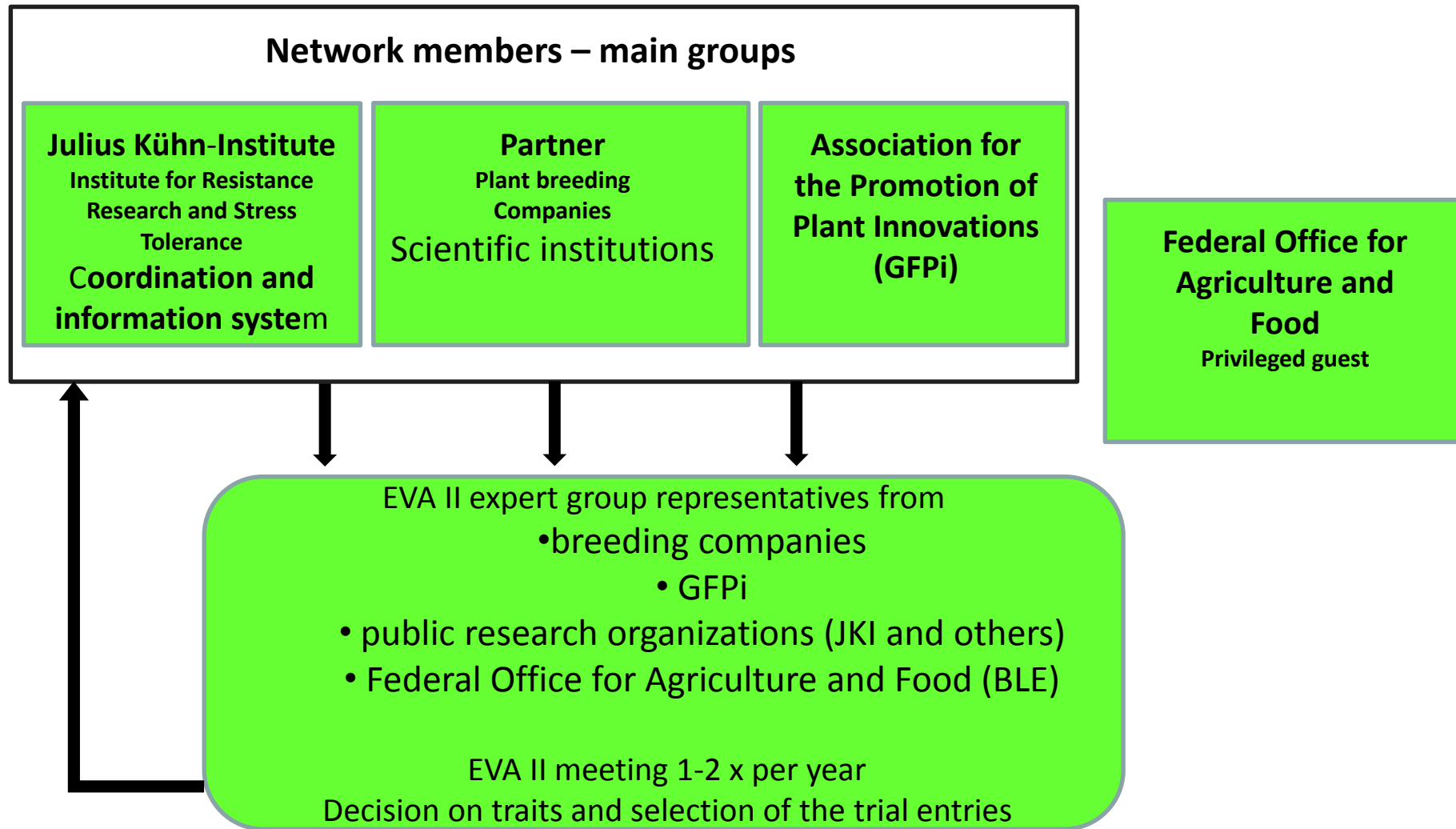


- 1 Pflanzenzucht SaKa GmbH & Co. KG
- 2 KWS LOCHOW GMBH
- 3 Saaten-Union GmbH
- 4 Limagrain GmbH
- 5 Syngenta Seeds GmbH
- 6 Strube Research GmbH & Co. KG
- 7 W. von Borries-Eckendorf GmbH & Co. KG
- 8 RAGT 2N
- 9 Nordsaat Saatzuchtgesellschaft mbH
- 10 Deutsche Saatveredelung AG
- 11 Saatzucht Streng-Engelen 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



Development of EVA II



Workflow: evaluation & documentation

- Selection of interesting diseases by the EVA II expert group
- Selection, 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)
- Import into the database, plausibility control by the coordinator and release of the results



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_10 - PROPOSAL | Type: Proposal | Current state: Open

Name	Accession number	Institute	Quantity	Proposed by	Proposed on	Reason	D - Mark	SRTA
CIMMYT_2015_38	STEMRRRN_6021_2014	Centro Internacional de ...		eva2coordnator (eva2.c...	2015-07-08T11:09:06		0 (Keine Bewertungen)	
CIMMYT_2015_117	STEMRRRN_6104_2014	Centro Internacional de ...		eva2coordnator (eva2.c...	2015-07-08T11:09:06		0 (Keine Bewertungen)	
CIMMYT_2015_64	STEMRRRN_6048_2014	Centro Internacional de ...		eva2coordnator (eva2.c...	2015-07-08T11:09:06		0 (Keine Bewertungen)	
CIMMYT_2015_92	STEMRRRN_6076_2014	Centro Internacional de ...		eva2coordnator (eva2.c...	2015-07-08T11:09:06		0 (Keine Bewertungen)	
CIMMYT_2015_128	STEMRRRN_6118_2014	Centro Internacional de ...		eva2coordnator (eva2.c...	2015-07-08T11:09:06		0 (Keine Bewertungen)	
CIMMYT_2015_138	STEMRRRN_6128_2014	Centro Internacional de ...		eva2coordnator (eva2.c...	2015-07-08T11:09:06		0 (Keine Bewertungen)	
CIMMYT_2015_7	SEPTON_5261_12	Centro Internacional de ...		eva2coordnator (eva2.c...	2015-07-08T11:09:06		0 (Keine Bewertungen)	
CIMMYT_2015_25	STEMRRRN_6207_2014	Centro Internacional de ...		eva2coordnator (eva2.c...	2015-07-08T11:09:06		0 (Keine Bewertungen)	

Buttons: Delete, Move, Invite partners, Import

Accession number: Save, New proposal

REPO Zusatzattribute Name Begründung Alle Bewertungen Experten

Accession name: CIMMYT_2015_38
 Genus: Triticum
 Species: aestivum
 Subspecies:
 Institute: Centro Internacional de

Accession number: STEMRRRN_6021_2X
 Collecting number:
 Collecting Institute:
 Common crop name: winter wheat
 Country of origin: DE

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

Bonburabelle nach Merkmal für EVA 8

No.	Accession number	Accession name	Institute	Common crop name	Year	2013/13.21			2014/14.22			2015/15.23			
						1	2	3	1	2	3	1	2	3	
12	1375	1375	081526	WG280_081	A										
13	1241	1241	081801	WG280_082	A										
14	2111	2111	081529	WG280_084	A										
15	9258.01	9258.01	081528	WG280_085	A										
16	8466.116	8466	081811	WG280_085	A										
17	82076	82076	081528	WG280_084	A										
18	1329	1329	081528	WG280_081	A										
19	8536.01	8536.01	081528	WG280_084	A										
20	Accession Number	0117403	1154329	WG280_085	A										
21	981	981	081803	WG280_093	A										
22	81780	81780	081802	WG280_091	A										
23	82076	82076	081528	WG280_093	A										
24	82076	82076	081528	WG280_093	A										
25	252	PI 2803	1154329	WG280_093	A										
26	204	204	174024	WG280_093	A										
27	82076	82076	081528	WG280_094	A										
28	103	103	081528	WG280_091	A										
29	82076	82076	081528	WG280_093	A										
30	Accession 1848	Clm 1512	1154329	WG280_093	A										
31	3802	3802	081528	WG280_023	A										
32	82076	82076	081528	WG280_093	A										
33	82076	82076	081528	WG280_093	A										
34	11476	11476	081528	WG280_093	A										

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

at EC₅₀ stage 17 - 20 a suspension of conidia (4.000 to 6.000 conidia/ml) with fungicide 20.05% Tween 20 is applied to the plants, which are then protected overnight (12 h in 12 °) with a plastic sheet to maintain optimal infection conditions (200 to 400).

Rating: At heading (BBCH 31) repeated estimations of infected 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 infected leaf area

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

Standard: 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: natural infection

at EC₅₀ stage 17 - 20 a suspension of spores in distilled water (10⁶ spores/ml) is applied with a mist-sprayer over the plants (100-150 mg spores/l) at 08:00 or 16:00 h on a cloudy day and high atmospheric humidity at morning of July (2000-25000 h total temperature from 10° to 20°C. The plants remain wet 20-30 h).

Rating: Systemic expression as percentage of infected leaf area

Rating trait: Systemic expression as percentage of infected leaf area

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

Standard: Westminister, Lenka

Workflow : evaluation & documentation



Informationssystem für Evaluierung pflanzengenetischer Ressourcen

Evaluationreleases

1. Sortiment auswählen
keine Auswahl

2. Merkmal auswählen
Erst Sortiment/Akzession wählen
Note: 1-3
Phazel: 8-100

3. Ort(e) auswählen
Erst Sortiment/Akzession wählen

4. Jahr(e) auswählen
Erst Sortiment/Akzession wählen

10. Akzession(en) auswählen
Akzessionsname
Akzession(en) auswählen

Nur die Filter in dieser Liste werden in den Auswertungen berücksichtigt

Filter speichern | Filter laden

Filter übernehmen
Ergebnisse anzeigen

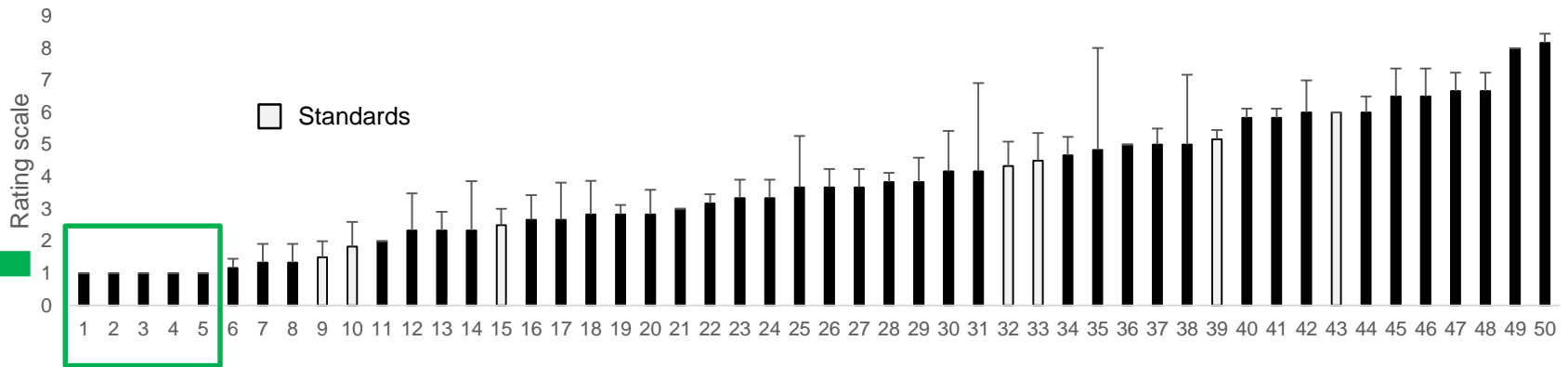
Zeige 1/32 von 32 Einträgen

Akzessionsname	Akzessionsnummer	Sortiment	Ort(e)	Jahr(e)	Besten Avg Note	Besten Min Note	Besten Max Note	Besten 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

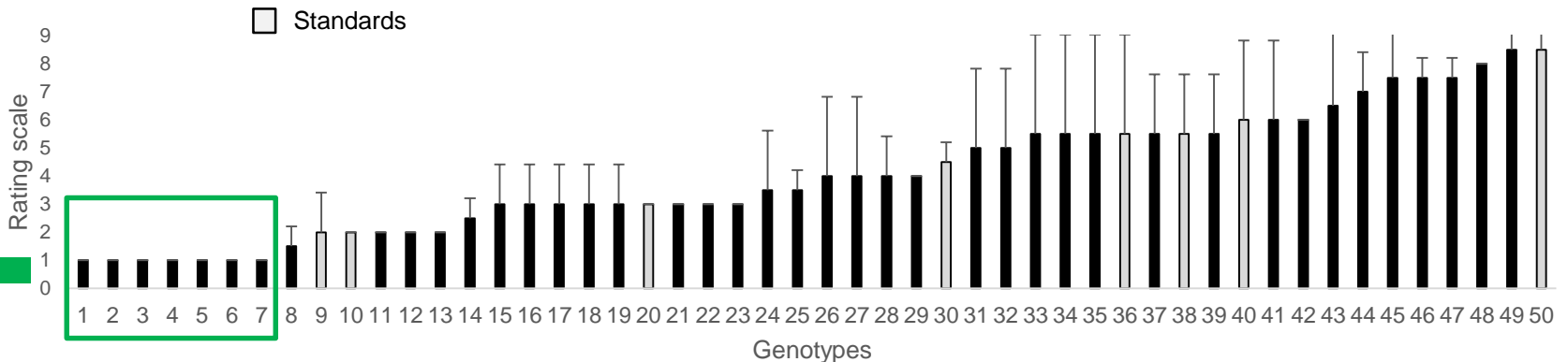
<http://eva2.jki.bund.de/site/index>
Export to Excel

Results of Evaluations in 2018

Stripe rust resistance level of genotypes within the evaluation set 2017



Stripe rust resistance level of genotypes within the evaluation set 2018



Data and genotypes evaluated as resistant are available for partners and usable for breeding.

Why EVAII as a blue print ?

Eva II fullfills the basic demands for an evaluation system and does not put too much additional work for the private partners

The infrastructure is in place and working, and can be easily transferred to different crops

New features needed and challenges

Implement molecular data (GBS, Chip data etc.)

Implement screening protocols for more complex traits

Implement tools for genome wide association studies (GWAS)

Implement tools for marker development

