

# Development of *Phytophthora*-resistant potato varieties

4th European Conference on Copper  
Georg Forster

Berlin 2019

# 1. Organic potato growing and late blight

Copper usage in German organic potato production (2018: 8.976 ha  $\approx$  3,6 %)

Year	$\emptyset$ Cu ha <sup>-1</sup> *a <sup>-1</sup>
2010	1,36
2011	1,60
2012	1,87
2013	1,38
2014	1,54
2015	1,50

→ Max.  $\emptyset$  2,25 kg Cu \* ha<sup>-1</sup>\*a<sup>-1</sup> (in five years); max. 3,0 kg Cu \* ha<sup>-1</sup>

[Reiners E. \(2017\): Ergebnisse des Kupfer-Monitoring der Bio-Verbände & Stand der Umsetzung des Strategiepapiers](#)

plant-resistance as an essential component for saving yield and copper usage

# 1. Organic potato growing and late blight


Clone 11.1025/03 on 28.7.2015 at Uelzen



complete defoliation within 2 weeks without copper application

## 2. BÖLN project (2810 OE 071) 2012-2018

„Development of late blight resistant potato breeding material for organic farming“

 Bundesanstalt für  
Landwirtschaft und Ernährung



### BÖLN

Bundesprogramm Ökologischer Landbau  
und andere Formen nachhaltiger  
Landwirtschaft



2nd winter-meeting at Freising in January 2014

# 2. BÖLN project (2810 OE 071) 2012-2018

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*S. demissum*

*S. andigena*

*S. bulbocastanum*

Eltern		Prebreeding Material Öko - Projekt 2014				
Mutter	Vater	Stamm-Nr.	Reife-Gruppe (eigene Einschätzung)	Speisewert	Stärke %	enthaltene Wildarten
90.6662.16	Satina	00.8038.03	msp	gering-mittel	18,6	dms, adg, sto, acl
88.6411.02	Cara	02.5015.06	msp	gut	15,1	dms, adg
Producent	93.7091.08	03.5129.06	msp	gering	14,6	dms, adg, spg, vrn
Ba.97.02.05	Lyra	04.5170.02	msp	gut-mittel	16,3	sto, acl, vrn, blb
Apart	98.Z.36.01	04.5182.06	msp	gut	14,3	spg, crc
Bonanza	94.7237.05	04.5214.03	msp	gut-mittel	23,0	dms, adg, tbr, sto, spg
Bonanza	94.7237.05	04.5214.04	msp	gering	23,3	dms, adg, tbr, sto, spg
93.6983.06	Presto	07.1018.05	msp	mittel	17,9	dms, adg, phu

*S. pinnatisectum*

*S. phureja*

*S. stoloniferum*



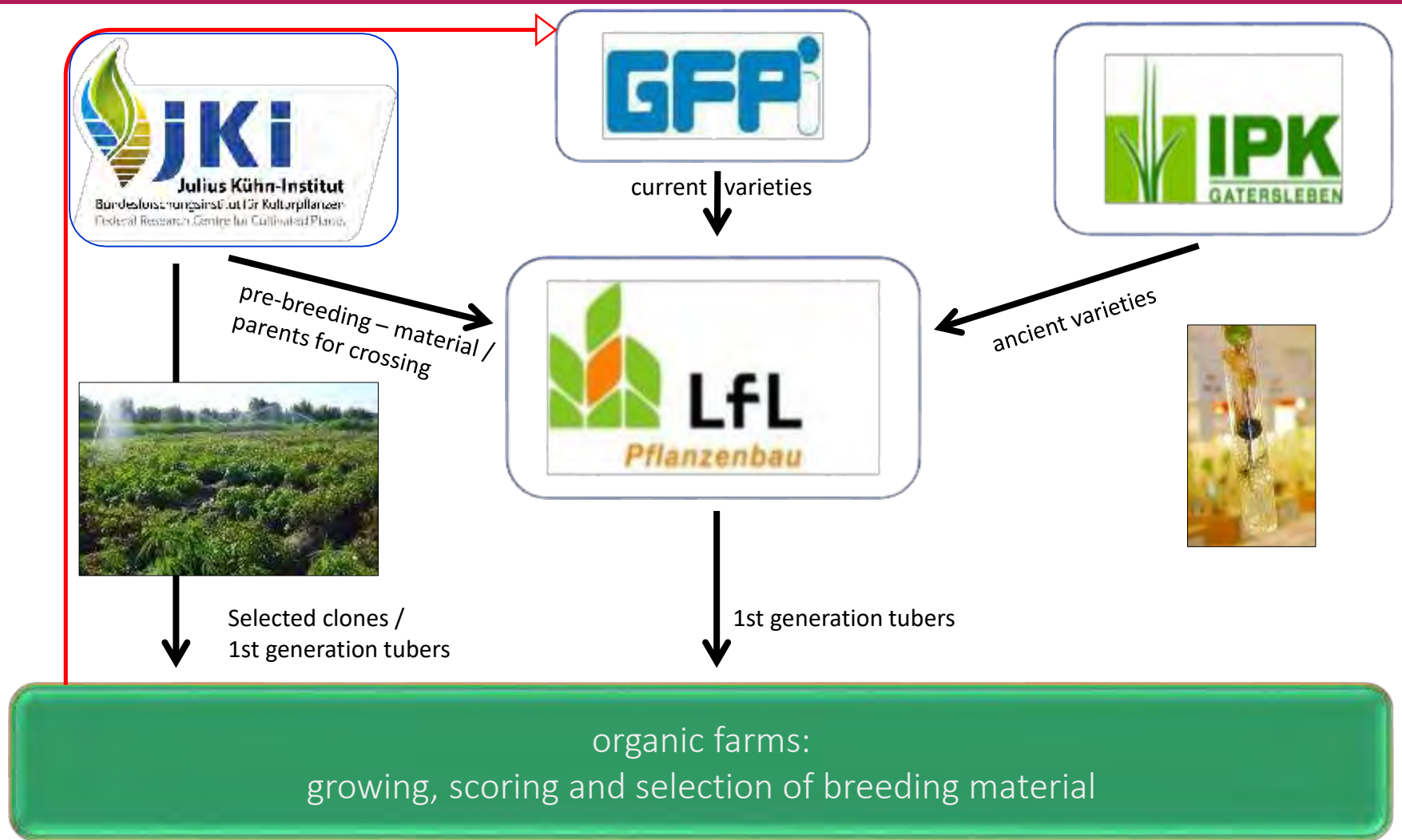
the base: JKI's pre breeding material

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organic breeding program

scientific field trial



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organic potato breeding differs from the beginning

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Seedlings selection via LB at JKI

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planting, maintenance and survey of the first field generation

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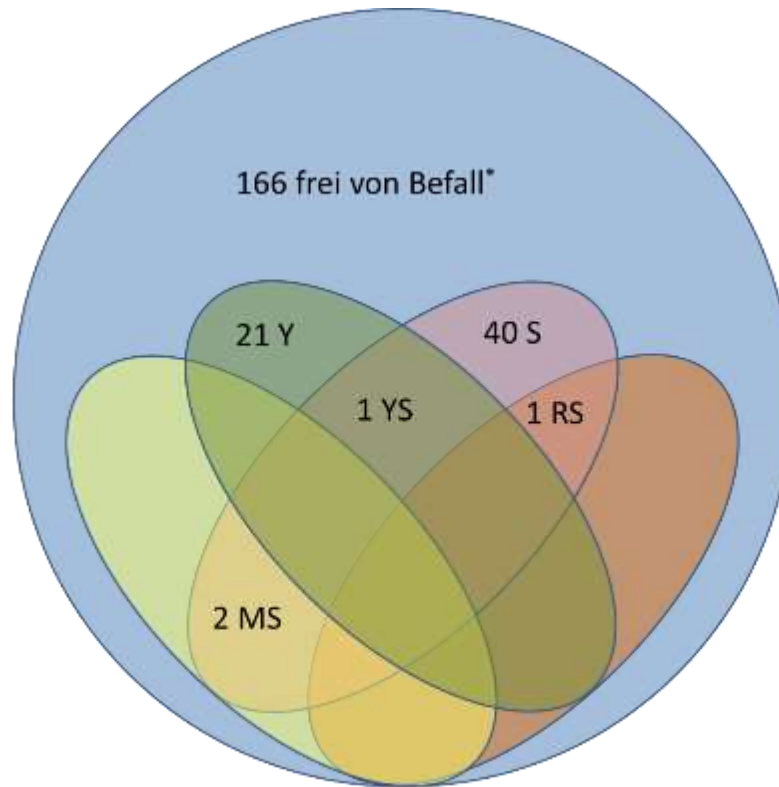
„Development of late blight resistant potato breeding material for organic farming“



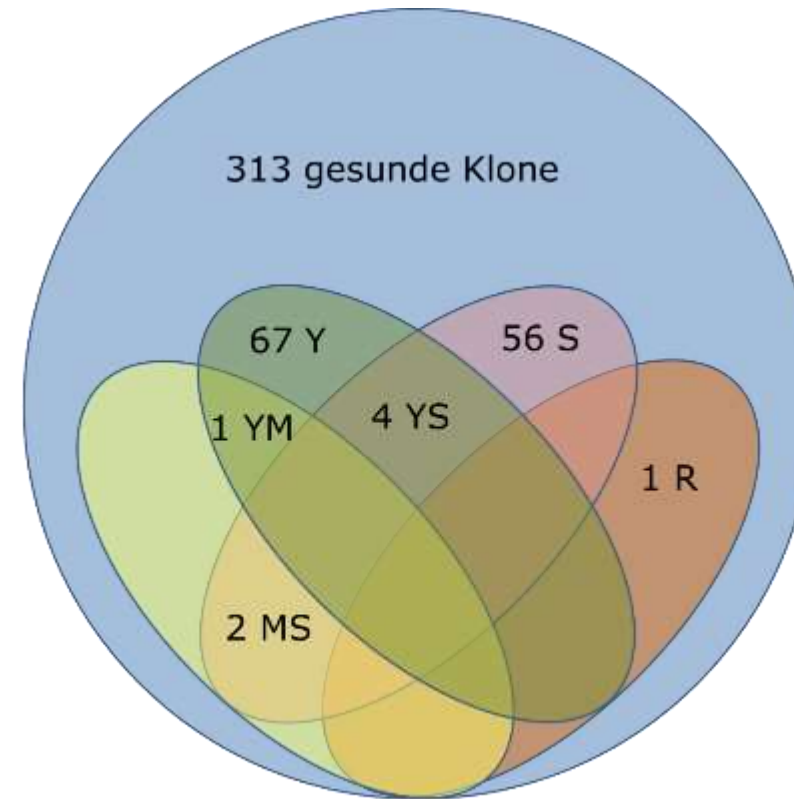
monitoring, harvest and selection of the first field generation

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Virusbefall in den Sämlingsstauden aus Landsberg und Schrobenhausen 2016  
\* Anbau bei Teilbefall von sechs getesteten Knollen



Virusbefall in den Sämlingsstauden aus Landsberg und Schrobenhausen 2017

### Virus infection rates after the first open air planting

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selection and propagation of superior clones

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selection and propagation of superior clones

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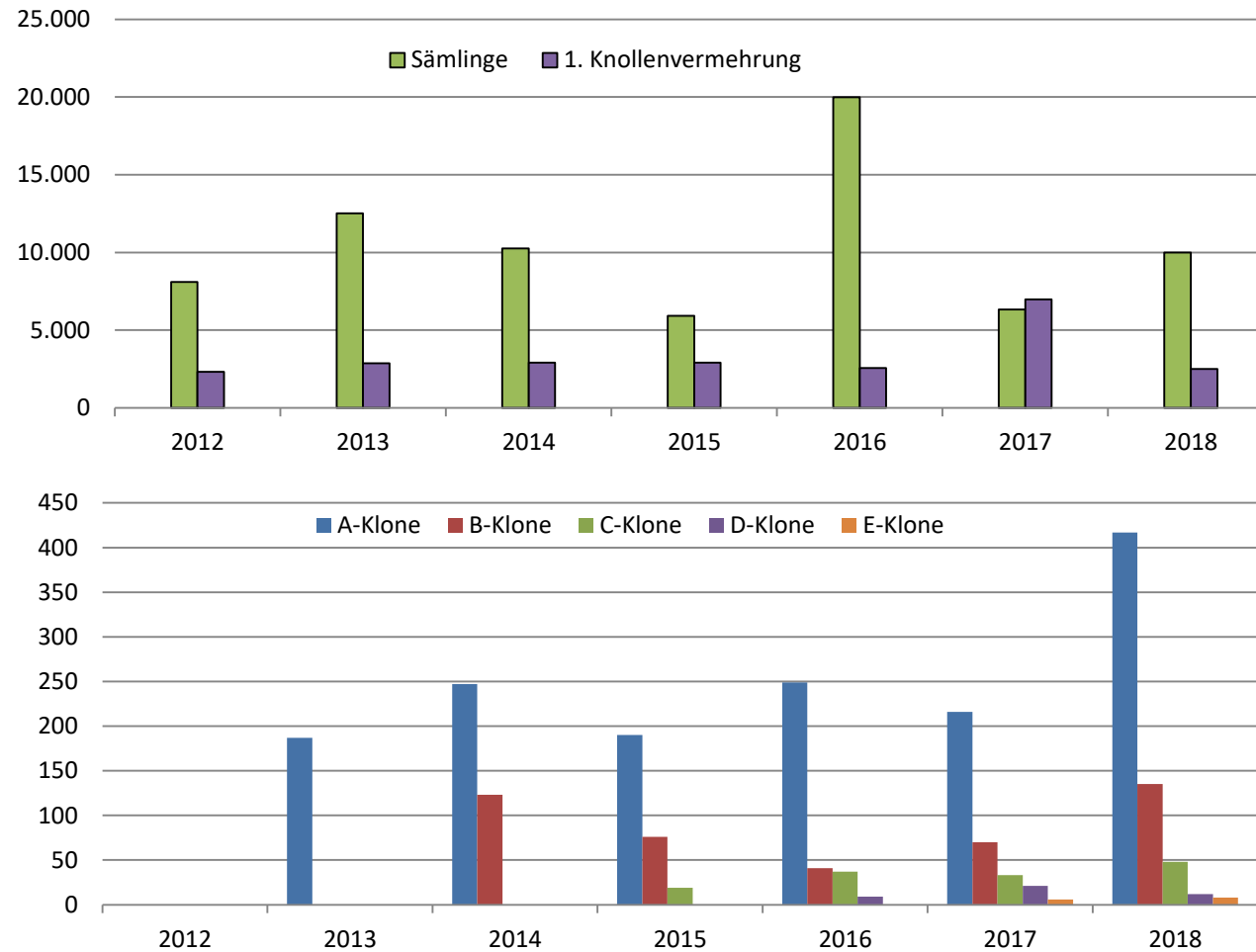
„Development of late blight resistant potato breeding material for organic farming“



cooking and frying tests

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„Development of late blight resistant potato breeding material for organic farming“



organic potato breeding in figures



## 2. BÖLN project (2810 OE 071) 2012-2018

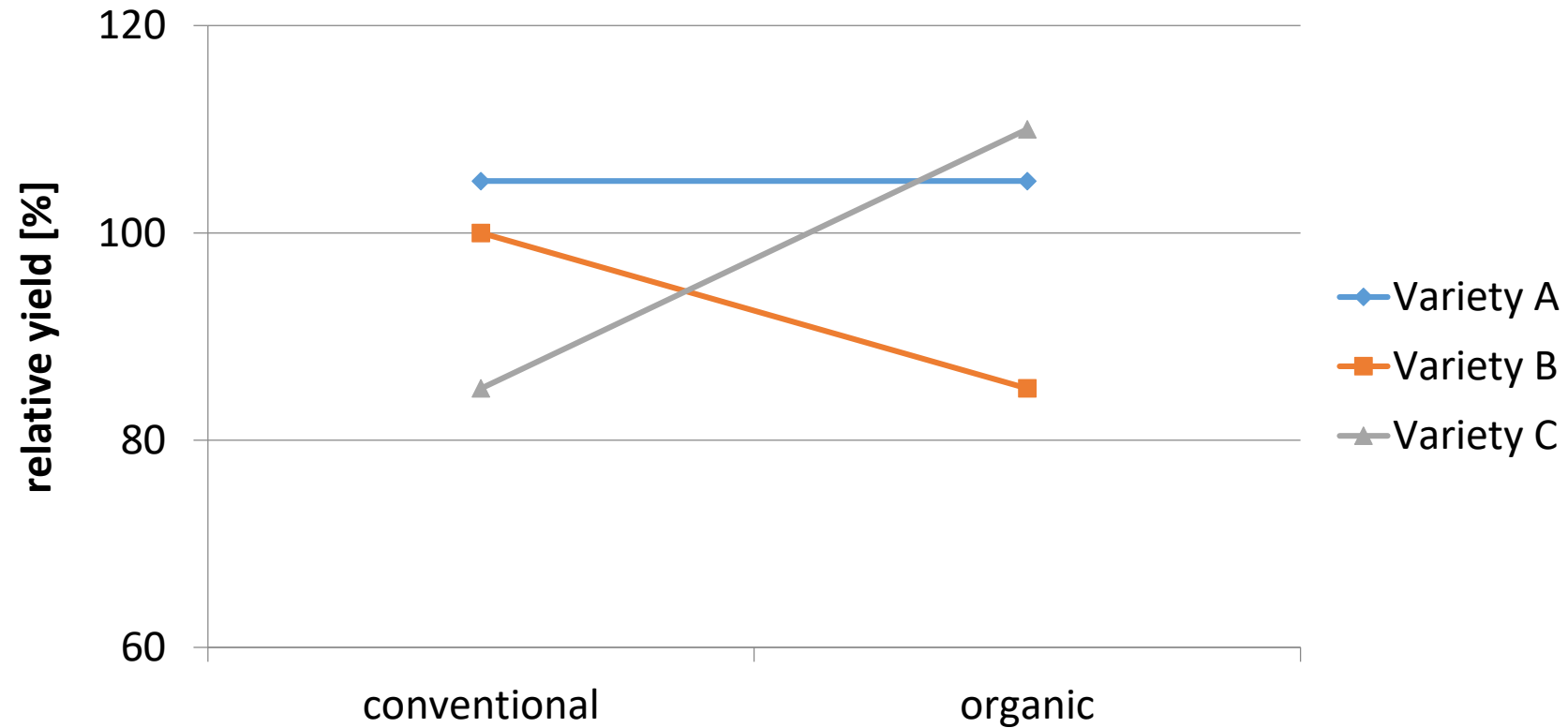
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Question:

Why to select new varieties under organic farming conditions instead of LB resistant ones under otherwise conventional conditions?

## 2. BÖLN project (2810 OE 071) 2012-2018

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Interaction of varieties and cultivation systems at the relative yield?

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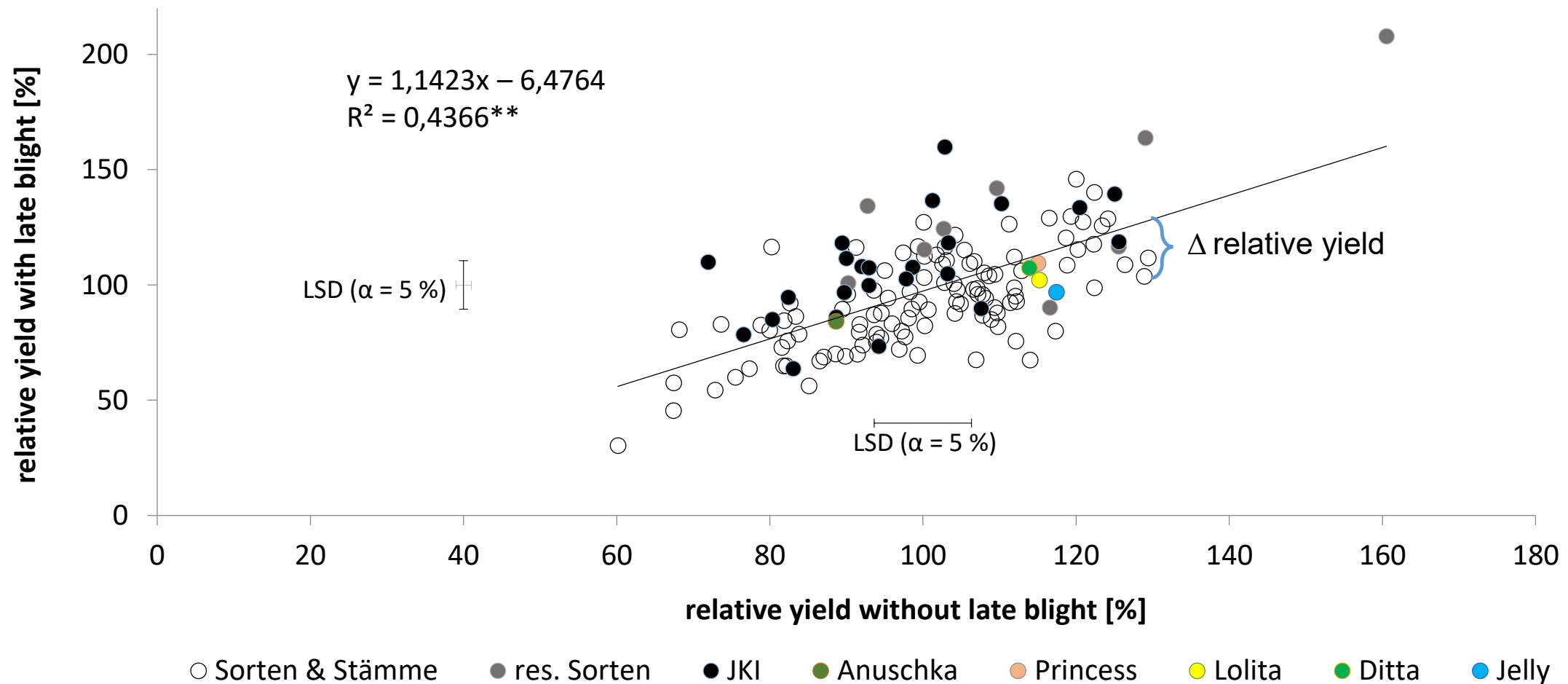
- 3 organic sites
  - 1 conventional site
  - 152 entries
    - 25 JKI
    - 91 varieties
    - 36 cultivars
- LB infection  
→ maturity  
→ yield



Field trial from 2012 - 2015

## 2. BÖLN project (2810 OE 071) 2012-2018

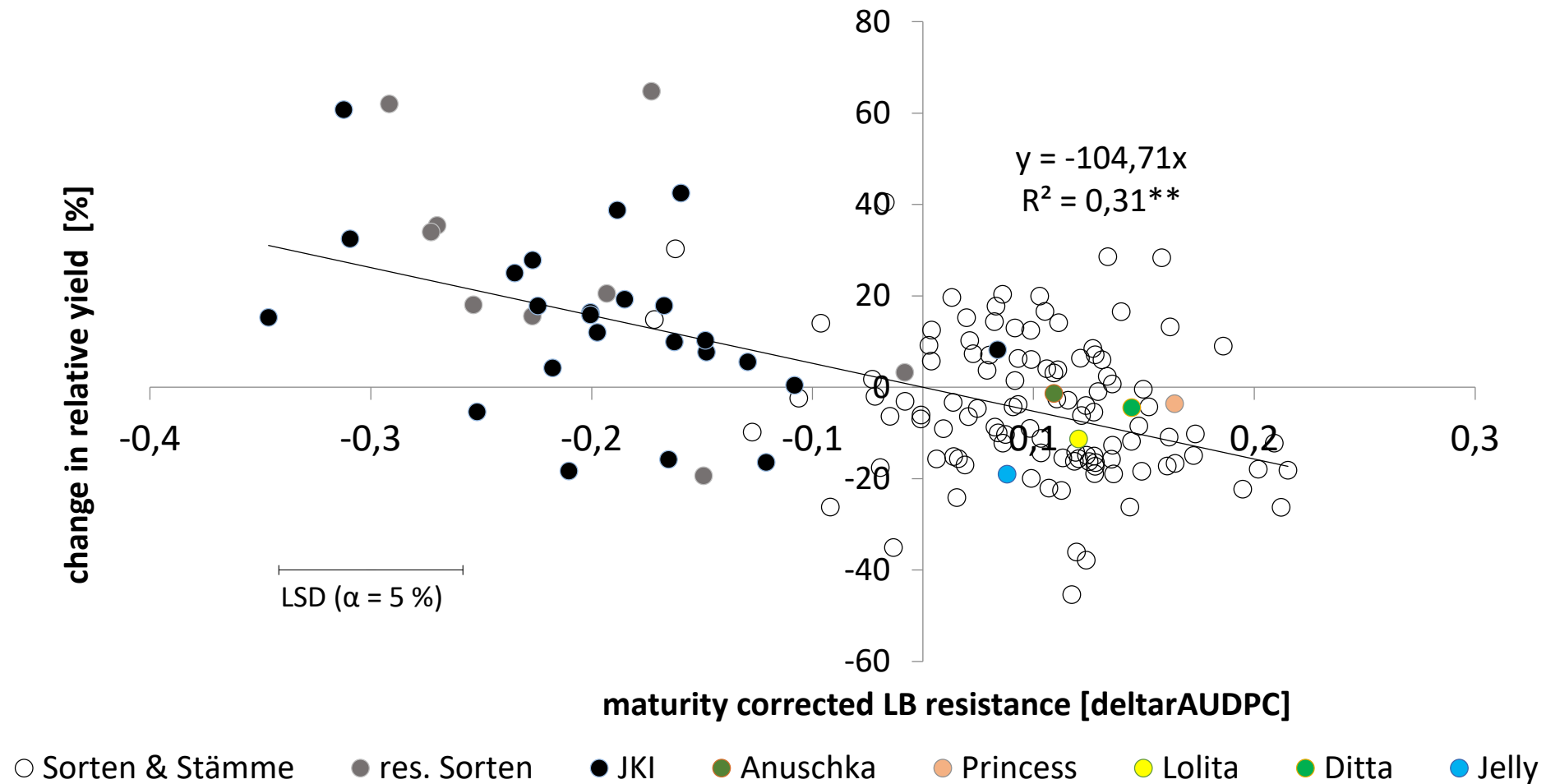
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most varieties change yield ranks under LB pressure

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¼ of change in relative yield is explained by maturity corrected LB resistance



# 3. BÖLN project (EFFIKAR) 2019-2022

„Breeding and Selection of nutrient-efficient and *phytophthora*-resistant potato varieties for sustainable organic farming“

