Versuchsbericht 2013

Arbeitsgemeinschaft
für Versuchswesen und Beratung im Zuckerrübenanbau
Zeitz GmbH

OT Grana
Kreisstraße 11
06712 Kretzschau
Wir danken allen Beteiligten für die Unterstützung bei der Planung, Durchführung, Analyse und Auswertung der Versuche.

Ganz besonders danken wir unseren Versuchsanstellern, die unserer Tätigkeit viel Verständnis entgegenbrachten und uns tatkräftig bei der Arbeit unterstützten.

Die Versuchsergebnisse sind nur zur persönlichen Unterrichtung bestimmt. Sie dürfen weder zu Veröffentlichungen noch zu Werbezwecken genutzt werden.
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Jürgen Lehnert

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Quelle: www.wetteronline.de, DWD, Mittelwerte der Stationen Halle, Erfurt, Gera, Görlitz, Leipzig
1.2 Temperaturverlauf


Quelle: www.wetteronline.de, DWD, Mittelwerte der Stationen Halle, Erfurt, Gera, Görlitz, Leipzig
1.3 Sonnenscheinstunden

2 Versuchsparameter

Anlage und Durchführung:

Beobachtungen und Bonituren:

Ernte und Aufbereitung:
Alle Versuche wurden mit dem schwedischen 3-reihigen Köpfroder der Firma EDENHALL gerodet. Die Ermittlung der Rübennettogewichte, die Breiherstellung sowie deren Analyse erfolgten im Werk Ochsenfurt der Südzucker AG. Der Rübenbrei der Versuche WP2 und LNS-R wurde im Institut für Zuckerrübenforschung Göttingen analysiert.

Auswertung der Ergebnisse:

Versuchsfläche:
Bedingungen bei der Anlage der Feldversuche 2013:


Mit sehr hohen Zuckergehalten und unterdurchschnittlichen Rüben ertragen steuerte das Verbandsgebiet auf die sechst beste Rübenrente zu. Der Standardmelasse-Verlust erreichte günstige Werte.

Die Erntebedingungen für die Versuche waren durchweg gut.
## 3 Versuchsstandorte 2013

### Großenstein (Landkreis Greiz, Thüringen)

<table>
<thead>
<tr>
<th>Standortbedingungen</th>
<th>Temperatur (°C)</th>
<th>2013: 8,6</th>
<th>langj. Ø: 7,5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Niederschlag (mm)</td>
<td>2013: 652</td>
<td>langj. Ø: 610</td>
</tr>
<tr>
<td>Höhenlage über NN (m)</td>
<td>300</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bodenwertzahl Ø</td>
<td>51</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Anbaubedingungen

**Vorfrucht**

Wintergerste

**Zwischenfrucht**

keine

**Aussaat**

22.-23.04.2013

**Ablage (cm)**

8

**Aufgang (ca. 75 %)**

04.05.2013

### Bodenbearbeitung

**Herbst**

22.11.12 Pflug mit Packer

**Frühjahr**

22.04.13 Saatbettkombination

### Düngung

<table>
<thead>
<tr>
<th>EUF - Bodenuntersuchung</th>
<th>pro ha</th>
<th>Gehaltsklasse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herbst</td>
<td>20.11.12</td>
<td>Rinderkompost 200 dt Ca C</td>
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<tr>
<td>Frühjahr</td>
<td>22.04.13</td>
<td>Akra Kombi 3,0 dt K E</td>
</tr>
<tr>
<td></td>
<td>22.05.13</td>
<td>KAS 27 3,0 dt NO₃-N/Norg C</td>
</tr>
</tbody>
</table>

**Herbst**

20.11.12 Branntkalk 30,0 dt Ca C

**Frühjahr**

10.04.13 60er Kali 4,17 dt K B

23.08.12 KAS 27 4,17 NO₃-N/Norg B

22.08.13 TSP 46 % 1,17 P A

### Pflanzenschutz (kg-l/ha)

1. NAK 06.05.13 Powertwin Plus1,0; Rebell Ultra 0,8; Goltix Gold 1,5

2. NAK 13.05.13 Powertwin Plus1,0; Rebell Ultra 0,8; Metafol SC 1,5

3. NAK 13.06.13 Betanal maxxPro 1,0; Goltix Gold 1,2; Debut 0,03; Kontakt 320 SC 0,6

27.06.13 Gallant Super 0,5

14.08.13 Spyrale + Ortiva 1,0+1,0 Faktor 2 Sortenversuche

### Elseraue / OT Rehmsdorf (Burgenlandkreis, Sachsen-Anhalt)

<table>
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<th>Standortbedingungen</th>
<th>Temperatur (°C)</th>
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<tbody>
<tr>
<td></td>
<td>Niederschlag (mm)</td>
<td>2013: 660</td>
<td>langj. Ø: 520</td>
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<tr>
<td>Höhenlage über NN (m)</td>
<td>200</td>
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<td></td>
</tr>
<tr>
<td>Bodenwertzahl Ø</td>
<td>88</td>
<td></td>
<td></td>
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</table>

### Anbaubedingungen

**Vorfrucht**

Winterweizen

**Zwischenfrucht**

keine

**Aussaat**

15.-17.04.2013

**Ablage (cm)**

8 bzw. 18

**Aufgang (ca. 75 %)**

23.04.2013

### Bodenbearbeitung

**Herbst**

20.10.12 Grubber

**Frühjahr**

11.04.13 Grubber (flach) + Kompaktor

### Düngung

<table>
<thead>
<tr>
<th>EUF - Bodenuntersuchung</th>
<th>pro ha</th>
<th>Gehaltsklasse</th>
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<tbody>
<tr>
<td>Herbst</td>
<td>23.08.12</td>
<td>Branntkalk 30,0 dt Ca C</td>
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<td>Frühjahr</td>
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<td>60er Kali 4,17 dt K B</td>
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<tr>
<td></td>
<td>23.08.12</td>
<td>KAS 27 4,17 NO₃-N/Norg B</td>
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<tr>
<td></td>
<td>22.08.13</td>
<td>TSP 46 % 1,17 P A</td>
</tr>
</tbody>
</table>

### Pflanzenschutz (kg-l/ha)

1. NAK 01.05.13 Betanal maxxPro 1,25; Goltix Gold 2,0

2. NAK 13.05.13 Betanal maxxPro 1,0; Goltix Gold 1,0; Debut 0,02

3. NAK 06.06.13 Betanal maxxPro 1,0; Goltix Gold 2,0; Debut 0,02

05.08.13 Spyrale + Ortiva 1,0+1,0 Faktor 2 Sortenversuche

08.08.13 Duett Ultra 0,6 Düngungsversuch

22.08.13 Juwel 1,0 Faktor 2 Sortenversuche
### Standortbedingungen

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Werte (2013)</th>
<th>Langzeitmittel ( ذ. Ø)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperatur (°C)</td>
<td>9,1</td>
<td>8,5</td>
</tr>
<tr>
<td>Niederschlag (mm)</td>
<td>660</td>
<td>550</td>
</tr>
<tr>
<td>Höhenlage über NN (m)</td>
<td>250</td>
<td></td>
</tr>
<tr>
<td>Bodenwertzahl Ø</td>
<td>68</td>
<td></td>
</tr>
</tbody>
</table>

### Anbaubedingungen

- **Vorfrucht**: Wintergerste
- **Zwischenfrucht**: keine
- **Aussaat**: 23.-24.04.2013
- **Ablage (cm)**: 8 bzw. 18
- **Aufgang (ca. 75 %)**: 03.05.2013

### Bodenbearbeitung

- **Herbst**: 22.10.2012
  - Grubber
- **Frühjahr**: 21.04.2013
  - Kompaktor

### Düngung

<table>
<thead>
<tr>
<th>Zeitraum</th>
<th>dt/ha</th>
<th>Gehalt</th>
<th>Klasse</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Herbst</strong></td>
<td>09.10.2012</td>
<td>NPK 6,0</td>
<td>Ca E</td>
</tr>
<tr>
<td></td>
<td>09.10.2012</td>
<td>60er Kali 3,0</td>
<td>K B</td>
</tr>
<tr>
<td><strong>Frühjahr</strong></td>
<td>12.06.2013</td>
<td>KAS 27 2,5</td>
<td>NO3-N /Norg B</td>
</tr>
<tr>
<td></td>
<td>12.06.2013</td>
<td>KAS 27 2,5</td>
<td>P B</td>
</tr>
</tbody>
</table>

### Pflanzenschutz (kg/l/ha)

1. **NAK** 13.05.2013
   - Betanal maxxPro 1,3; Metafol SC 1,5
2. **NAK** 27.05.2013
   - Betanal maxxPro 1,0; Metafol SC 1,5
12.06.2013
   - Agil-S 0,5
  02.07.2013
   - Metafol SC 2,0; Gallant Super 0,5
02.08.2013
   - Spyrale + Ortiva 1,0+1,0 Faktor 2 Sortenversuche
30.08.2013
   - Juwel 1,0 Faktor 2 Sortenversuche
### Sortenleistungsgleich 2013 – Rizomania (SV-R)

#### 4.1 SV-R – Verzeichnis der geprüften Sorten

<table>
<thead>
<tr>
<th>Sorte</th>
<th>ZR-Nr.</th>
<th>Toleranz</th>
<th>Zulassungsjahr</th>
<th>Vertrieb</th>
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<tbody>
<tr>
<td>Beretta*</td>
<td>1665</td>
<td>rt</td>
<td>2006</td>
<td>KWS SAAT AG, Einbeck</td>
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<tr>
<td>Rubens*</td>
<td>1718</td>
<td>rt</td>
<td>2007</td>
<td>Strube GmbH &amp; Co. KG, Söllingen</td>
</tr>
<tr>
<td>Sabrina KWS*</td>
<td>1910</td>
<td>rt</td>
<td>2009</td>
<td>KWS SAAT AG, Einbeck</td>
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<tr>
<td>Arnold*</td>
<td>1973</td>
<td>rt</td>
<td>2010</td>
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<tr>
<td>Annika KWS</td>
<td>2104</td>
<td>rt</td>
<td>2011</td>
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<td>Hannibal</td>
<td>2148</td>
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<td>Sporta</td>
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<td>2006</td>
<td>Syngenta Seeds GmbH, Bad Salzuflen</td>
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<td>Robinson</td>
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<tr>
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<tr>
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<tr>
<td>Elaina KWS</td>
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*Verrechnungssortiment; rt = rizomaniatolerant
4.2 SV-R 2013 – Ergebnisse süddeutsche Standorte
4.2.1 SV-R 2013 – Feldaufgang, Schosser und Bonituren

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Quelle: Kuratorium für Versuchswesen und Beratung im Zuckerrübenanbau, Ochsenfurt, 2013;* 100 = Verrechnungs-Mittel der Sorten Beretta, Rubens, Sabrina KWS, Arnold; regionale ARGEn, IfZ
** zu wenige Standorte, siehe dreijährige Ergebnisse
### 4.2.2 SV-R 2013 – Ertrag und Qualität relativ* mit Fungizid

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Quelle: Kuratorium für Versuchswesen und Beratung im Zuckerrübenanbau, Ochsenfurt, 2013:
* 100 = Verrechnungs-Mittel der Sorten Beretta, Rubens, Sabrina KWS, Arnold; regionale ARGEn, IfZ
4.3  SV-R 2013 – Ergebnisse regionale Standorte

4.3.1  SV-R 2013 – Feldaufgang, Schosser und Bonituren - Rehmsdorf ohne Fungizid

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### 4.3.5 SV-R 2013 – Bonituren Großenstein ohne Fungizid

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* 100 = Verrechnungs-Mittel der Sorten Beretta, Rubens, Sabrina KWS, Arnold
4.3.8 SV-R 2013 – Ertrag und Qualität mit Fungizid – Großenstein

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*100 = Verrechnungs-Mittel der Sorten Beretta, Rubens, Sabrina KWS, Arnold
### 4.4 SV-R 2011 bis 2013 – Ergebnisse süddeutsche Standorte

#### 4.4.1 SV-R 2011 bis 2013 – Feldaufgang, Schosser und Bonituren

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¹ 100 = Mittel der Verrechnungssorten Beretta, Rubens, Sabrina KWS, Arnold  
² Toleranz = relativer BZE-Verlust bei Befall mit Blattkankheiten  
³ Daten 2011 aus dem LNS-R + LNS  
** Quelle: Kuratorium für Versuchswesen und Beratung im Zuckerrübenanbau, Ochsenfurt, 2013  
** Toleranz = relativer BZE-Verlust bei Befall mit Blattkrankeiten

Feldaufgang und Schosser aus Stufe ohne und mit Fungizid  
Bonituren aus Stufe ohne Fungizid; BZE aus Stufe mit Fungizid
### 4.4.2 SV-R 2011 bis 2013 – Ertrag und Qualität relativ* mit Fungizid

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Quelle: Kuratorium für Versuchswesen und Beratung im Zuckerrübenanbau, Ochsenfurt, 2013

* 100 = Verrechnungs-Mittel der Sorten Beretta, Rubens, Sabrina KWS, Arnold

¹ Daten 2011 aus dem LNS-R + LNS

² Daten 2011 aus der WP RI² + S₂, 2012 aus dem LNS-R
5 Spezieller Sortenleistungsvergleich – Rizomania SSV-R (N)

5.1 SSV-R (N) 2013 – Verzeichnis der geprüften Sorten

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<th>Sorte</th>
<th>ZR-Nr.</th>
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*Verrechnungssortiment, rt = rizomaniatolerant, nt= nematodentolerant, rh = rhizoctoniatolerant, nr = nematodenresistent
### 5.2 SSV-R (N) 2013 – Ergebnisse deutsche Standorte

#### 5.2.1 SSV-R (N) 2013 – Feldaufgang, Schosser und Bonituren

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Quelle: IfZ 2013

* 100 = Verrechnungs-Mittel der Sorten Beretta, Rubens, Sabrina KWS, Arnold

Feldaufgang und Schosser aus Stufe mit und ohne Fungizid, Bonituren aus Stufe ohne Fungizid
### 5.2.2 SSV-R (N) 2013 – Ertrag und Qualität relativ* ohne Fungizid

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Quelle: IfZ 2013

* 100 = Verrechnungs-Mittel der Sorten Beretta, Rubens, Sabrina KWS, Arnold
5.2.3  SSV-R (N) 2013 – Ertrag und Qualität relativ* mit Fungizid

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<th>SMV</th>
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<th>Na mmol/1000g Rüben</th>
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Quelle: IfZ 2013
* 100 = Verrechnungs-Mittel der Sorten Beretta, Rubens, Sabrina KWS, Arnold
5.3 SSV-R (N) 2013 – Ergebnisse regionale Standorte

5.3.1 SSV-R (N) 2013 – Feldaufgang, Schosser und Bonituren - Rehmsdorf ohne Fungizid

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### 5.3.2 SSV-R (N) 2013 – Feldaufgang, Schosser und Bonituren - Rehmsdorf mit Fungizid

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5.3.3  SSV-R (N) 2013 – Ertrag und Qualität ohne Fungizid – Rehmsdorf

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* 100 = Verrechnungs-Mittel der Sorten Beretta, Rubens, Sabrina KWS, Arnold
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* 100 = Verrechnungs-Mittel der Sorten Beretta, Rubens, Sabrina KWS, Arnold
### 5.3.5 SSV-R (N) 2013 – Feldaufgang, Schosser und Bonituren - Großenstein ohne Fungizid

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5.3.6 SSV-R (N) 2013 – Feldaufgang, Schosser und Bonituren - Großenstein mit Fungizid

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* 100 = Verrechnungs-Mittel der Sorten Beretta, Rubens, Sabrina KWS, Arnold
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* 100 = Verrechnungs-Mittel der Sorten Beretta, Rubens, Sabrina KWS, Arnold
6 Leistungsvergleich neuer rizomaniatoleranter Sorten (LNS-R)

6.1 LNS-R 2013 – Verzeichnis der geprüften Sorten

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*Verrechnungssortiment, rt = rizomaniatolerant, nt = nematodentolerant, rh = rhizoctoniatolerant, nr = nematodenresistent
### LNS-R 2013 – deutsche Standorte

#### 6.2.1 LNS-R 2013 – Feldaufgang, Schosser und Bonituren

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Quelle: IfZ, 2013

* 100 = Verrechnungs-Mittel der Sorten Beretta, Rubens, Sabrina KWS, Arnold

Feldaufgang und Schosser aus Stufe mit und ohne Fungizid, Bonituren aus Stufe ohne Fungizid
### 6.2.2 LNS-R 2013 – Ertrag und Qualität relativ* ohne Fungizid – deutsche Standorte

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Quelle: IfZ, 2013
* 100 = Verrechnungs-Mittel der Sorten Beretta, Rubens, Sabrina KWS, Arnold
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Quelle: IfZ, 2013

* 100 = Verrechnungs-Mittel der Sorten Beretta, Rubens, Sabrina KWS, Arnold
### 6.3 LNS-R 2013 – regionaler Standort

#### 6.3.1 LNS-R 2013 – Feldaufgang, Schosser und Bonituren - Scheiplitz ohne Fungizid

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* 100 = Verrechnungs-Mittel der Sorten Beretta, Rubens, Sabrina KWS, Arnold
### 6.3.4 LNS-R 2013 – Ertrag und Qualität mit Fungizid – Scheiplitz

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* 100 = Verrechnungs-Mittel der Sorten Beretta, Rubens, Sabrina KWS, Arnold
### LNS-R 2011-2013 – deutsche Standorte

#### 6.4.1 LNS-R 2011-2013 - Feldaufgang, Schosser und Bonituren

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Quelle: IfZ, 2013

* 100 = Verrechnungs-Mittel der Sorten Beretta, Rubens, Sabrina KWS, Arnold
Feldaufgang nur einjährig
Feldaufgang und Schosser aus Stufe mit und ohne Fungizid, Bonituren aus Stufe ohne Fungizid
### 6.4.2 LNS-R 2011-2013 – Ertrag und Qualität relativ* ohne Fungizid

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Quelle: IIZ, 2013

* 100 = Verrechnungs-Mittel der Sorten Beretta, Rubens, Sabrina KWS, Arnold
6.4.3 LNS-R 2011-2013 – Ertrag und Qualität relativ* mit Fungizid

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Quelle: IfZ, 2013
* 100 = Verrechnungs-Mittel der Sorten Beretta, Rubens, Sabrina KWS, Arnold
### 7 Sortenversuch Biomasse (SV-B)

#### 7.1 SV-B 2013 – Verzeichnis der geprüften Sorten

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*Verrechnungssortiment; rt = rizomaniatolerant; nt = nematodentolerant; rz = rhizoctoniatolerant
### 7.2 SV-B 2013 – deutsche Standorte

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Quelle: IfZ, 2013

* 100 = Verrechnungs-Mittel der Sorten Beretta, Rubens, Sabrina KWS, Arnold
* Feldaufgang nur einjährig
* Feldaufgang und Schosser aus Stufe mit und ohne Fungizid, Bonituren aus Stufe ohne Fungizid
7.2.2 SV-B 2013 – Ertrag, Qualität und Methanertrag relativ*

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Quelle: IfZ, 2013
* 100 = Verrechnungs-Mittel der Sorten Beretta, Rubens, Sabrina KWS, Arnold
### 7.3 SV-B 2013 – regionaler Standort - Großenstein

#### 7.3.1 SV-B 2013 – Feldaufgang, Schosser und Bonituren - Großenstein

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7.3.2 SV-B 2013 - Ertrag, Qualität und Trockensubstanzgehalt - Großenstein

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* 100 = Verrechnungs-Mittel der Sorten Beretta, Rubens, Sabrina KWS, Arnold
7.4 SV-B 2011-2013 – deutsche Standorte

7.4.1 SV-B 2011-2013 - Feldaufgang, Schosser und Bonituren

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Quelle: IfZ, 2013

¹ 100 = Verrechnungs-Mittel der Sorten Beretta, Rubens, Sabrina KWS, Arnold
² Daten 2011 aus der WP S2, Blattkrankheiten aus der Stufe mit Fungizid
³ Daten 2011 aus der WP S2 und 2012 aus dem LNS, Blattkrankheiten jeweils die Stufe mit Fungizid
⁴ Daten 2011 aus WP S1 und 2012 aus WP S2, Blattkrankheiten jeweils aus Stufe mit Fungizid, Feldaufgang nur einjährig (2013), daher keine Ausweisung
⁵ zweijährige Ergebnisse aus den Jahren 2012 und 2013
### 7.4.2 SV-B 2011-2013 – Ertrag, Qualität und Methanertrag relativ*

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</table>

Quelle: IfZ, 2013

* 100 = Verrechnungs-Mittel der Sorten Beretta, Rubens, Sabrina KWS, Arnold

1. Daten 2011 aus der WP S2, Stufe mit Fungizid, Ableitung des TSG aus dem ZG (TSG = 1,16 x ZG + 2,95)
2. Daten 2011 aus der WP S2 und 2012 aus dem LNS-R, jeweils die Stufe mit Fungizid, Ableitung des TSG aus dem ZG (TSG = 1,16 x ZG + 2,95)
3. Daten 2011 aus der WP S1 und 2012 aus der WP S2, jeweils die Stufe mit Fungizid, Ableitung des TSG aus dem ZG (TSG = 1,16 x ZG + 2,95)
4. zweijährige Ergebnisse aus den Jahren 2012 und 2013
8.1 Ringversuch Herbizide 2013 – deutsche Standorte


Im Jahr 2013 trat das Bingelkraut an allen geplanten Versuchsstandorten auf. Hundspetersilie und Vogelknöterich traten in diesem Jahr nur in sehr begrenztem Umfang an jeweils zwei der geplanten Standorte auf. Darüber hinaus traten diese Unkräuter auch an weiteren Standorten auf, welche bei der übergreifenden Auswertung berücksichtigt werden konnten. Die Verunkrautung an den Standorten der Standardvarianten war vor allem durch den Weißen Gänsefuß und einer breiten Mischverunkrautung geprägt (Tab. 4).

In den 13 Versuchen in Deutschland konnten, wie in den Vorjahren, nur in geringem Ausmaß Symptome durch Phytotoxizität durch den Einsatz der Herbizide in Zuckerrüben beobachtet werden. In den Versuchsgründern (VG) der Standardvarianten wurde die höchste Schädigung in der Regel nach der Applikation der dritten NAK bioni- tiert. Im Mittel der meisten VG lag diese Schädigung bei ca. 5 % (Abb. 1). Eine höhere Schädigung im Bereich von ca. 10 % zeigten die VG 6, 7, 8 und 13. Auch nach den ersten Applikationen und der Abschlussbonitur zeigten diese VG eine leicht höhere Schädigung gegenüber dem Mittel. In diesen Varianten wurde das Mittel Betanal maxxPro mit einer Aufwandmenge von 1,25 l/ha oder höher eingesetzt. Bei den anderen Varianten ging die Schädigung zur Bonitur nach dem Bestandesschluss im Vergleich stärker zurück. Bei der Spezialverunkrautung Bingelkraut wurde die höchste Schädigung häufig nach der Applikation der zweiten NAK bioni- tiert (Abb. 2). Hier lagen die VG überwiegend bei etwa 5 % und damit auf vergleichbarem Niveau zu den Standardvarianten. Das VG 5 hatte zu allen Boniturterminen die höchste Schädigung durch Phytotoxizität, die deutlich über den Werten der anderen VG lag. Die Schädigung wurde insbesondere durch die Reaktion an einem der Standorte hervorgerufen. Bei den Varianten Hundspetersilie/Vogelknöterich lag die Schädi- gung durch Phytotoxizität ebenfalls auf geringem Niveau zwischen 5 und 10 % (Abb. 3). Insbesondere die beiden Standardvarianten zeigten die geringste Schädigung. Die höchste Schädigung wurde in den VG 4, 5, 8 und 9 bioni- tiert.

Wie in den Vorjahren war das Jahr 2013 von einer guten herbiziden Wirkung gekennzeichnet. Selbst gegenüber den betrachteten Spezialunkräutern ließen sich nur in wenigen Fällen deutliche Wirkungsunterschiede zwischen den einzelnen VG beobachten. Viele der betrachteten Unkräuter traten im Jahr 2013 nur in sehr geringen Deckungsgraden an den Standorten auf, was die Interpretation der Er- gebnisse erschwerte.

über 35 % zu (Abb. 7). Eine zunehmende Differenzierung zwischen den VG konnte nicht beobachtet werden. Auch der Unkrautde-
ckungsgrad des Weißen Gansefüßes verdoppelte sich, wobei weiter-
hin von allen VG hohe Wirkungsgrade erreicht wurden (Abb. 8). Beim 
Raps konnte in den Versuchen in diesem Jahr kein Anstieg im Un-
krutdeckungsgrad zum späteren Boniturzeitpunkt beobachtet wer-
den (Abb. 9). Mit Ausnahme der beiden Standardvarianten erreichten
alle VG hohe Wirkungsgrade von über 97 % gegenüber diesem Un-
kraut. Die Ergebnisse der Einzelorte für den Gesamtwirkungsgrad
können in Tabelle 5 entnommen werden.

Bingelkraut trat in allen drei dazu angelegten Standorten der Ver-
unkrautung vor. Der Gesamtwirkungsgrad lag nach Applikation
der dritten NAK in der unbehandelten Kontrolle bei 25 % (Abb.
10) und lag auf geringerem Niveau als in den Vorjahren. Die Stan-
dardvarianten erreichten einen Gesamtwirkungsgrad von 96 %, die
meisten Prüfvarianten hatten einen Gesamtwirkungsgrad von über
98 %. Einzige Ausnahme bildet das VG 12, welches einen Gesamtwirkungsgrad von knapp über 80 % erreichte. Dies ist durch die ge-
ringe Wirkung an zwei der drei Standorte begründet. Der Gesamtwir-
kautdeckungsgrad und der Gesamtwirkungsgrad sind im wesentli-
chen durch die Wirkung aus das Bingelkrautes geprägt, welches ei-
en Deckungsgrad von ca. 20 % erreichte (Abb. 11). Die bonitieren
Wirkungsgrade entsprechen den beschriebenen Ergebnissen des
Gesamtwirkungsgrades. Zur Bonitur nach dem Bestandesschluss
stieg der Gesamtwirkungsgrad auf über 35 % an (Abb. 12). Die Differenzierung zwischen den VG nahm deutlich zu. Die beiden Stan-
dardvarianten lagen in ihrer Wirkung zu diesem Zeitpunkt, eben-
so wie VG 12, etwas unter 90 %. Die übrigen VG konnten Gesamt-
wirkungsgrade von über 95 % erzielen, wobei die sicherste Bekämp-
fung VG 9 mit über 98 % erreichte. Die Wirkungen gegenüber dem
Bingelkraut entsprechen den geschilderten Ergebnissen des Gesa-
mtwirkungsgrades (Abb. 13). Die Ergebnisse der Einzelorte für den
Gesamtwirkungsgrad sind in der Tabelle 5 aufgeführt.

An den Standorten mit den Varianten gegen Hundspetersilie und
Vogelknöterich wurden diese Spezialunkräuter 2013 im Mittel nur in
sehr geringem Umfang festgestellt. Der Gesamtwirkungsgrad betrug
an den Standorten ca. 25 % nach der dritten NAK (Abb. 14).
Zwischen den VG waren deutliche Unterschiede zu beobachten. VG
2 erreichte einen relativ geringen Gesamtwirkungsgrad von knapp
über 80 %, die VG 3, 11 und 12 von knapp über 90 %. Die sicherste
Wirkung zeigte VG 9 mit über 98 %. Hundspetersilie trat an zwei
Standorten mit 17 % auf (Abb. 15). Zwischen den Prüfgliedern waren
nur geringe Unterschiede zu bonitieren. Auffällig ist der sehr deutliche
Unterschied im Wirkungsgrad zwischen den beiden Standardvarianten
für dieses Unkraut. Auch der Vogelknöterich trat an zwei Standor-
ten allerdings nur mit einem geringen Unkrautdeckungsgrad von ca.
5 % auf, was bei der Interpretation der Ergebnisse berücksichtigt
werden muss (Abb. 16). Gegenüber diesem Unkraut zeigten die VG
8, 11 und 12 geringere Wirkungsgrade. Gegenüber dem Weißen
Gansefüß konnten alle VG sehr hohe Wirkungsgrade erzielen (Abb.
17). Zum Zeitpunkt nach dem Bestandesschluss nahm der Gesamt-
unkrautdeckungsgrad durch die beginnende Spätverunkrautung wei-
ter zu und betrug im Mittel der Standorte fast 80 % (Abb. 18). Die
Unterschiede im Gesamtwirkungsgrad nahmen weiter zu. VG 2 zeig-
te nur noch einen Gesamtwirkungsgrad von unter 80 %, die VG 3 und 12 lagen bei ca. 84 %. Die höchste Wirkung erzielte VG 4 mit 98 %. Die Ergebnisse der Einzelorte für den Gesamtwirkungsgrad können der Tabelle 7 entnommen werden.

## Ringversuch Herbizide 2013

### Tabelle 1: Varianten für die Standardverunkrautung

<table>
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Abb. 1: Schäden an der Kultur durch die Applikation verschiedener Herbizidkombinationen (VG 2 - 13) der Standardvarianten

- nach NAK 1
- nach NAK 2
- nach NAK 3
- nach BS

Phytotoxizität (%)

Versuchsglieder
Abb. 4: Gesamtunkrautdeckungsgrad (GUDG) in der unbehandelten Kontrolle (VG 1) und Gesamtwirkungsgrad (GWG) verschiedener Standardapplikationen (VG 2 - 13)
Bonitur nach der dritten NAK, Mittel aus 5 Versuchen
Ringversuch Herbizide 2013

Abb. 5: Unkrautdeckungsgrad (UDG) in der unbehandelten Kontrolle (VG 1) von Weißem Gänsefuß (CHEAL) und Wirkungsgrad (WG) verschiedener Standardapplikationen (VG 2 - 13)

Bonitur nach der dritten NAK, Mittel aus 5 Versuchen

UDG | Wirkungsgrad (WG)
--- | ---
8.8 | 98.7
98.7 | 98.4
99.2 | 99.0
99.2 | 99.0
98.9 | 99.3
98.7 |

Mittelwerte

Unkrautdeckungsgrad bzw. Wirkungsgrad CHEAL (%)

Versuchsglieder
Ringversuch Herbizide 2013

Abb. 6: Unkrautdeckungsgrad (UDG) in der unbehandelten Kontrolle (VG 1) von Ausfallraps (BRSNA) und Wirkungsgrad (WG) verschiedener Standardapplikationen (VG 2 - 13)

Bonitur nach der dritten NAK, Mittel aus 3 Versuchen
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Abb. 7: Gesamtunkrautdeckungsgrad (GUDG) in der unbehandelten Kontrolle (VG 1) und Gesamtwirkungsgrad (GWG) verschiedener Standardapplikationen (VG 2 - 13) Bonitur nach dem Bestandesschluss, Mittel aus 5 Versuchen

GUDG | GWG
---|---
36,5 | 94,1
96,1 | 96,5
98,4 | 97,1
98,3 | 97,8
97,7 | 98,1
97,8 | 97,3
97,7 |

Mittelwerte

Gesamtunkrautdeckungsgrad bzw. Gesamtwirkungsgrad (%)
Abb. 8: Unkrautdeckungsgrad (UDG) in der unbehandelten Kontrolle (VG 1) von Weißem Gänsefuß (CHEAL) und Wirkungsgrad (WG) verschiedener Standardapplikationen (VG 2 - 13)

Bonitur nach dem Bestandesschluss, Mittel aus 5 Versuchen

UDG 19,9 96,6 99,0 98,4 98,0 97,8 97,4
WG

Unkrautdeckungsgrad bzw. Wirkungsgrad CHEAL (%)
Abb. 9: Unkrautdeckungsgrad (UDG) in der unbehandelten Kontrolle (VG 1) von Ausfallraps (BRSNA) und Wirkungsgrad (WG) verschiedener Standardapplikationen (VG 2 - 13)

Bonitur nach dem Bestandesschluss, Mittel aus 3 Versuchen

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<th>VG 2</th>
<th>VG 3</th>
<th>VG 4</th>
<th>VG 5</th>
<th>VG 6</th>
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Mittelwerte

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8.2 Ringversuch Herbizide 2013 – regionaler Standort
8.2.1 Ringversuch Herbizide Rehmsdorf 2013 – Versuchsbeschreibung


Zur 3. Bonitur Anfang/Mitte Juni erreichte Raps in der unbehandelten Kontrolle einen Deckungsgrad von 3,25 %, Weißer Gänsefuß 12,5 %, Windenknöterich 13,75 %, Hundspetersilie 9,0 % und Ackerstiefmütterchen 1,75 %

Der Gesamtdeckungsgrad der Unkräuter betrug 41,25 %. Mit Wirkungsgraden von 93-94 % bei den Versuchsgliedern 2, 4, 12 und 15 konnten keine befriedigenden Ergebnisse erzielt werden.

### 8.2.2 Ringversuch Herbizide Rehmsdorf 2013 – Versuchsglieder für Standardverunkrautung

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8.2.6 Ringversuch Herbizide Rehmsdorf 2013 – Bonitur 4 nach 3. NAK

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<th>Mittel</th>
<th>1. NAK 30. Apr.</th>
<th>2. NAK 08. Mai</th>
<th>3. NAK 29. Mai</th>
<th>Kultur- schäden (kg-l/ha)</th>
<th>Deckungsgrad (%) dominierende Unkräuter</th>
<th>DG UK (%)</th>
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<th>Variante</th>
<th>Mittel</th>
<th>1. NAK 30. Apr.</th>
<th>2. NAK 08. Mai</th>
<th>3. NAK 29. Mai</th>
<th>Kultur-schäden (%)</th>
<th>DG UK (%)</th>
<th>Deckungsgrad (%) dominierende Unkräuter</th>
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9 Fungizidversuche
9.1 Fungizidversuch Scheiplitz 2013

9.1.1 Versuchsbeschreibung

Der Fungizidversuch wurde im Jahr 2013 am Standort Scheiplitz bei Naumburg durchgeführt.

Die Ertragszahlen zeigten in den einzelnen Varianten bei meist geringem Befall positive Effekte durch die Fungizidmaßnahme. Aufgrund des einjährigen Versuchs an einem Standort dienen diese Ergebnisse nicht zur Verallgemeinerung.

Grundsätzlich muss unter Berücksichtigung der süddeutschen Standorte festgehalten werden, dass der Zeitpunkt der Fungizidapplikation einen größeren Einfluss auf den Bekämpfungserfolg ausübt als die Wahl des Fungizids. Bei Befallsstandorten mit sehr starkem Cercosporadruck konnte mit strobilurinhaltigen Fungiziden oft ein höherer Wirkungsgrad erreicht werden.

<table>
<thead>
<tr>
<th>Versuchsglieder RV Fungizide</th>
<th>VG</th>
<th>Wirkstoff</th>
<th>Datum</th>
<th>Aufwandmenge (l/ha)</th>
<th>Wartezeit (d)</th>
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<td>100 g/l Difenoconazol + 375 g/l Fenpropidin</td>
<td>01.08.13</td>
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<td>28</td>
</tr>
<tr>
<td>3 MCW 733 SC</td>
<td>3</td>
<td>200 g/l Picoxystrobin + 80 g/l Cyproconazol</td>
<td>21.08.13</td>
<td>1,0</td>
<td>(28)</td>
</tr>
<tr>
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<td>200 g/l Picoxystrobin + 80 g/l Cyproconazol</td>
<td>21.08.13</td>
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<td>(35)</td>
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<td>100 g/l Difenoconazol + 375 g/l Fenpropidin</td>
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<td>100 g/l Difenoconazol + 375 g/l Fenpropidin + 250 g/l Azoxystrobin</td>
<td>21.08.13</td>
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9.1.2 Ergebnisse der Bonituren auf Pilzkrankheiten am Standort Scheiplitz
Boniturnoten zum 07.10.2013

- Cercospora
- Ramularia
- Mehltau
- Rost

* Terminvariante Applikation am 01.08.+21.08.2013
9.1.3 Fungizidversuch Scheiplitz 2013 – Ertrag und Qualität

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<tr>
<th>Fungizide</th>
<th>Rübenertrag t/ha</th>
<th>Zuckergehalt % rel.*</th>
<th>BZG %</th>
<th>Ausbeutb. Zucker SMV % a.S.</th>
<th>BZE t/ha rel.*</th>
<th>K mmol/1000g Rüben</th>
<th>Na</th>
<th>Amino-N</th>
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<td>89,99 1,19</td>
<td>12,44 100,00</td>
<td>37,21</td>
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<td>89,85 1,19</td>
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<td>16,00</td>
<td>89,86 1,20</td>
<td>13,32 107,07</td>
<td>36,84</td>
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<td>17,75 99,23</td>
<td>15,95</td>
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* Verrechnungs-Mittel= Kontrolle
¹ Terminvariante mit einer zusätzlichen Fungizidapplikation
### 9.2 Fungizidversuche 2011-2013 – Ertrag und Qualität

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<th>Zucker gehalt</th>
<th>Berein. Zucker gehalt</th>
<th>Ausbeuterbarer Zucker</th>
<th>SMV</th>
<th>Zucker ertrag bereinigt</th>
<th>K</th>
<th>Na</th>
<th>Amino-N</th>
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<td>% rel.*</td>
<td>%</td>
<td>% %a.S.</td>
<td>%</td>
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<td>mmol/1000g Rüben</td>
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<tr>
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<tr>
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<td>12,68 105,9</td>
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* Verrechnungs-Mittel = Kontrolle = 100
Der Düngever such wurde im Jahr 2013 am Standort Rehmsdorf durchgeführt. Der Versuch besitzt zwei Faktoren. 1. Faktor ist Stickstoff mit sechs Versuchsgliedern 0, 40, 80, 120, 160 und 200 Kilogramm pro Hektar Stickstoff, der in Form von KAS gedüngt wurde. Der 2. Faktor Phosphor mit zwei Versuchsgliedern 0 und 100 Kilogramm pro Hektar (P₂O₅), der in Form von Tripelsuperphosphat gedüngt wurde. Alle Parzellen erhielten zusätzlich 300 Kilogramm pro Hektar K₂O in Form von 60er Kali als Ausgleichsdüngung. Der Dünger wurde vor der Saatbettbereitung ausgebracht und mit der Saatbettbereitung eingearbeitet (ca. 8 cm). Die Aussaat erfolgte 6 reihig auf 18 cm Endabstand am 15.04.2013 mit der Sorte Isabella KWS. Stickstoffgaben über 120 Kilogramm pro Hektar wurden geteilt und am 17.05.2013 nachgedüngt. Herbizid- und Fungizidmaßnahmen erfolgten Betriebsüblich.
### Laborergebnis - akkreditiert nach ISO/IEC 17025

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<th>Probenummer</th>
<th>Bodenart</th>
<th>Humus-%</th>
<th>Schwefel*</th>
<th>Stickstoff* N</th>
<th>Phosphor* P_1 / P_2</th>
<th>Kalium* K_1 / K_2</th>
<th>Calcium* Ca / Calc</th>
<th>Magnesium* Mg</th>
<th>Bor mg/1000 g</th>
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<td>0.7/1.5</td>
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### Versorgungstufe

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<th>A = sehr niedrig</th>
<th>A = sehr niedrig</th>
<th>C = anzu-streben</th>
<th>C = anzu-streben</th>
<th>E = sehr hoch</th>
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<th>Phosphat P_2O_5</th>
<th>Kali K_2O</th>
<th>Kalk CaO</th>
<th>Magnesium MgO</th>
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<td>1500</td>
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<td>Vorfrucht</td>
<td>Weizen/sonstge</td>
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## 10.4 Düngevorschlag Rehmsdorf 2013 – Ertrag und Qualität

<p>| Versuchs- | Anzahl | Rüben Ertrag | Zuckerertrag bereinigt | Bereinigter Zuckerertrag | Versuchsmittel |</p>
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<th>% rel.*</th>
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<tr>
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<td>104,7</td>
<td>71,2</td>
<td>107,4</td>
<td>18,93</td>
<td>101,52</td>
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*rel. 100 = 0 kg N/ha + 0 kg P$_2$O$_5$/ha

<p>| Versuchs- | Ausbeutbarer Zucker | SMV | Zuckerertrag bereinigt | K | Na | Amino-N |</p>
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<th>% a.S.</th>
<th>%</th>
<th>%</th>
<th>mmol/100g Rüben</th>
<th>mmol/100g Rüben</th>
<th>mmol/100g Rüben</th>
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<tbody>
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<td>------</td>
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*rel. 100 = 0 kg N/ha + 0 kg P$_2$O$_5$/ha
## Verzeichnis der verwendeten Abkürzungen

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<th>Abkürzung</th>
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<tr>
<td>t/ha</td>
<td>Tonnen pro Hektar</td>
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</tr>
<tr>
<td>u.</td>
<td>und</td>
</tr>
<tr>
<td>UK</td>
<td>Unkraut</td>
</tr>
<tr>
<td>V. Knöterich</td>
<td>Vogelknöterich</td>
</tr>
<tr>
<td>Verr.- Mittel</td>
<td>Verrechnungs-Mittel</td>
</tr>
<tr>
<td>Vers.- Mittel</td>
<td>Versuchs-Mittel</td>
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<tr>
<td>VG</td>
<td>Versuchsglied</td>
</tr>
<tr>
<td>W. Knöterich</td>
<td>Windenknöterich</td>
</tr>
<tr>
<td>WG</td>
<td>Wirkungsgrad</td>
</tr>
<tr>
<td>WP (2)</td>
<td>Wertprüfung (2)</td>
</tr>
<tr>
<td>z.T.</td>
<td>zum Teil</td>
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<tr>
<td>ZE</td>
<td>Zuckerertrag</td>
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<tr>
<td>ZG</td>
<td>Zuckergehalt</td>
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<td>ZR-Anbau</td>
<td>Zuckerrübenanbau</td>
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<tr>
<td>ZR-Nr.</td>
<td>Zuckerrüben- Kennnummer (BSA)</td>
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### Definitionen

<table>
<thead>
<tr>
<th>Merkmal</th>
<th>Abkürzung</th>
<th>Berechnung</th>
<th>Einheit</th>
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<tbody>
<tr>
<td>Rübenertrag</td>
<td>RE</td>
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<td>Zuckergehalt</td>
<td>ZG</td>
<td></td>
<td>°Z</td>
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<tr>
<td>Zuckerertrag</td>
<td>ZE</td>
<td>( ZE = \frac{\text{RE} \times \text{ZG}}{100} )</td>
<td>t/ha</td>
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<tr>
<td>Bereinigter Zuckerertrag</td>
<td>BZE</td>
<td>( \text{BZE} = \frac{\text{RE} \times (\text{ZG} - \text{AV})}{100} )</td>
<td>t/ha</td>
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<tr>
<td>Standardmelasseverlust</td>
<td>SMV</td>
<td>( \text{SMV} = 0,12 \times (\text{K} + \text{Na}) + 0,24 \times \text{AmN} + 0,48 )</td>
<td>% auf Rübe</td>
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<td>Ausbeuteverlust</td>
<td>AV</td>
<td>( \text{AV} = 0,12 \times (\text{K} + \text{Na}) + 0,24 \times \text{AmN} + 1,08 )</td>
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<tr>
<td>Kalium</td>
<td>K</td>
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<td>mmol/1000 g Rübe</td>
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<tr>
<td>Natrium</td>
<td>Na</td>
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<td>mmol/1000 g Rübe</td>
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<td>Amino-Stickstoff</td>
<td>AmN</td>
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<td>mmol/1000 g Rübe</td>
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<td>AZ</td>
<td>( \text{AZ} = \frac{(\text{ZG} - \text{AV}) \times 100}{\text{ZG}} )</td>
<td>% auf Saccharose</td>
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<tr>
<td>Trockenmasseertrag</td>
<td>TME</td>
<td>( \text{TME} = \text{TSG} \times \text{RE} )</td>
<td>t/ha</td>
</tr>
<tr>
<td>Trockensubstanzgehalt</td>
<td>TSG</td>
<td>( \text{TSG} = 1,16 \times \text{ZG} + 2,95 )</td>
<td>% auf Rübe</td>
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