Mar 2022

SEED FORWARD

grow better with

MAISGUARD®

RESULTS 2018 - 2022

WITH LIFEBLOOD AND FACTS

SHAPING THE FUTURE

New challenges need new approaches.

CHALLENGES Climate change, water and soil scarcity, disease and pest infestation

SOLUTIONS Protection and conservation of ecosystems.

OUR CONTRIBUTION

Bio-based seed treatments with biostimulants and bio-based plant protection with EU conformity

SEED FORWARD
grow better

MORE THAN A NUTRITION COCKTAIL

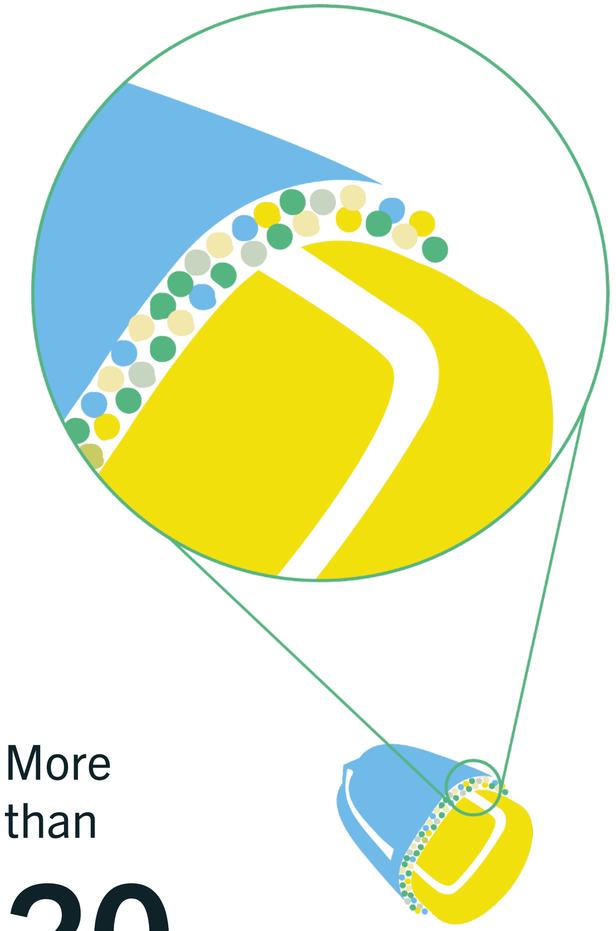
5x **more macro nutrients**
N, P, K, S, Mg, Ca

6x **more micro nutrients**
Mn, Zn, Mo, Fe, B, Cu

4x **more soil activators**
Humic acids, rock flour, plant extracts, silicon

8x **more biostimulants**
Organic acids, microorganisms, plant extracts (incl. algae), humic acids, silicon, technical additives as support

Values compared to other seed treatments on a nutrient or biostimulant base. Effects may depend on seed, soil and environmental factors.
As of: 08/2022



More than

20

selected and carefully balanced **active ingredients and nutrients!**

EFFECTS IN KEY FIGURES

230 trials from 2018 – 2022

grow better with MAISGUARD®

+ 3.5%

germinating power

[average]

+ 11%

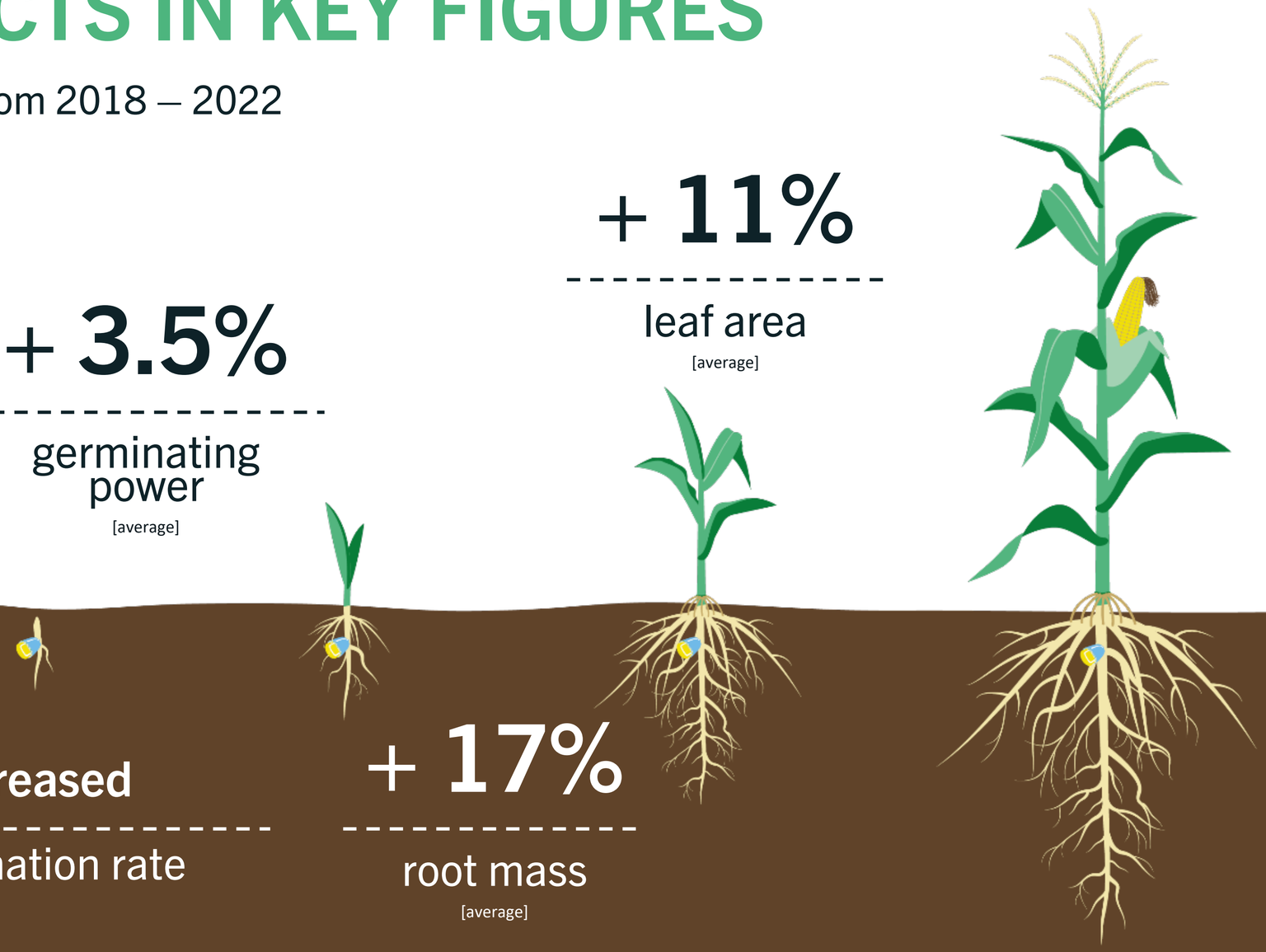
leaf area

[average]

+ 4.5%

additional yield

[average]



increased

germination rate

+ 17%

root mass

[average]

Values in comparison with trials with standard seed treatments, depending on seed, soil and environmental factors. 03/2022

MAIN FACTS

Convincing product quality.

CROP ESTABLISHMENT

Improved **field emergence** due to stronger **shoot power and germination capacity**

NUTRITIONAL EFFICIENCY

More efficient **resource usage** through greater **root mass** and thus improved **nutrient and water absorption**

VITALITY

Stress-resistant **crop development** in all growth phases, thus providing best preconditions for **assured yield stability**

PRIMARY EFFECTS

FIELD EMERGENCE AND YOUTH DEVELOPMENT

Nothing can replace a good start.

grow better with MAISGUARD®

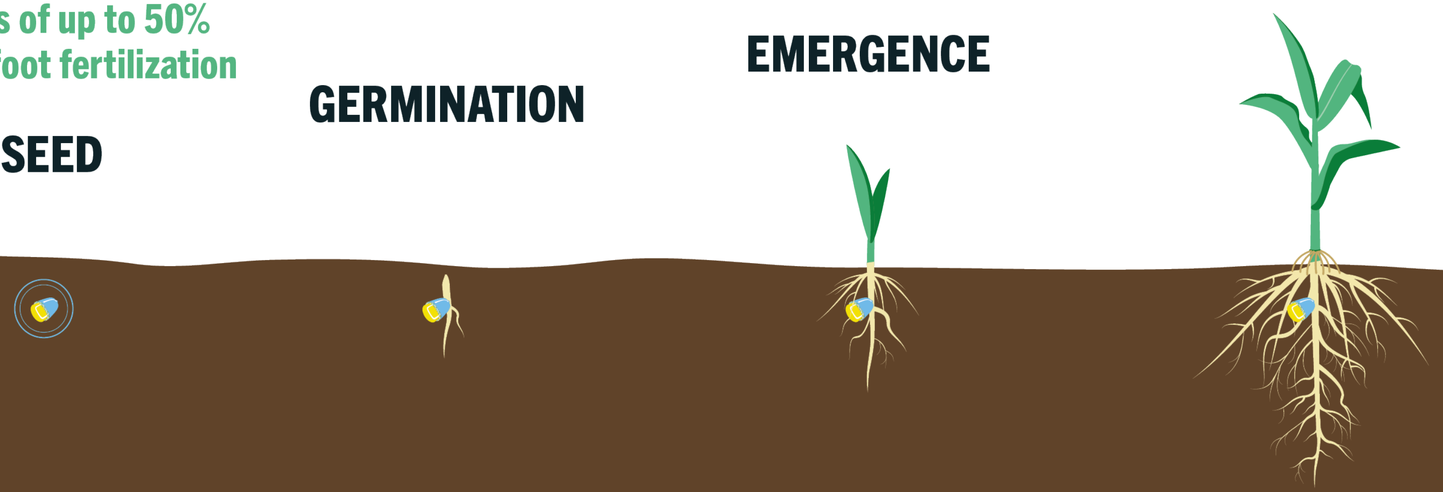
Savings of up to 50%
P-underfoot fertilization

SEED

GERMINATION

EMERGENCE

YOUTH DEVELOPMENT



effects & active ingredients

improved swelling
due to natural absorbers (rock dust)

increased germination speed & germination power
due to organic acids and technical additives

secured field emergence
due to various different plant extracts (a.o. algae)

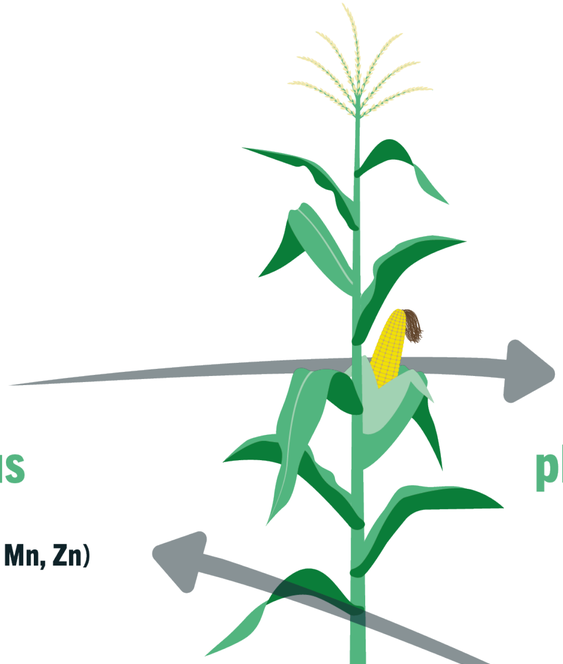
increased root mass, larger root surface
due to humic substances and plant extracts (a.o. algae)

RESULT:
IMPROVED NUTRIENT ABSORPTION

SECONDARY EFFECTS
NUTRIENT ABSORPTION

Long-term benefits up until harvest.

grow better with MAISGUARD®



higher nutrient status

- measurable through -
NPK + S, micronutrients (Mg, Mn, Zn)

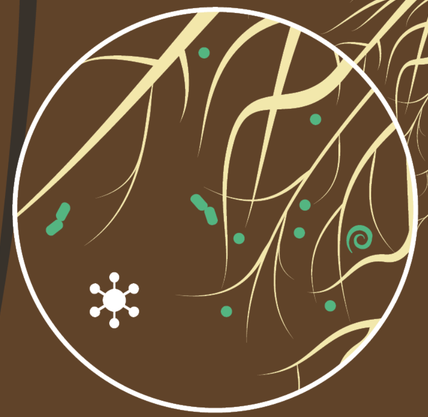
improved photosynthetic power

- measurable through -
LAI/leaf coverage per m²

larger root surface

creates greater **habitat for microorganisms** that contribute to stimulating of root exudation and exploiting / divining of **immobile nutrients**

- measurable through -
root mass and root surface



more intense soil access

leads to increased **absorption of available nutrients**

improved water supply

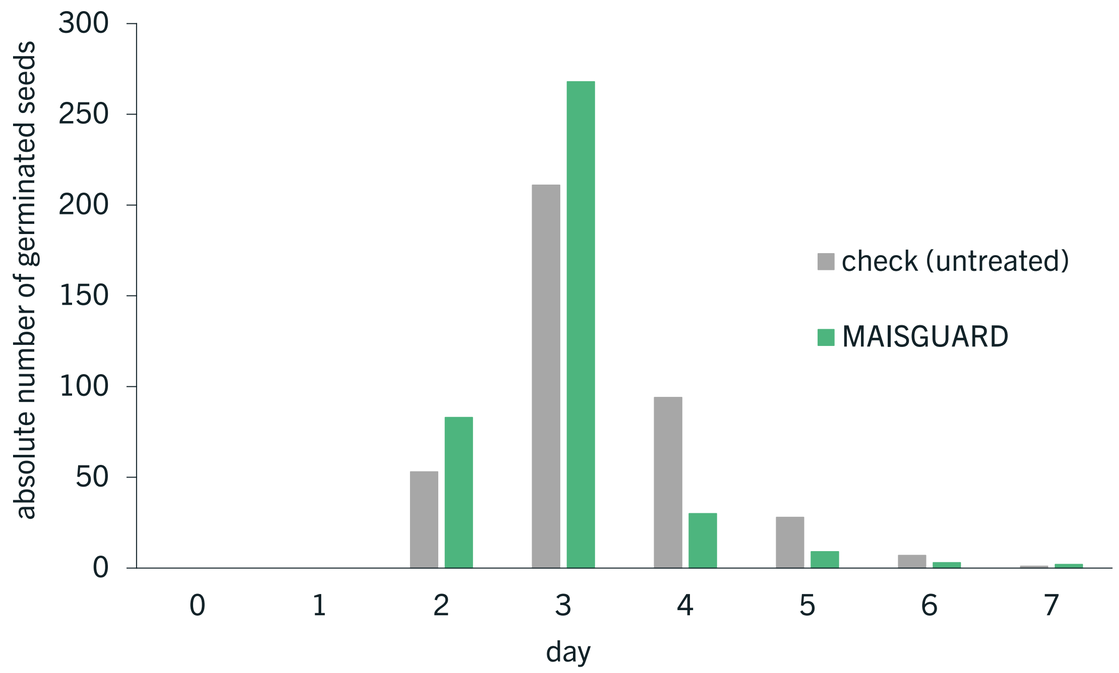
RESULTS IN DETAIL 2018 - 2022

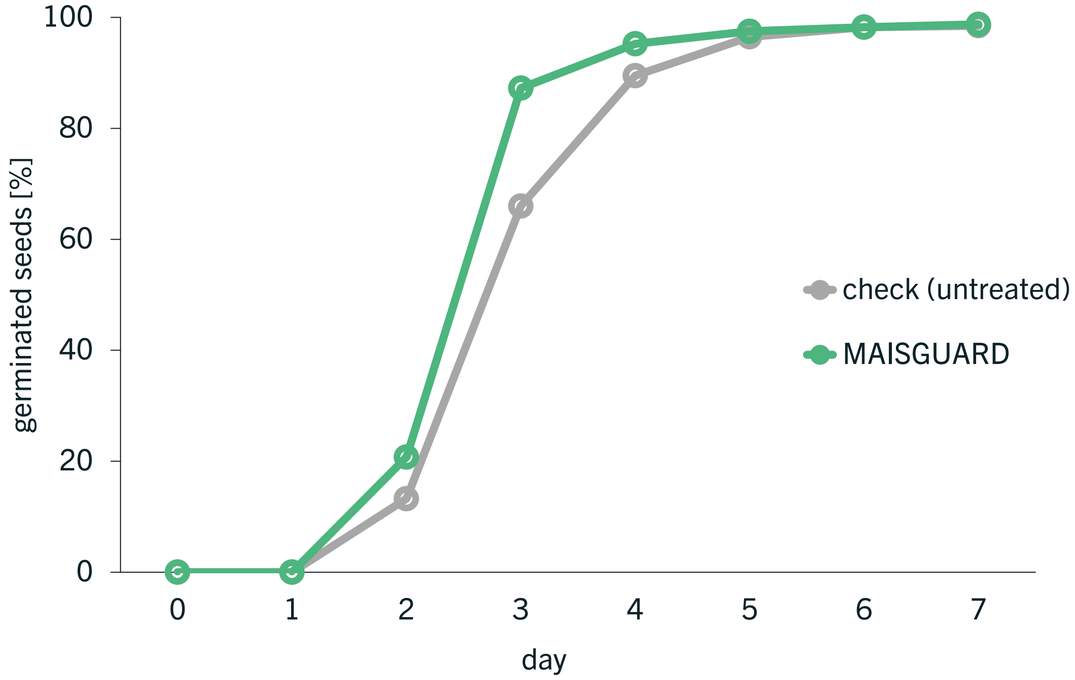
01 GERMINATION WITH MAISGUARD

- More than 20 carefully selected active ingredients and nutrients ensure the activation of numerous enzymes. These are involved in metabolism already during germination.
- Each individual active ingredient supports plant growth on its own way. Moreover, it is enhanced by the interaction with other active ingredients.
- To investigate germination behavior independent analyses between 2018 and 2021 were made. Seeds treated with MAIS**GUARD** germinated faster compared to untreated check.
- In addition to an accelerated germination the total germination capacity of seeds could be increased with MAIS**GUARD**. This was even shown in independent trials with seeds of comparatively low quality.

GERMINATION WITH MAISGUARD

Germination frequency of a seed lot with **high** germination capacity

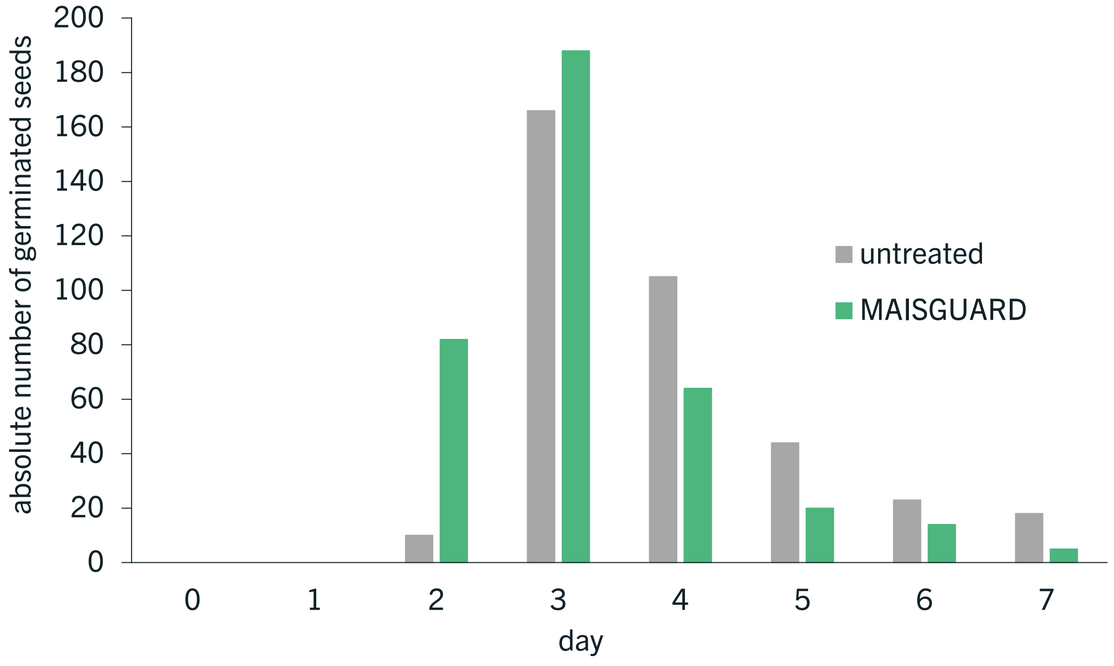


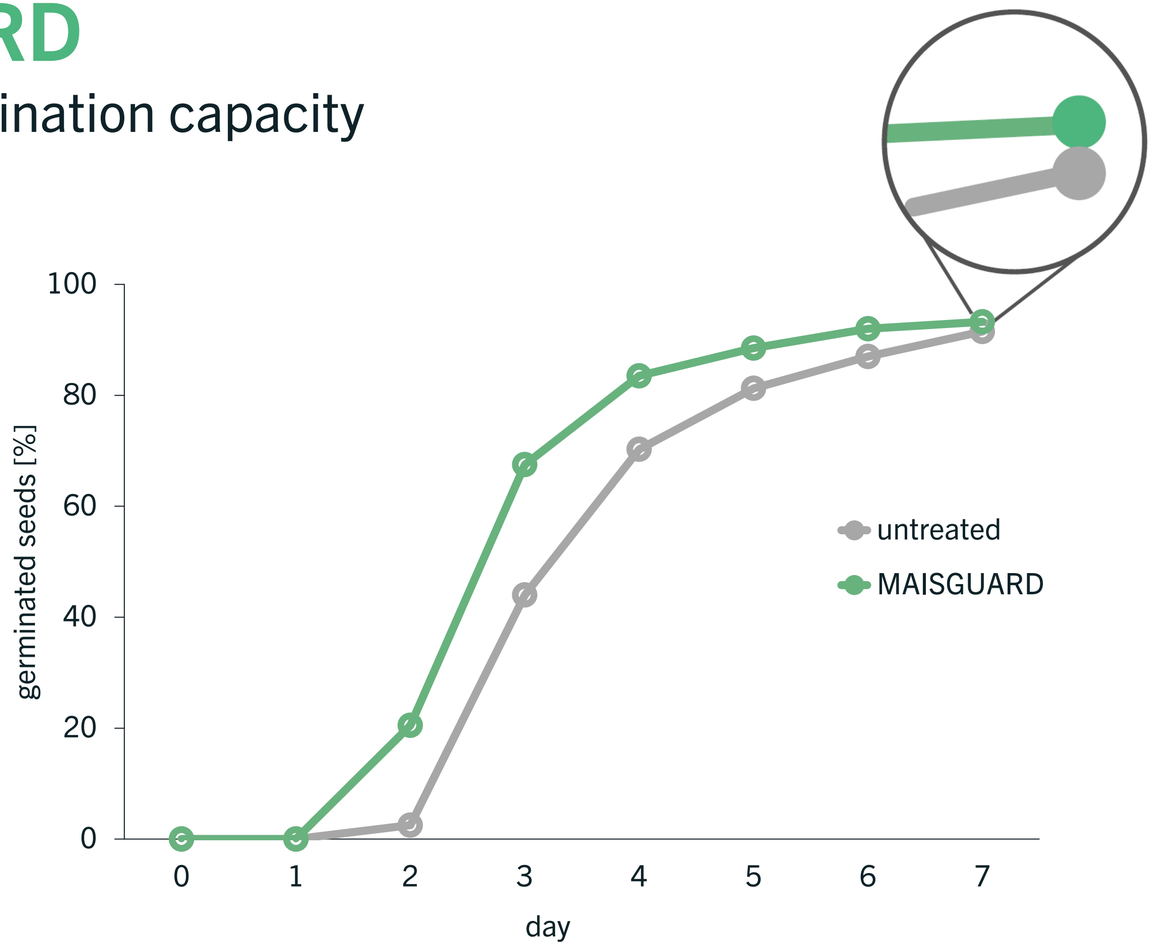


- **Accelerated germination** with MAIS**GUARD** compared to the untreated control with equal germination capacity (98%)
- n = 400 seeds per treatment of a seed lot with a **high** germination capacity, under laboratory conditions

GERMINATION WITH MAISGUARD

Germination frequency of a seed lot with **low** germination capacity





- **Accelerated germination** as well as **increased germination capacity** of 2.2% with MAIS**GUARD** (total 93.2%) compared to the untreated control (91%)
- n = 400 seeds per treatment of a seed lot with a **low** germination capacity, under laboratory conditions

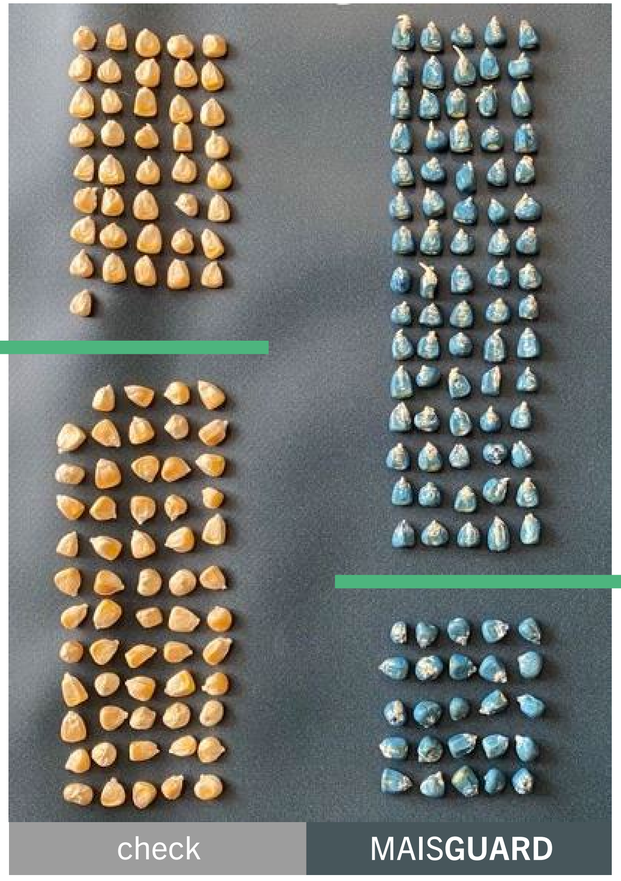
GERMINATION WITH MAISGUARD

Germination studies

After 68 hours

41%

of the seeds germinated



After 68 hours

75%

of the seeds germinated

- In germination tests accelerated germination was observed with MAIS**GUARD**.

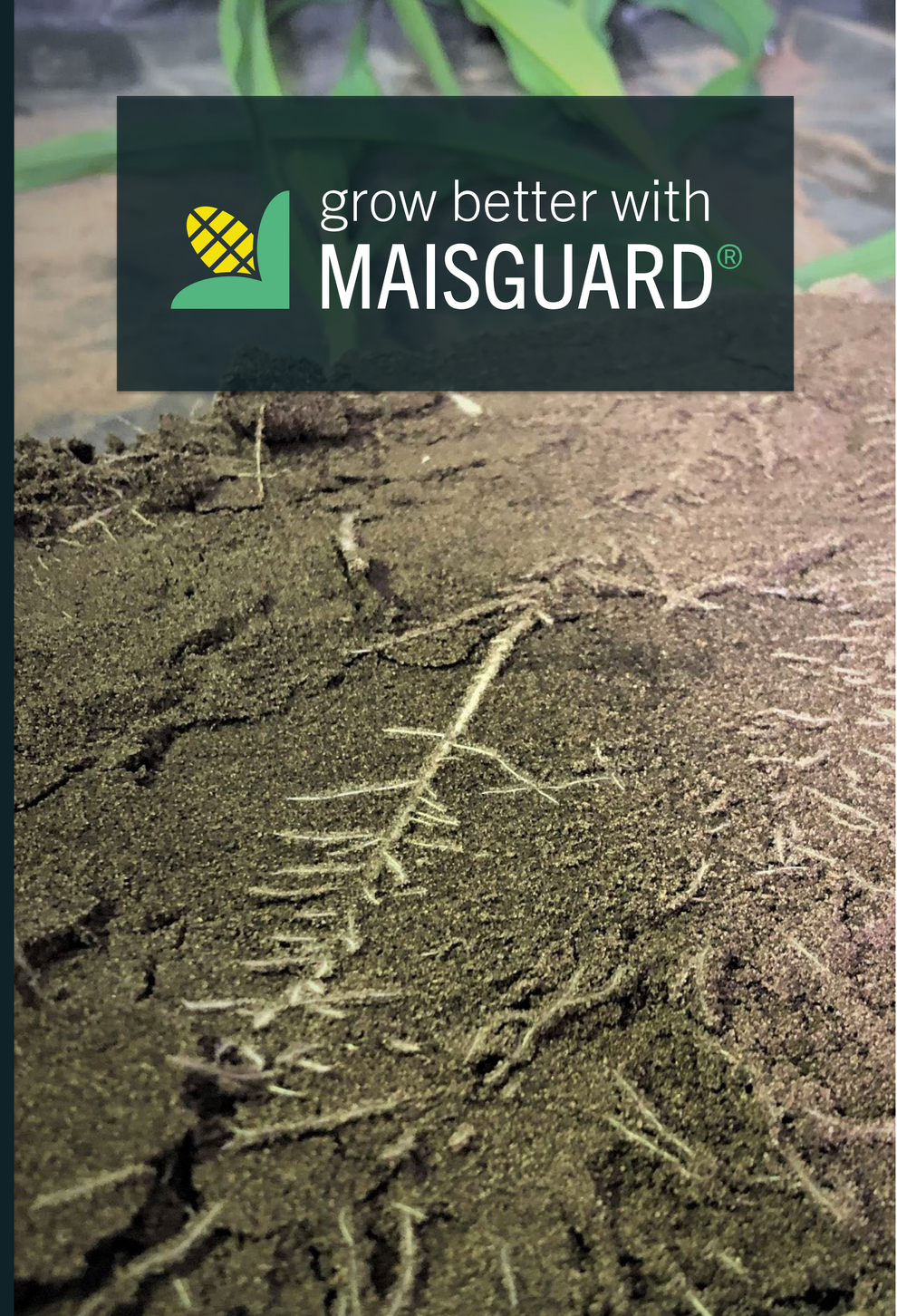
After 68 hours:

- Check (untreated):
  41% of seeds germinated.

- MAIS**GUARD**:
  75% of seeds germinated.

02 ROOT DEVELOPMENT WITH MAISGUARD

- Both in indoor and field trials, root growth with MAIS**GUARD** is visibly enhanced.
- The formation of a higher root mass is stimulated by active ingredients of MAIS**GUARD**.
- Right from the start, finer roots ensure more efficient access to water and nutrients.
- The increased root surface creates additional active habitat for microorganisms living in the rhizosphere. This can further improve plant growth.
- Over the last four years, improved root architecture and higher root biomass was observed in both, indoor and field trials.



ROOT DEVELOPMENT IN THE FIELD

FIELD TRIAL BRAMSCHE (LOWER SAXONY) 2020

check | MAISGUARD

FELD TRIAL WARENDORF (NRW) 2020

check | MAISGUARD

FIELD TRIAL CHAMBER OF AGRICULTURE (LOWER SAXONY) 2020

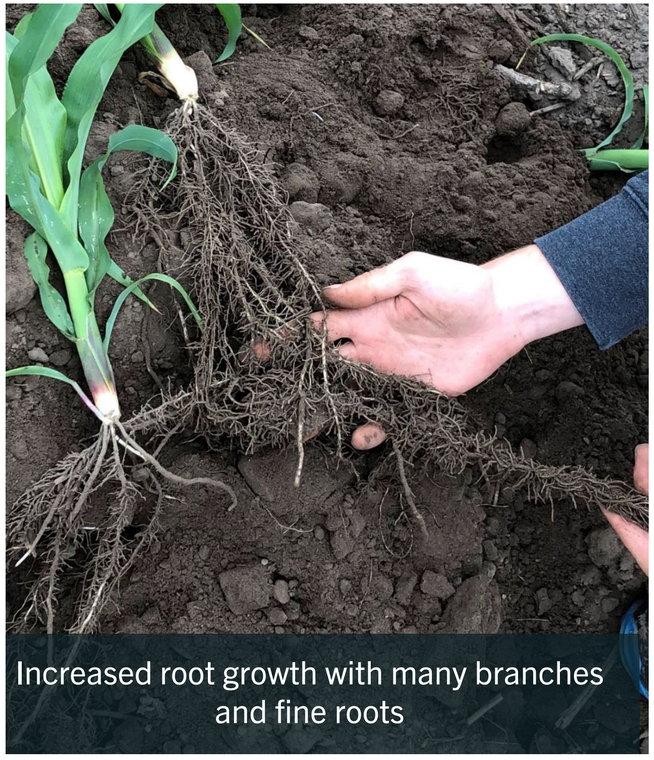
check | MAISGUARD

INCREASED ROOT GROWTH

check | MAISGUARD

- **Increased root growth with higher amount of fine roots**
  for a more efficient nutrient and water uptake

check | MAISGUARD

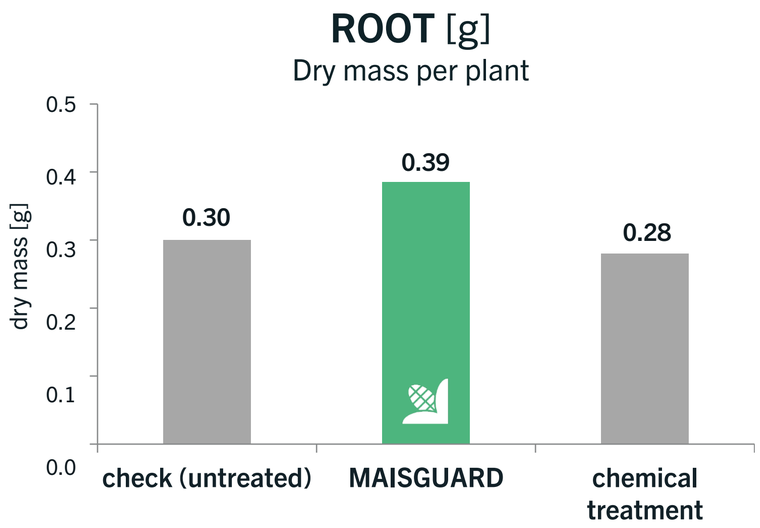


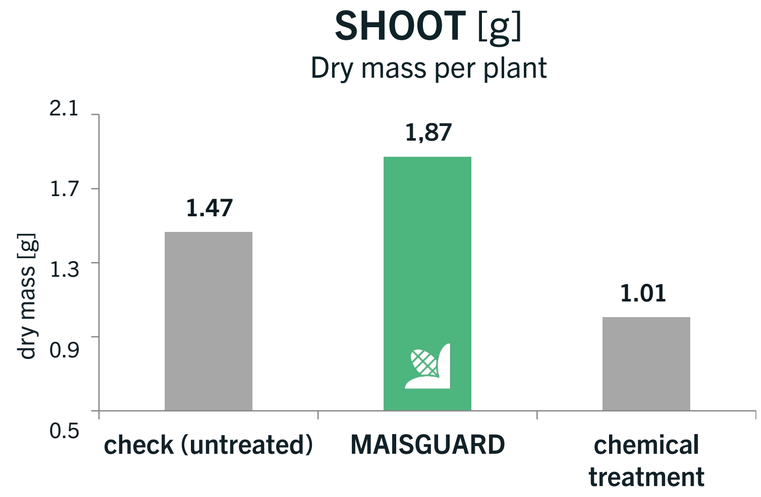
Increased root growth with many branches and fine roots

ROOT- AND SHOOT-DEVELOPMENT WITH MAISGUARD

Results of a bachelor thesis conducted at University of Applied Sciences Osnabrück, 2020

- Plot trial with n = 5 repetitions per treatment, analysis at BBCH 13
- Untreated and MAIS**GUARD** without chemical treatment
- Compared to the check (untreated) and chemical treatment, plants treated with MAIS**GUARD** showed a higher root and shoot biomass at BBCH 13.
- The better plant growth with MAIS**GUARD** was also confirmed in the yield measurements (cf. p. 21).





Bachelor thesis Finn Meyer, University of applied sciences Osnabrück, 2020: Investigations on the biological seed dressing "MAIS**GUARD**" as a possible alternative to conventional seed treatment in corn cultivation (*Zea mays*)

03 YOUTH DEVELOPMENT WITH MAISGUARD

- Especially under cold conditions corn shows a relatively slow development at the beginning of plant growth.
- The biostimulants contained in MAIS**GUARD** activate the plant metabolism already at germination and stimulate plant growth.
- Existing resources can be used more effectively for the formation of biomass due to better root performance. Improved ability of water and nutrient uptake ensures increased stress stability in the further development.
- Classic under-foot fertilization in corn improves nutrient uptake and increases root formation, especially due to the local placement of fertilizer. However, in view of the latest fertilizer regulation , the phosphorus quantity must be reduced in many places, especially in regions with high livestock numbers.
- In 2019 and 2020, field trials treated with MAIS**GUARD**, showed same or even slightly higher yields while P under-foot fertilization was reduced by half (cf. pp. 18 and 19). This results from more intensive root growth as well as metabolic activation by MAIS**GUARD**. Hence, plants have an improved access to nutrient reserves in the soil.

YOUTH DEVELOPMENT IN THE FIELD

PLOT TRIAL
CAPPELN (LOWER SAXONY), 2020

check | MAIS**GUARD**

TRIALS OF CHAMBER OF AGRICULURE (SCHLESWIG-HOLSTEIN), 2020

check | MAIS**GUARD**

TRIALS OF CHAMBER OF AGRICULTURE (LOWER SAXONY), 2020

check | MAIS**GUARD**

HIGHER STRESS STABILITY

until harvest

check | MAIS**GUARD**

check | MAIS**GUARD**

- 2020: high temperatures with low precipitation
- Plants treated with MAIS**GUARD** remained significantly greener and more vital until harvest
- Improved water and nutrients uptake resulted in more stress-stable plants.

Strip trial: Stuvenborn, Schleswig-Holstein, 2020

04 YIELD WITH MAISGUARD

- The complex composition of MAIS**GUARD** sustainably ensures a more stress-resistant development in all growth stages and creates the best conditions for a high yield.
- Improved root growth as well as accelerated metabolic activities leads to a higher performance and increased utilization of available resources. - from germination to harvest
- In 2018 – 2021, better crop development with MAIS**GUARD** resulted in an increased yield up to 10% compared to the standard treatment.
- In addition to higher yields, a higher energy yield could also be achieved with MAIS**GUARD** Bio.

YIELD WITH MAISGUARD

Results of a bachelor thesis conducted at Hochschule Osnabrück University of applied sciences.

TREATMENT	YIELD (dry weight) [dt/ha]	GROWTH HEIGHT [cm]	COMMENT
check	99.10	270.60	corn smut
MAISGUARD - without chemical treatment-	105.68	285.00	no corn smut
chemical treatment	102.91	277.40	no corn smut

Further results of the experiment analyzing shoot and root mass at BBCH 13 are shown on p.11.

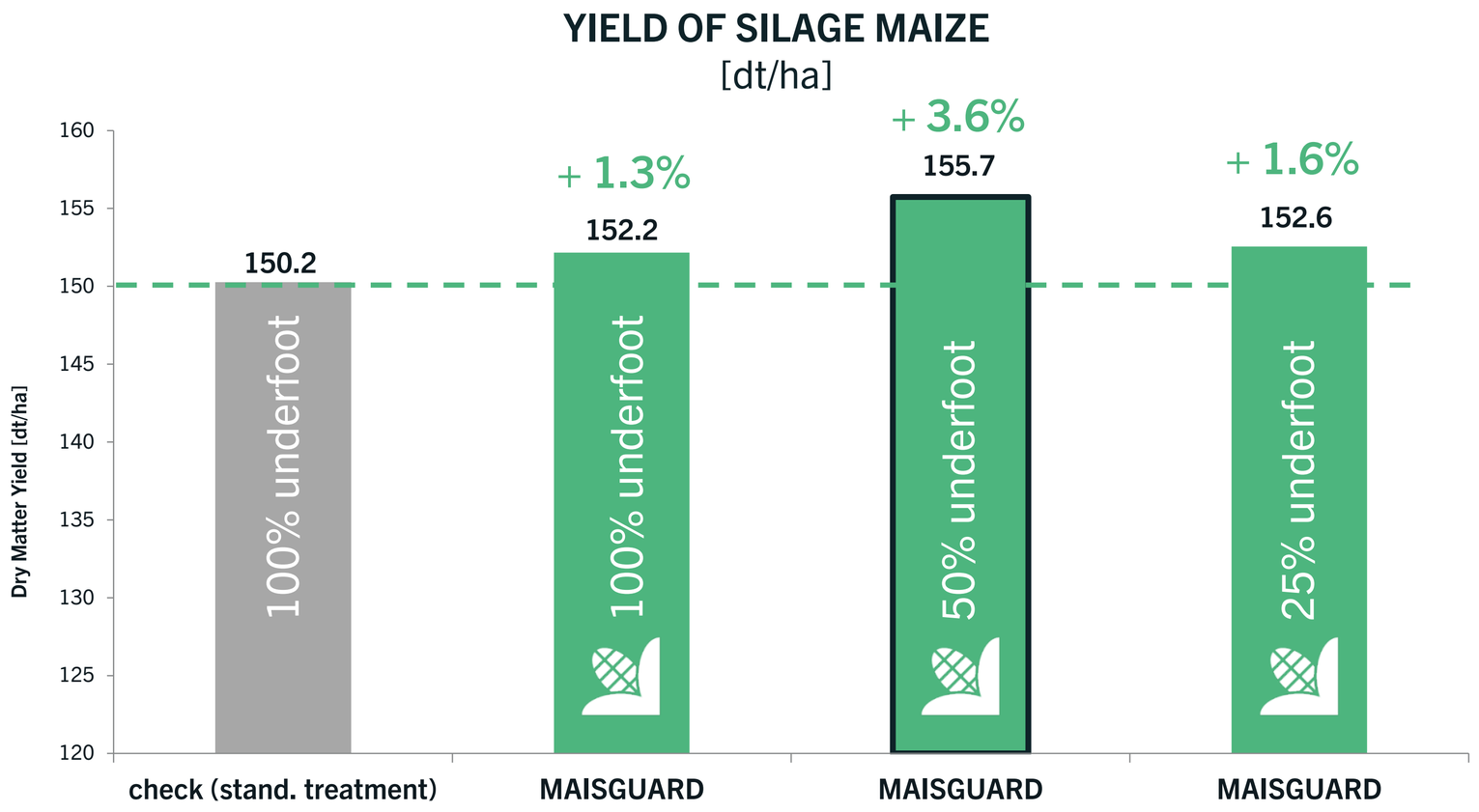
Plot trial with n = 5 repetitions per treatment; check and MAISGUARD without chemical treatment

Bachelor thesis of Finn Meyer, Hochschule Osnabrück University of applied sciences, 2020:
Investigations on the bio-based seed treatment "MAISGUARD" as a possible alternative to conventional seed treatments

YIELD WITH MAISGUARD

grow better with MAISGUARD®

with reduced NP-underfoot fertilization in plot trials, Huntlosen 2022



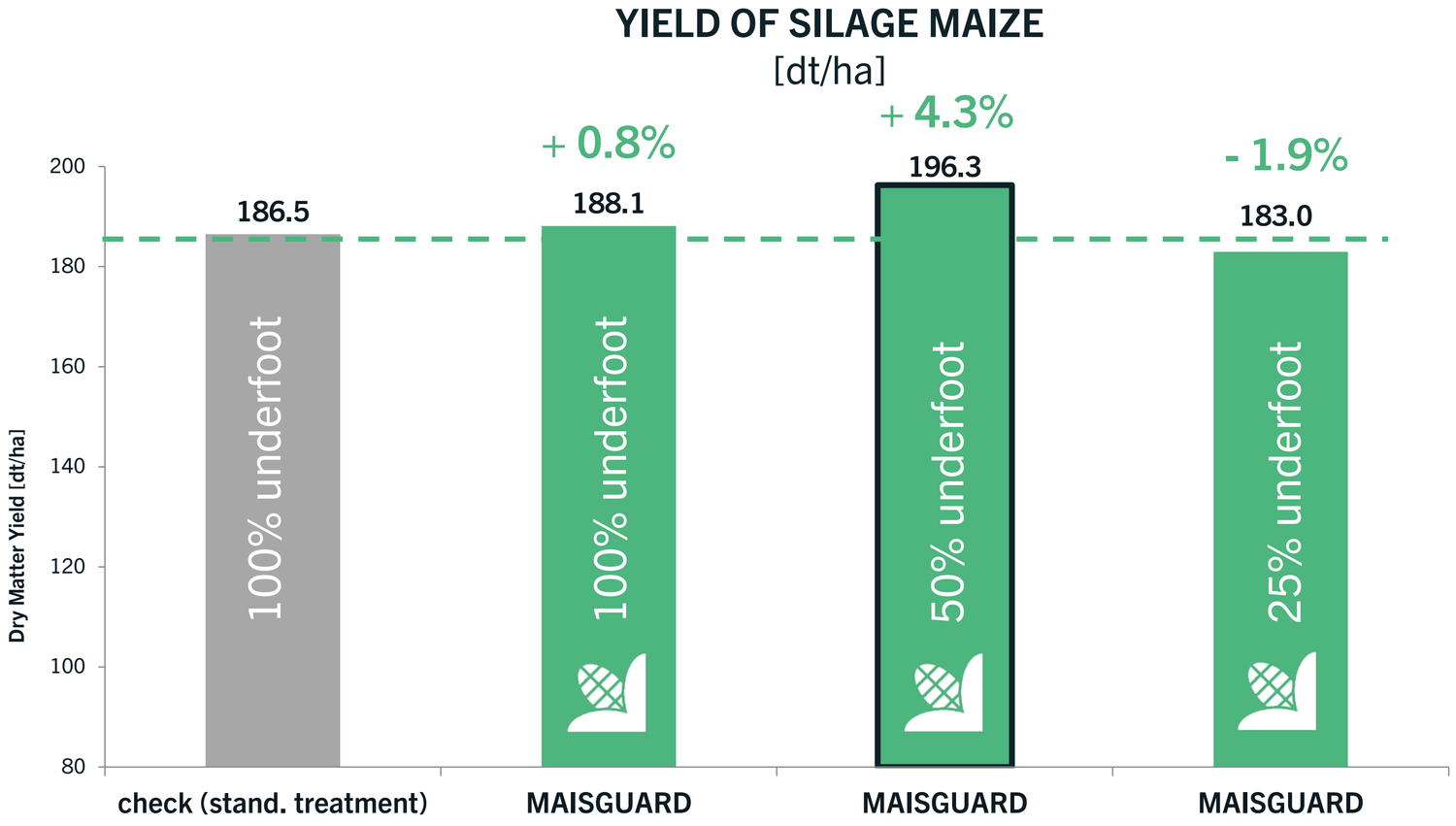
Variety: Farmirage, Standard treatment: Prothioconazol, Metalaxyl
Huntlosen, 2022
Plot trials, n=5 repetitions per variety
Field trial manager: Plantus GbR

NP-Fertilizer (20|20)
100% = 200 kg/ha

YIELD WITH MAISGUARD

grow better with MAISGUARD®

with reduced NP-underfoot fertilization in plot trials, Greven 2022



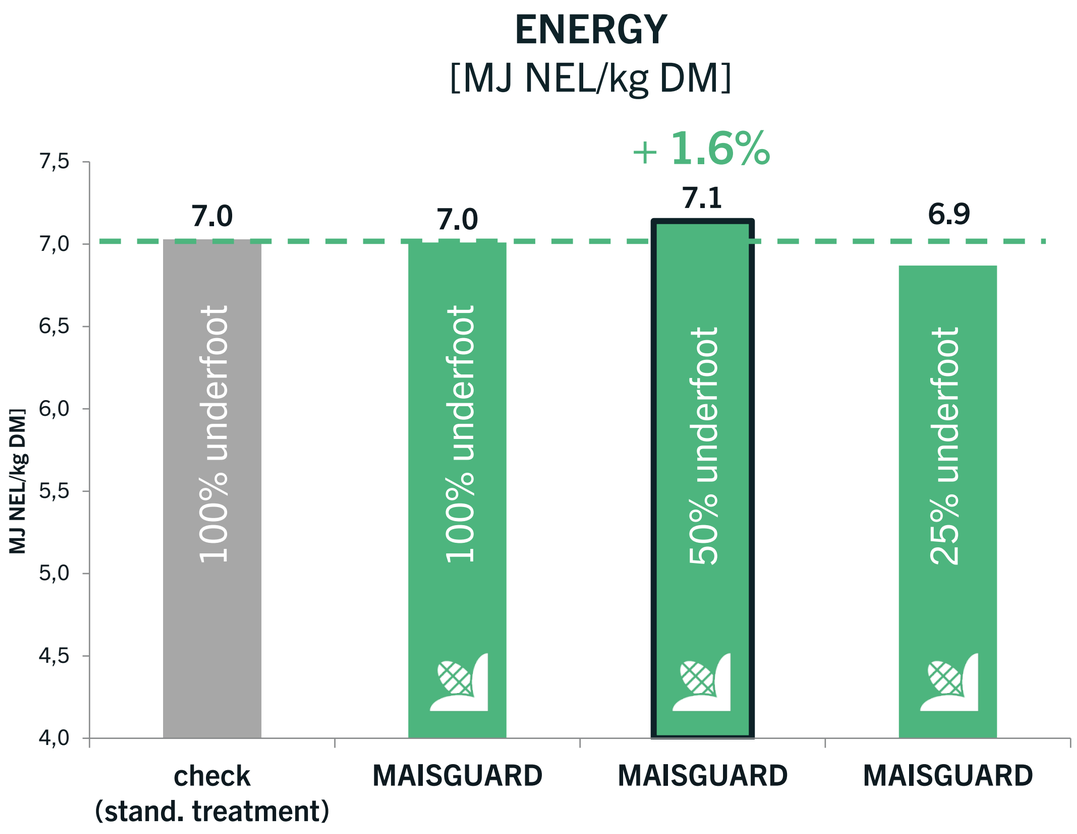
Variety: Farmirage, Standard treatment: Prothioconazol, Metalaxyl
Greven, 2022
Plot trials, n=5 repetitions per variety
Field trial manager: SW Feldversuche

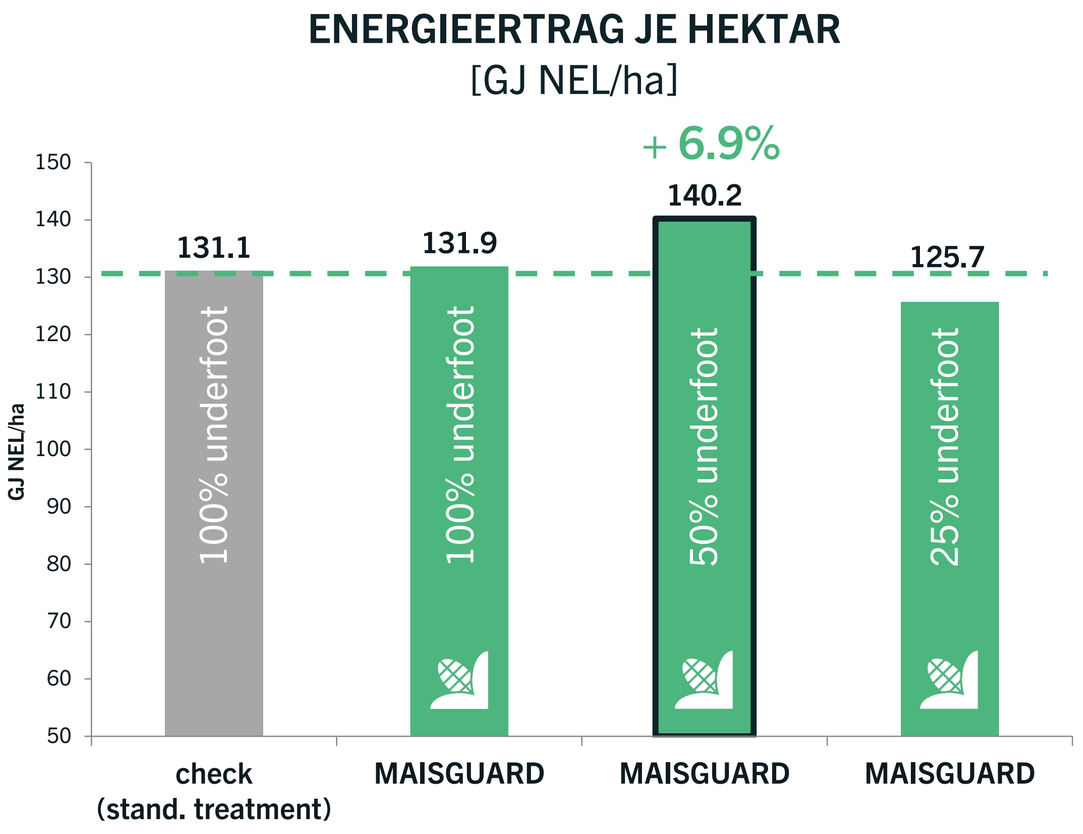
NP-Fertilizer (28|12 (10))
100% = 150 kg/ha

FODDER VALUE WITH MAISGUARD

grow better with MAISGUARD®

with reduced NP-underfoot fertilization in plot trials, Greven 2022





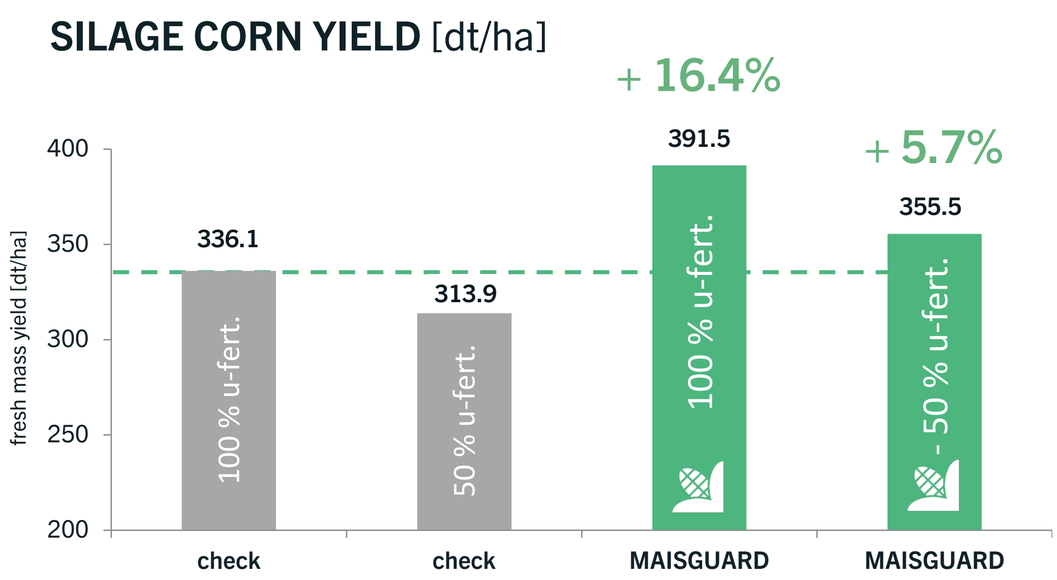
Variety: Farmirage, Standard treatment: Prothioconazol, Metalaxyl
Greven, 2022
Plot trials, n=5 repetitions per variety
Field trial manager: SW Feldversuche

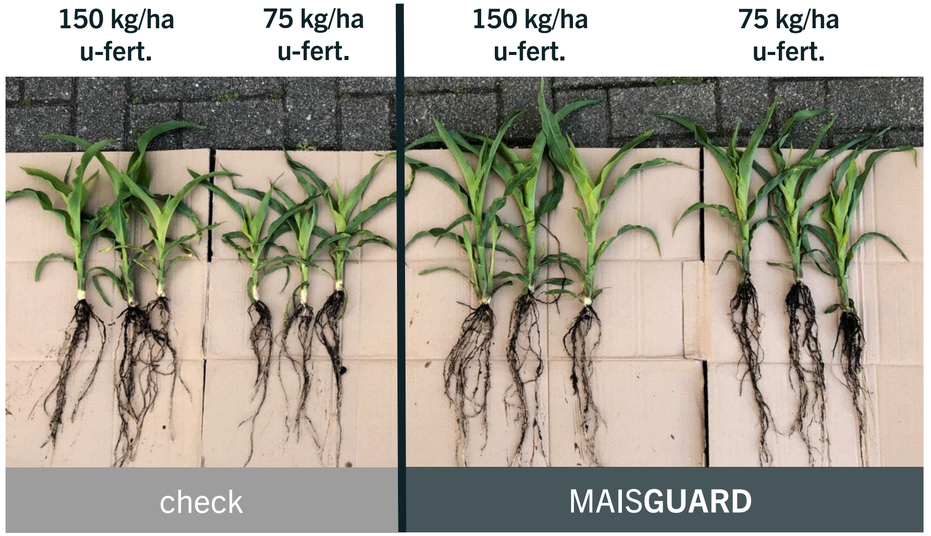
NP-Fertilizer (28|12 (10))
100% = 150 kg/ha

STRIP TRIAL

Reduction of P underfoot fertilization, 2020

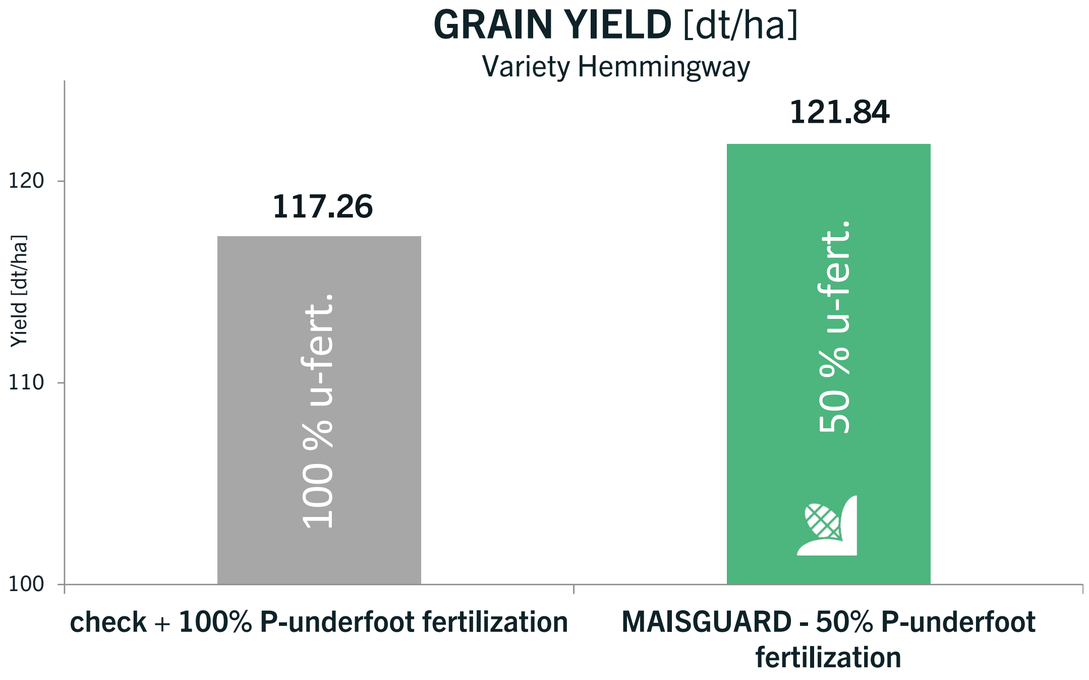
- Strip trial
- Trial question: Is a reduction of under-foot fertilization possible with MAIS**GUARD**?
- Location: Stuvenborn, Schleswig-Holstein, light soil conditions
  Variety: ES AMULET, NP-underfoot fertilizer 12 | 27
- Treatments: check and MAIS**GUARD**, respectively with 150 and 75 kg/ha underfoot fertilizer
- Observations: Under-foot fertilization reduced by half (75 kg/ha) in combination with MAIS**GUARD** showed no differences in the above-ground development of the individual plants compared to the check with 150 kg/ha under-foot fertilization. Due to better root development and growth-promoting effect of MAIS**GUARD**, soil resources could be utilized more effectively.
- Results: The plants treated with MAIS**GUARD** were able to utilize the resources better than standard treated plants. With MAIS**GUARD**, yield in both fertilization treatments could be maintained or additionally increased by 5% and 16%, compared to the standard treatment with 150 kg under-foot fertilizer.

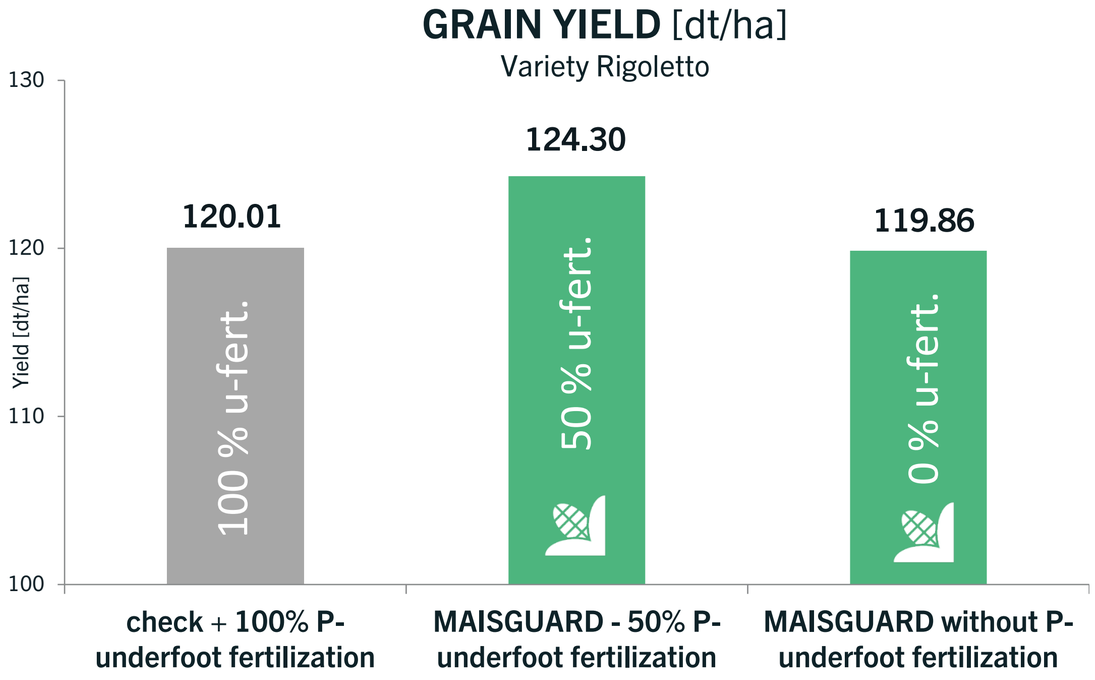




STRIP TRIAL

Reduction of P underfoot fertilization, 2019



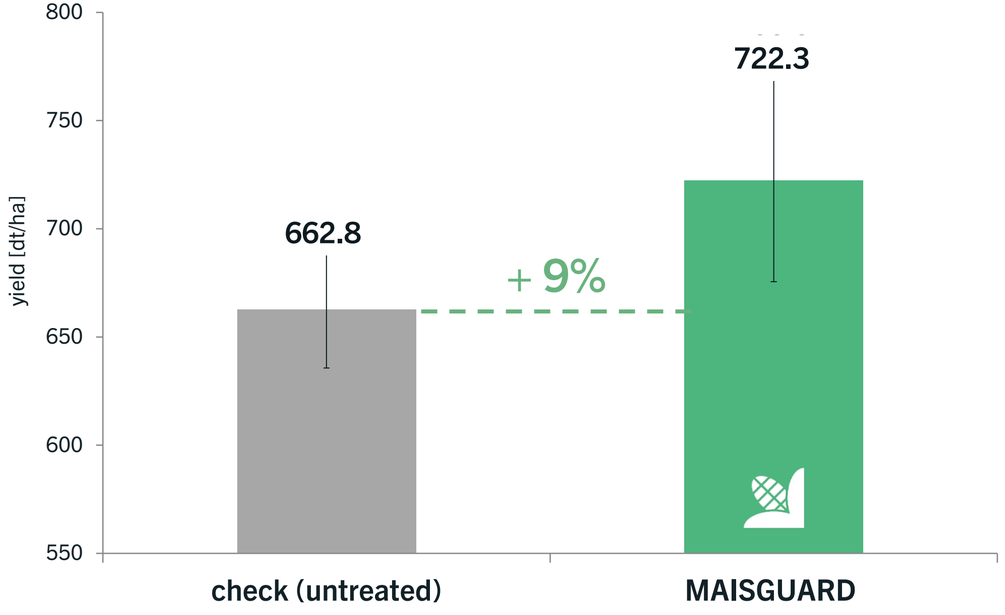


Osnabrück (North Rhine-Westphalia), 2019

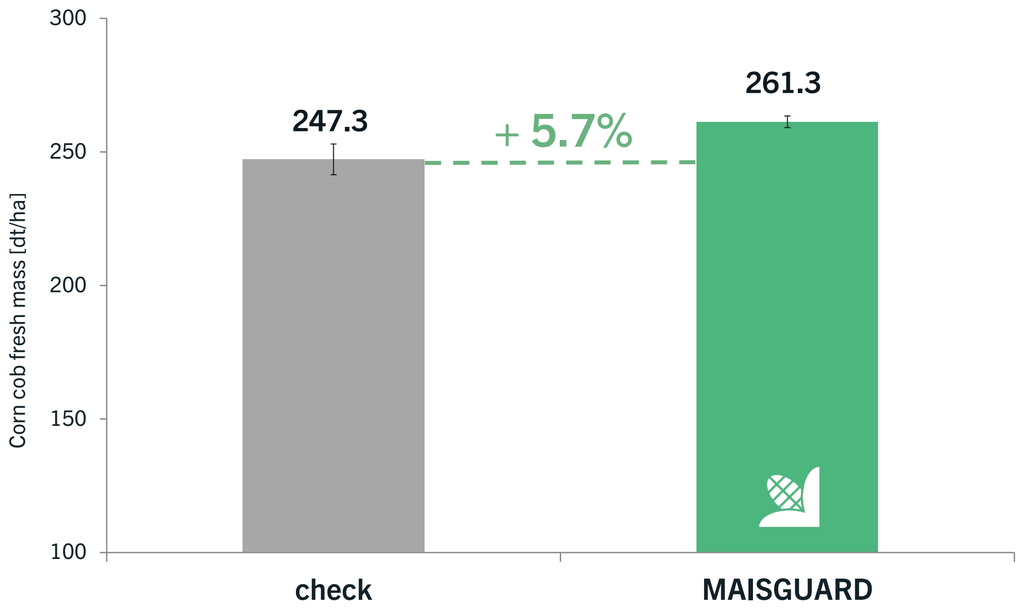
YIELD WITH MAISGUARD 2021

Strip trial in Milte (North Rhine-Westphalia)

FRESH MASS YIELD [dt/ha]
silage corn



CORN COB FRESH WEIGHT
[corn + spindle]

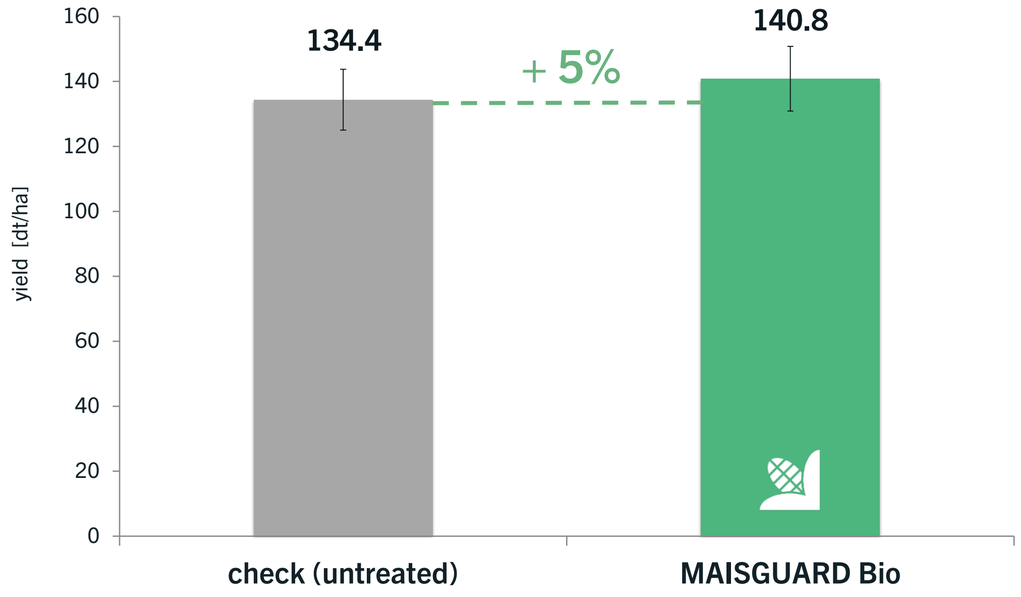


Variety: LG + chemical treatment (Ziram) / MAIS**GUARD** + chemical treatment
Milte (North Rhine-Westphalia), 2021
Strip trial, n = 3 repetitions per treatment
Field trial manager: farmer

YIELD WITH MAISGUARD 2021

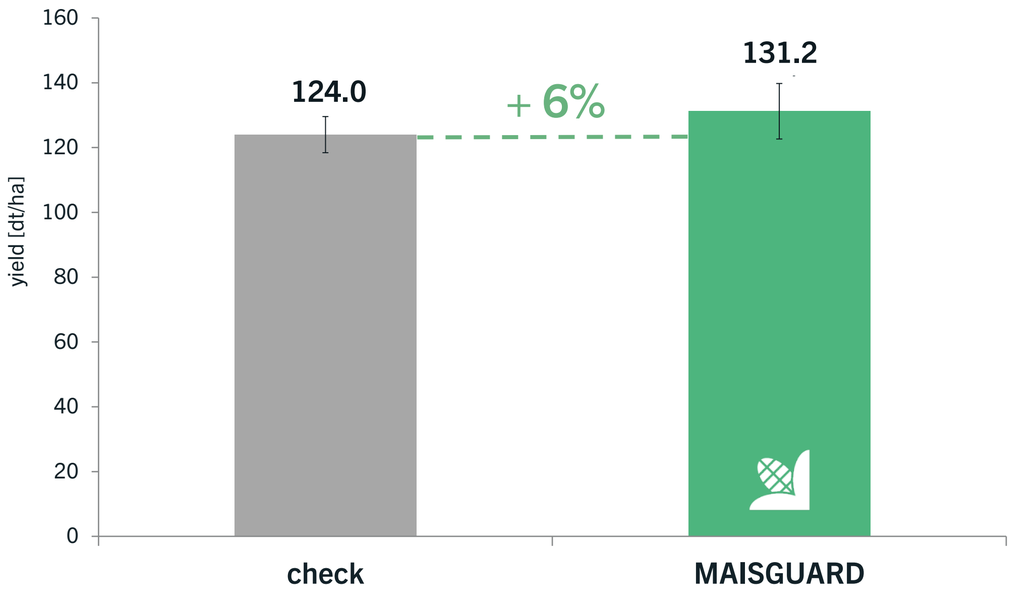
Plot trials in Everswinkel (North Rhine-Westphalia)

GRAIN YIELD [dt/ha]
grain corn, 14% humidity



Variety: Farmirage, MAIS**GUARD Bio** without chemical treatment
Everswinkel (North Rhine-Westphalia), 2021
Plot trial, n = 3 repetitions per treatment
Field trial manager: Staphyt GmbH

GRAIN YIELD [dt/ha]
grain corn, 14% humidity

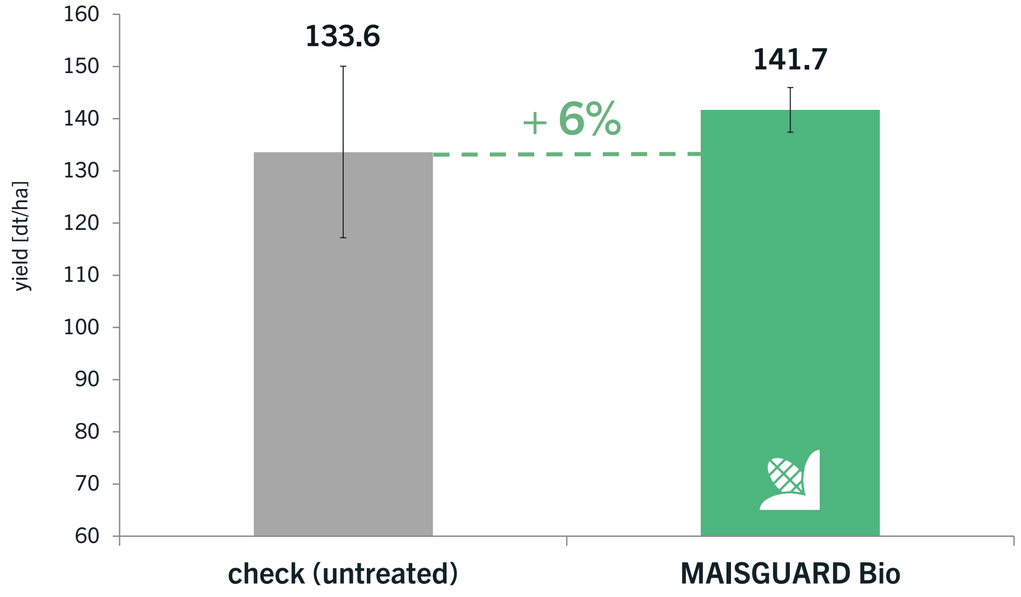


Variety: Farmirage + chemical treatment (Prothioconazol, Metalaxyl) / MAIS**GUARD** + chemical treatment
Everswinkel (North Rhine-Westphalia), 2021
Plot trial, n = 3 repetitions per treatment
Field trial manager: Staphyt GmbH

YIELD WITH MAISGUARD 2021

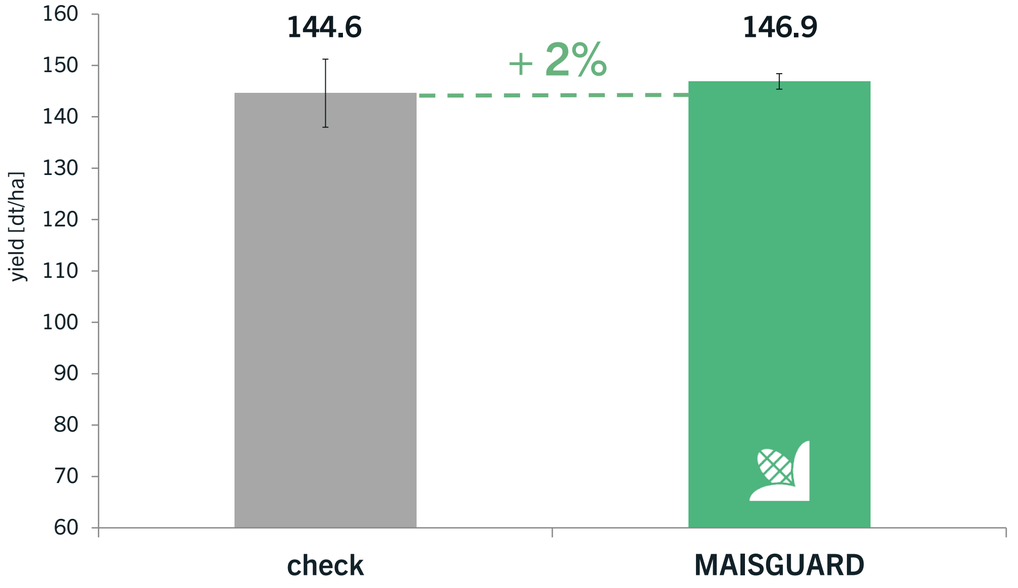
Plot trials in Everswinkel (North Rhine-Westphalia)

GRAIN YIELD [dt/ha]
grain corn, 14% humidity



Variety: Farmoritz, MAIS**GUARD Bio** without chemical treatment
Everswinkel (North Rhine-Westphalia), 2021
Plot trial, n = 3 repetitions per treatment
Field trial manager: Staphyt GmbH

GRAIN YIELD [dt/ha]
grain corn, 14% humidity

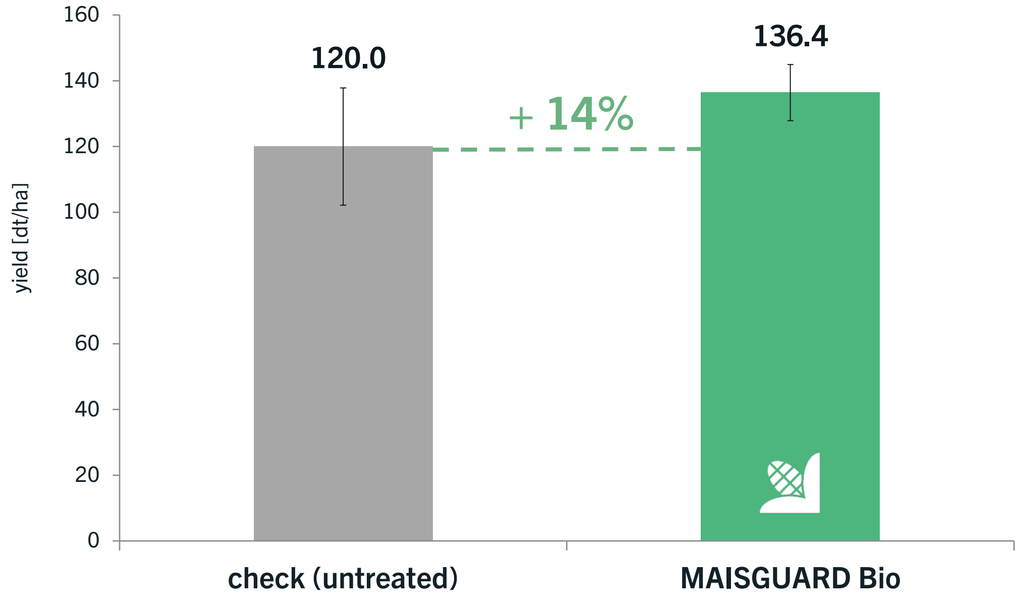


Variety: Farmoritz + chemical treatment (Prothioconazol, Metalaxyl) / MAIS**GUARD** + chemical treatment
Everswinkel (North Rhine-Westphalia), 2021
Plot trial, n = 3 repetitions per treatment
Field trial manager: Staphyt GmbH

YIELD WITH MAISGUARD 2021

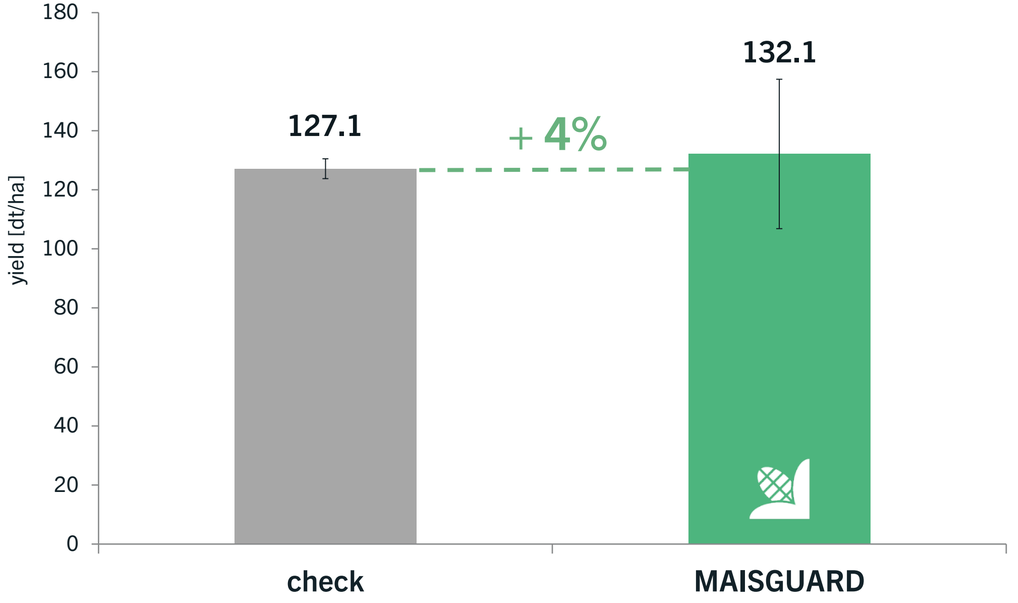
Plot trials in Großräschen (Brandenburg)

GRAIN YIELD [dt/ha]
grain corn, 14% humidity



Variety: Farmirage, MAIS**GUARD Bio** without chemical treatment
Großräschen (Brandenburg), 2021
Plot trial, n = 3 repetitions per treatment
Field trial manager: Staphyt GmbH

GRAIN YIELD [dt/ha]
grain corn, 14% humidity

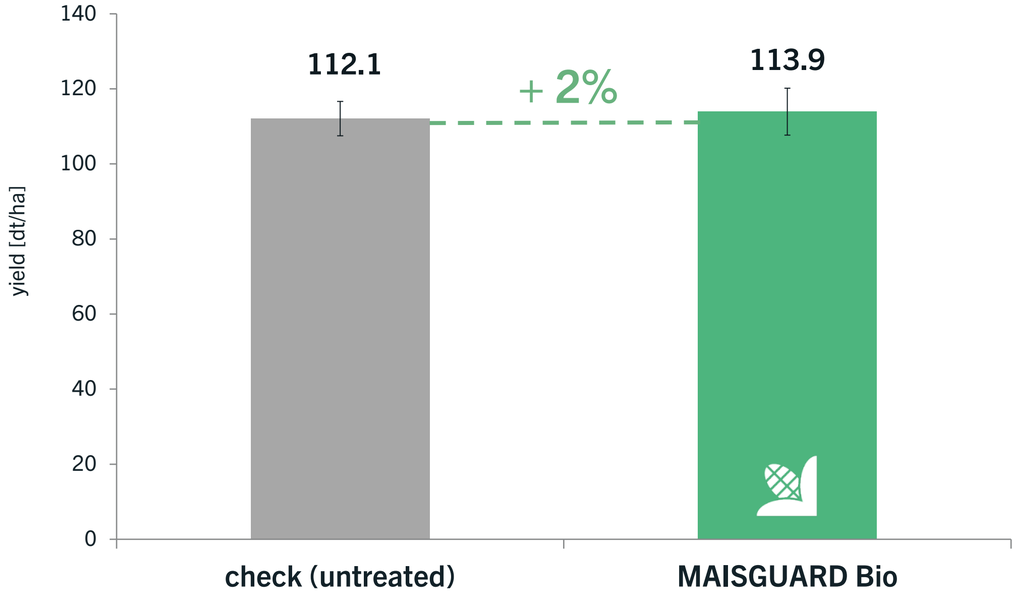


Variety: Farmoritz + chemical treatment (Prothioconazol, Metalaxyl) / MAIS**GUARD** + chemical treatment
Großräschen (Brandenburg), 2021
Plot trial, n = 3 repetitions per treatment
Field trial manager: Staphyt GmbH

YIELD WITH MAISGUARD 2021

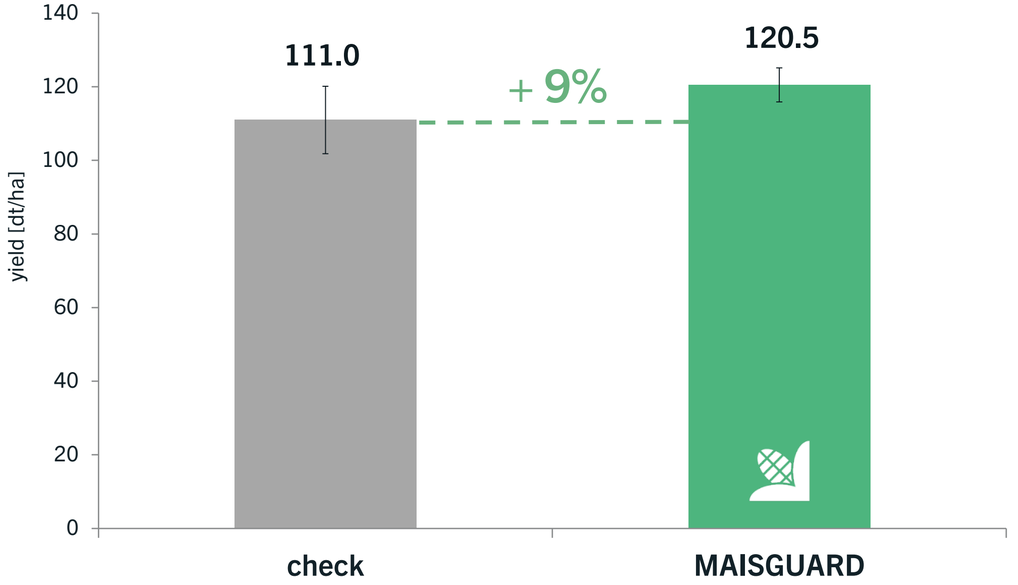
Plot trials in Sülzetal (Sachsen-Anhalt)

GRAIN YIELD [dt/ha]
grain corn, 14% humidity



Variety: Farmirage, MAIS**GUARD Bio** without chemical treatment
Sülzetal (Saxony-Anhalt), 2021
Plot trial, n = 3 repetitions per treatment
Field trial manager: Staphyt GmbH

GRAIN YIELD [dt/ha]
grain corn, 14% humidity

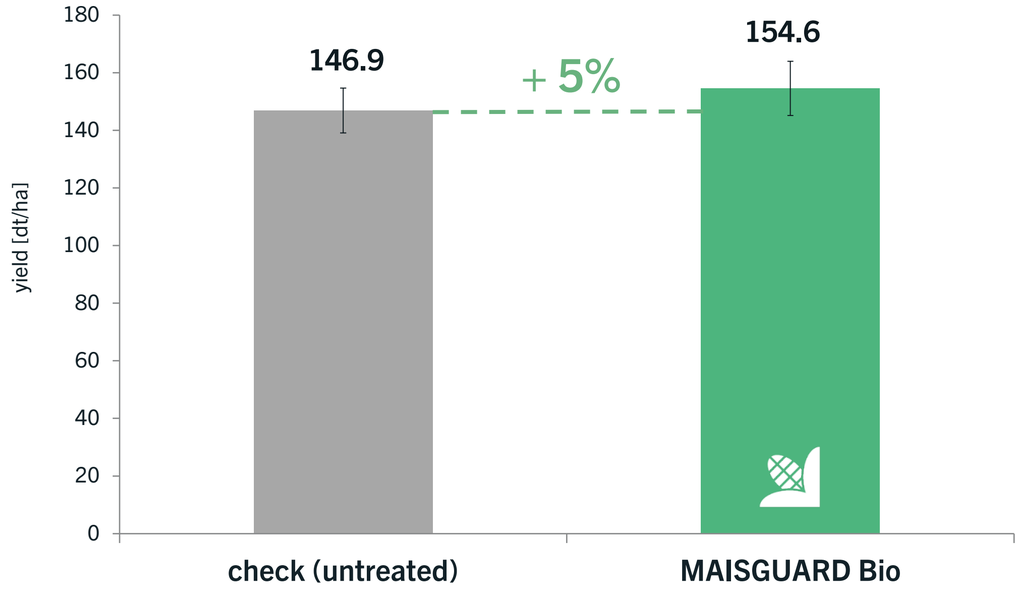


Variety: Farmoritz + chemical treatment (Prothioconazol, Metalaxyl) / MAIS**GUARD** + chemical treatment
Sülzetal (Saxony-Anhalt), 2021
Plot trial, n = 3 repetitions per treatment
Field trial manager: Staphyt GmbH

YIELD WITH MAISGUARD 2021

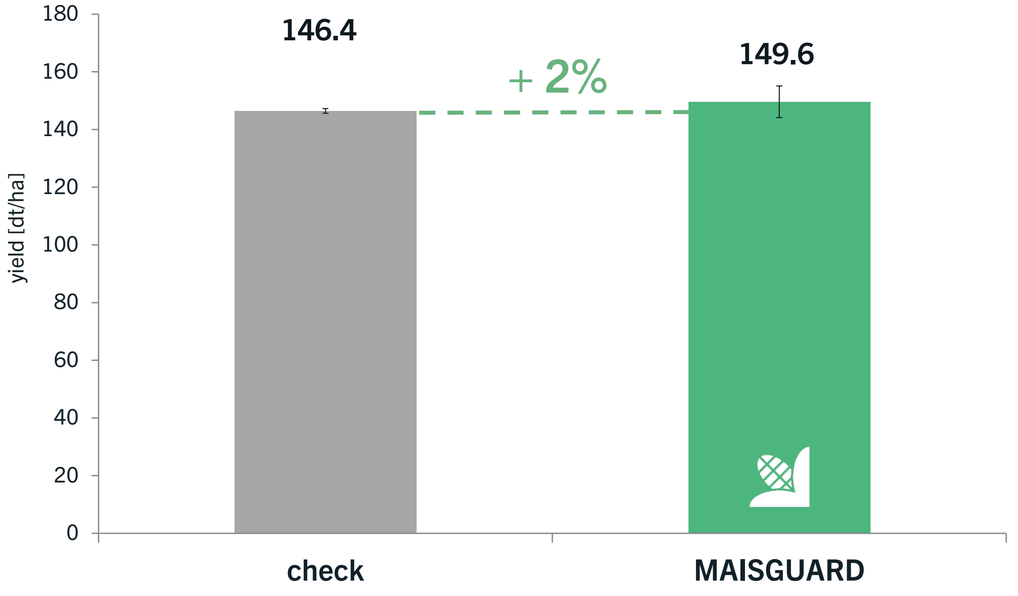
Plot trials in Wettringen (NRW)

GRAIN YIELD [dt/ha]
grain corn, 14% humidity



Variety: Farmirage, MAIS**GUARD Bio** without chemical treatment
Wettringen (North Rhine-Westphalia), 2021
Plot trial, n = 3 repetitions per treatment
Field trial manager: Staphyt GmbH

GRAIN YIELD [dt/ha]
grain corn, 14% humidity

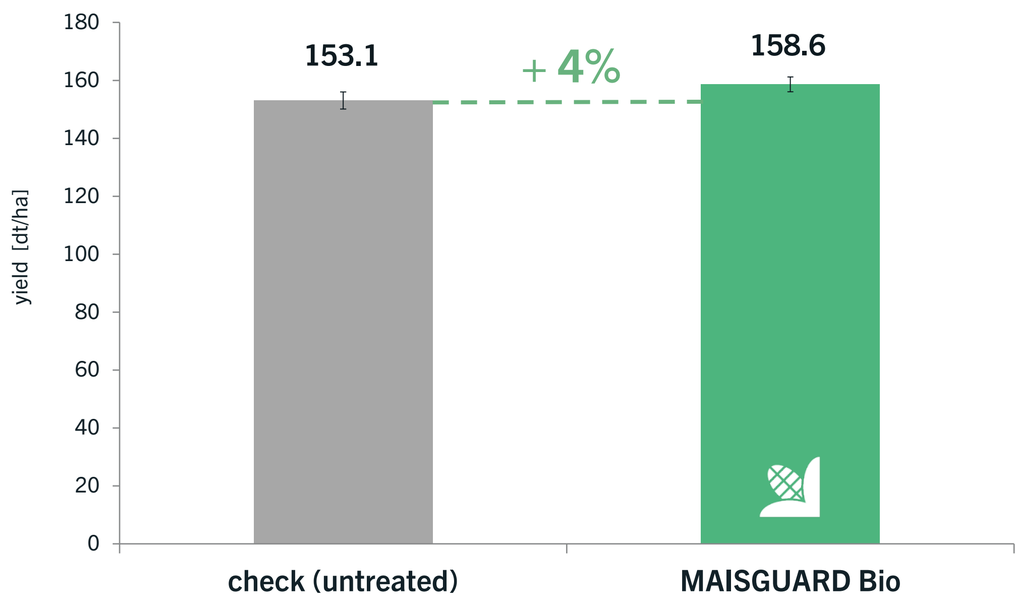


Variety: Farmirage + chemical treatment (Prothioconazol, Metalaxyl) / MAIS**GUARD** + chemical treatment
Wettringen (North Rhine-Westphalia), 2021
Plot trial, n = 3 repetitions per treatment
Field trial manager: Staphyt GmbH

YIELD WITH MAISGUARD 2021

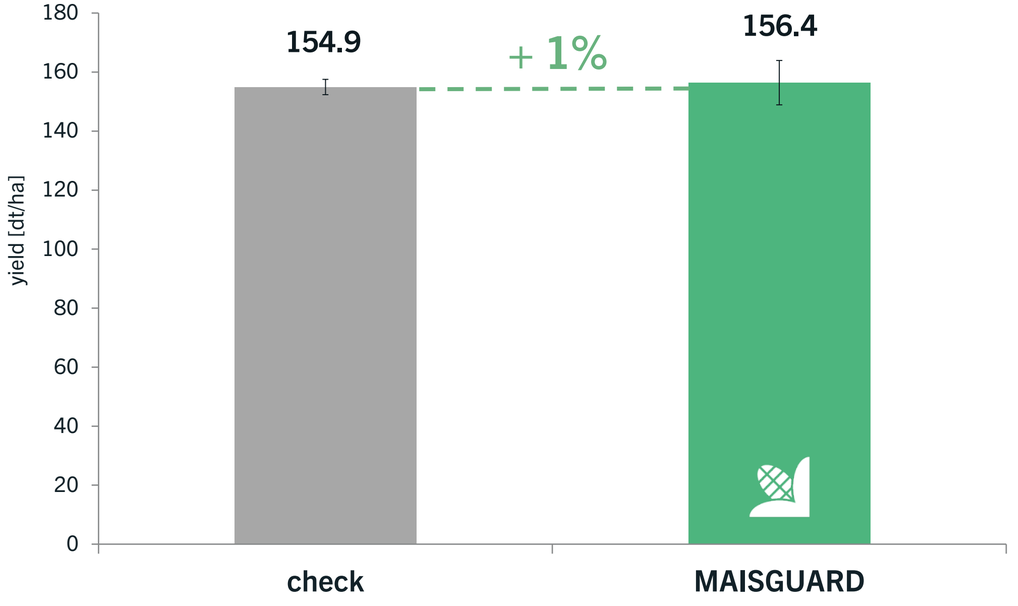
Plot trials in Wettringen (North Rhine-Westphalia)

GRAIN YIELD [dt/ha]
grain corn, 14% humidity



Variety: Farmoritz, MAIS**GUARD Bio** without chemical treatment
Wettringen (North Rhine-Westphalia), 2021
Plot trial, n = 3 repetitions per treatment
Field trial manager: Staphyt GmbH

GRAIN YIELD [dt/ha]
grain corn, 14% humidity

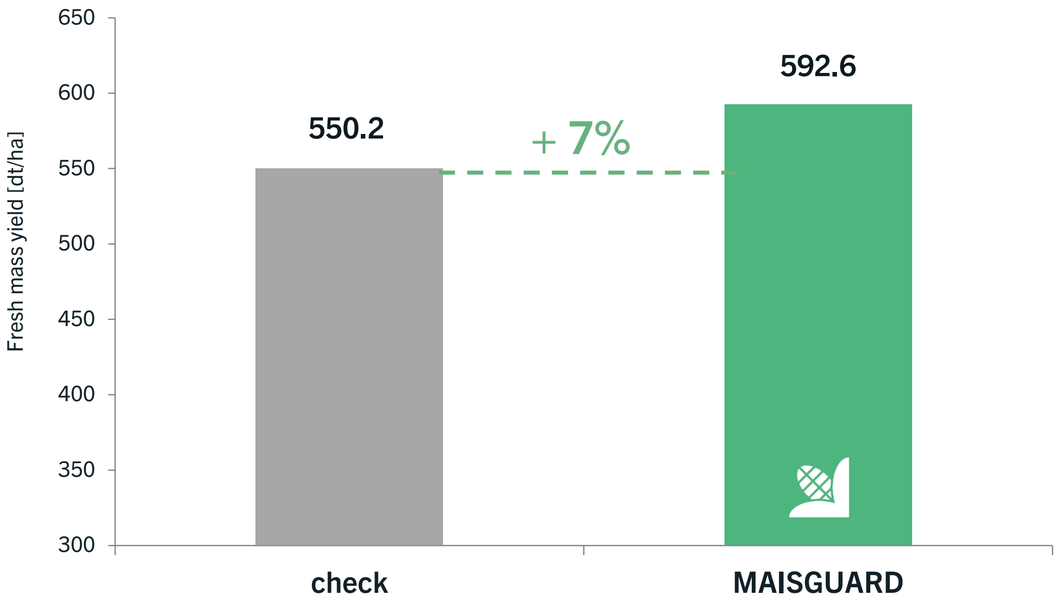


Variety: Farmoritz + chemical treatment (Prothioconazol, Metalaxyl) / MAIS**GUARD** + chemical treatment
Wettringen (NRW), 2021
Plot trial, n = 3 repetitions per treatment
Field trial manager: Staphyt GmbH

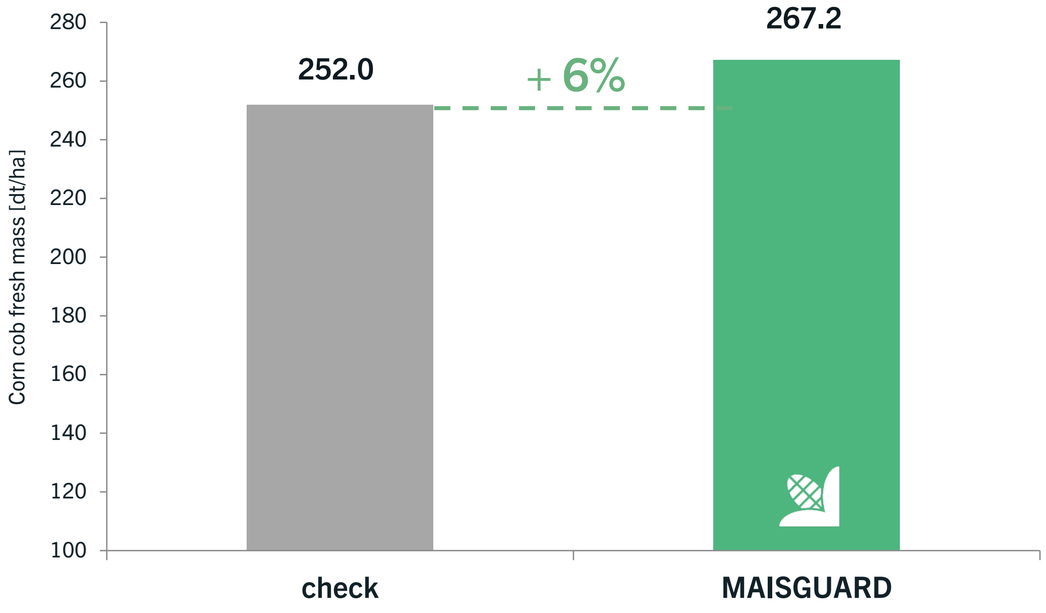
YIELD WITH MAISGUARD 2020

Strip trials in Eimen (Lower Saxony)

SILAGE YIELD
[dt/ha]



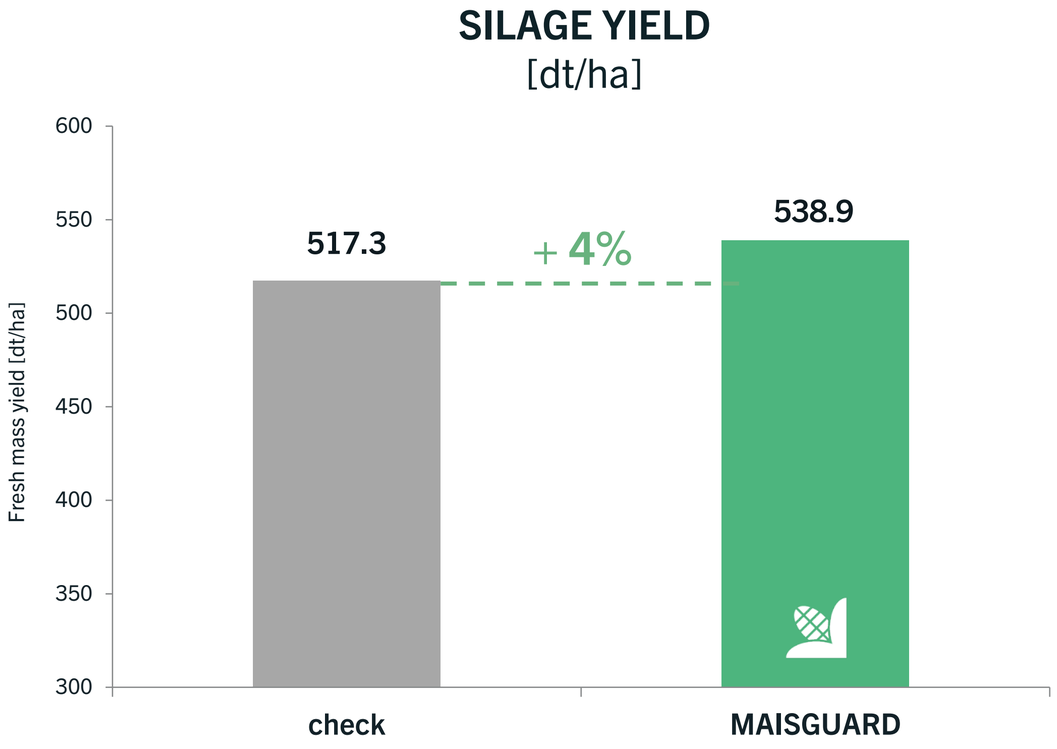
CORN COB FRESH WEIGHT
[corns + spindle]

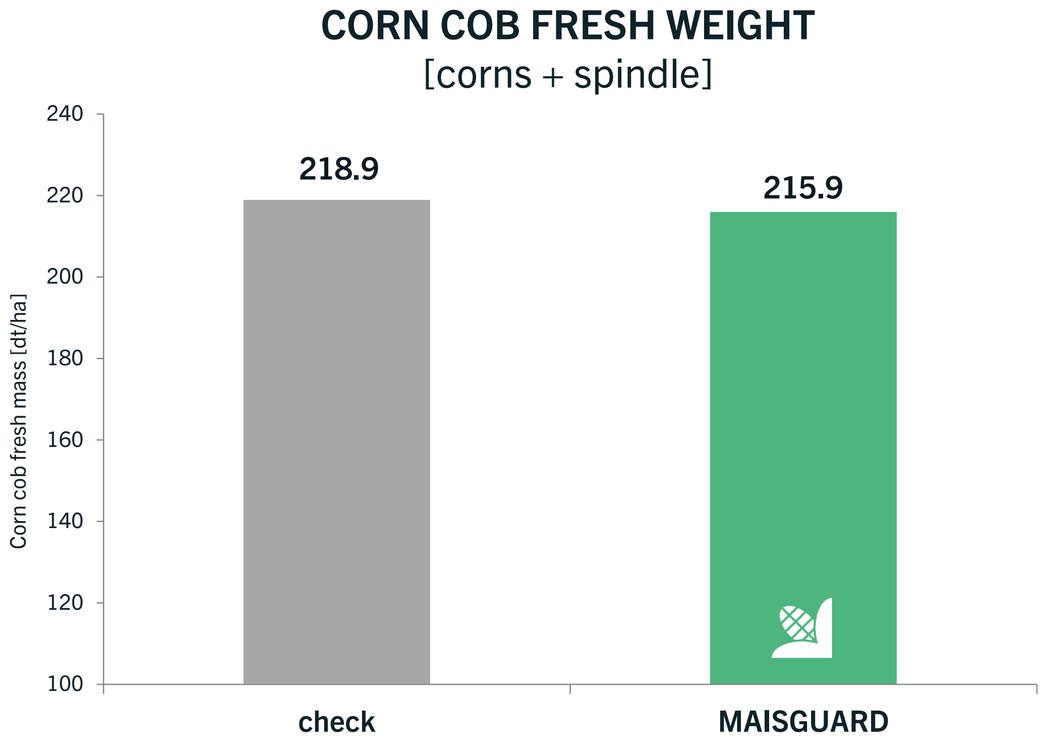


Variety: KWS Keops
Eimen (Lower Saxony), 2020
Strip trial
Field trial manager: farmer Malte Messerschmidt

YIELD WITH MAISGUARD 2020

Strip trials in Goch (North Rhine-Westphalia)



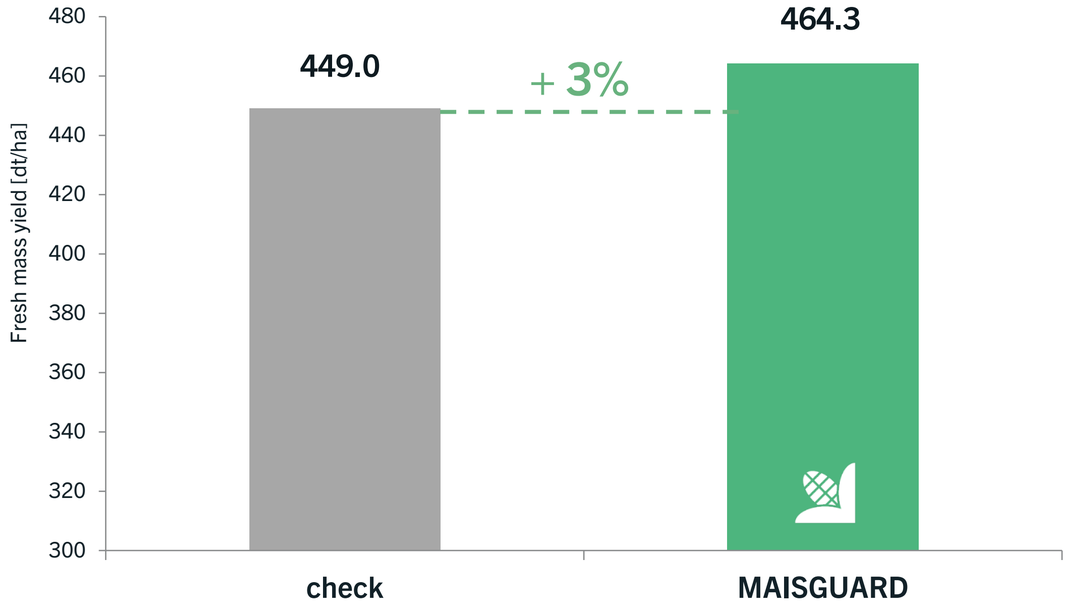


Variety: DKC 3575
Goch (North Rhine-Westphalia), 2020
Strip trial

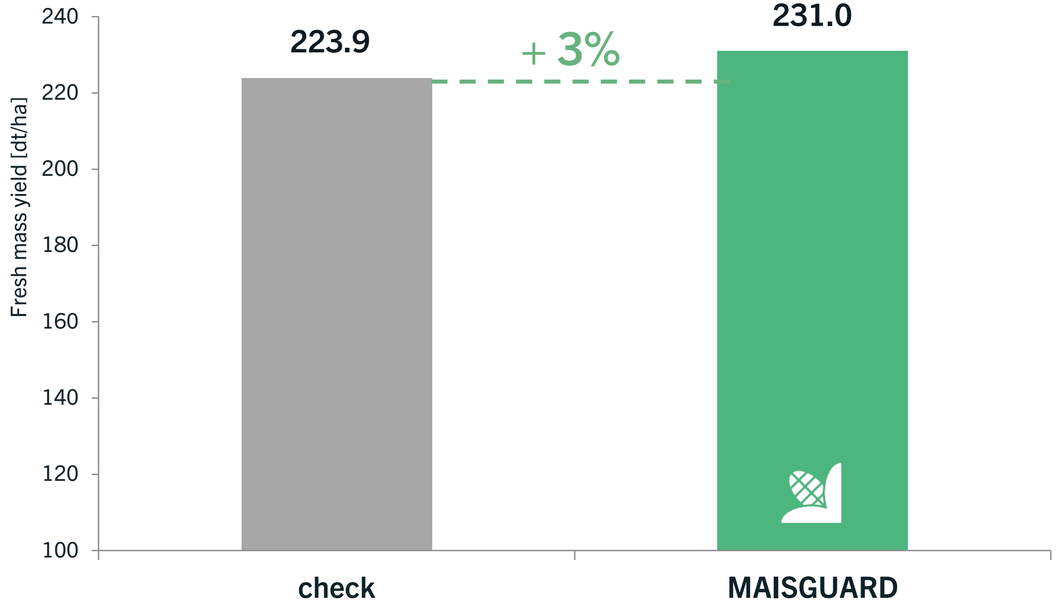
YIELD WITH MAISGUARD 2020

Strip trials in Goch (North Rhine-Westphalia)

SILAGE YIELD
[dt/ha]



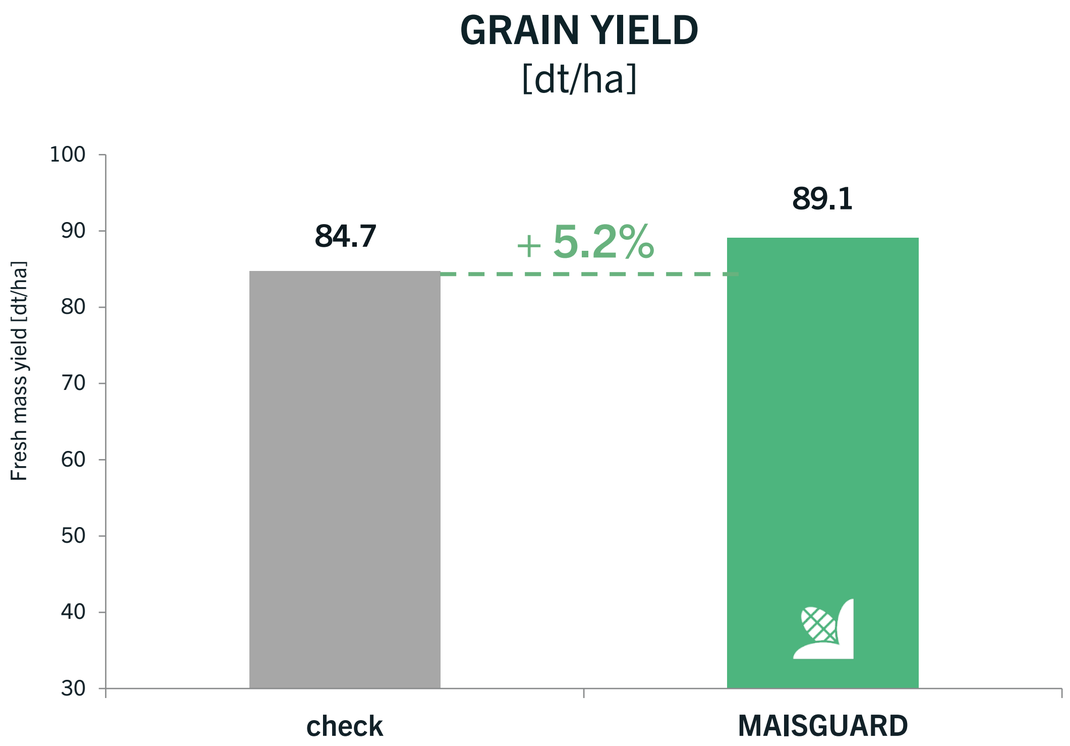
CORN COB FRESH WEIGHT
[corns + spindle]



Variety: Santimo
Goch (North Rhine-Westphalia), 2020
Strip trial

YIELD WITH MAISGUARD 2020

Strip trial in Warendorf (North Rhine-Westphalia)

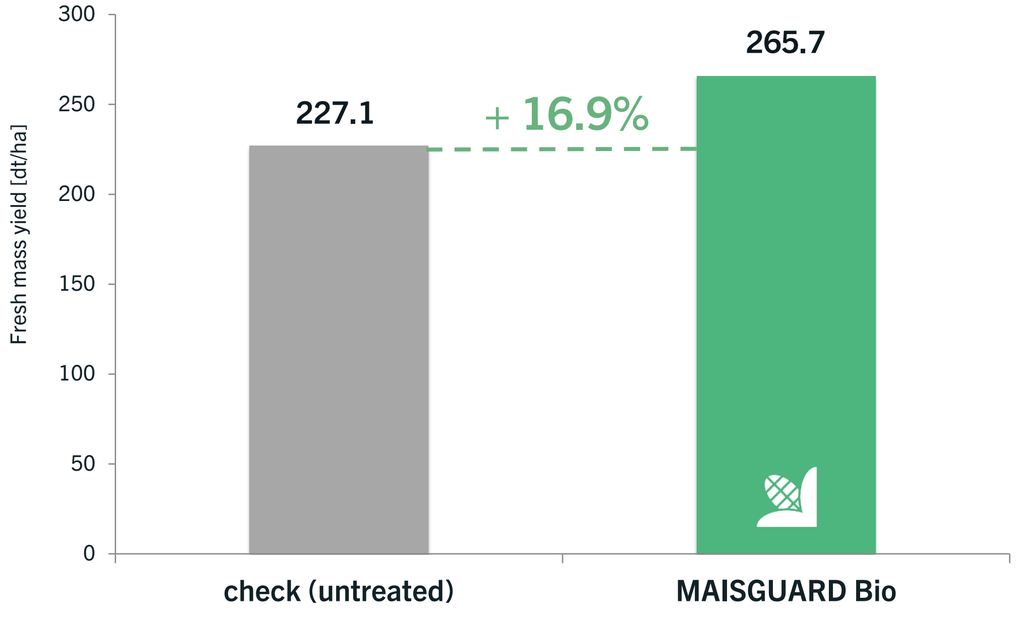


Variety: Es Inventive
Warendorf (North Rhine-Westphalia), 2020
Strip trial, n = 5 repetitions per treatment

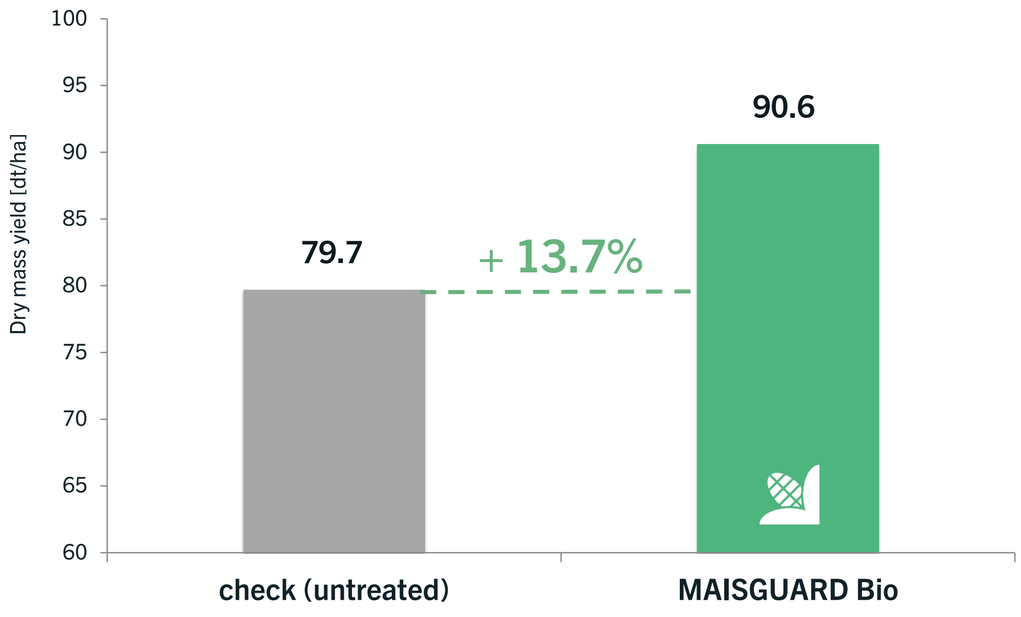
YIELD WITH MAISGUARD BIO 2020

Plot trials in Neu Lübbenau (Brandenburg)

YIELD (FRESH WEIGHT) [dt/ha]
silage corn



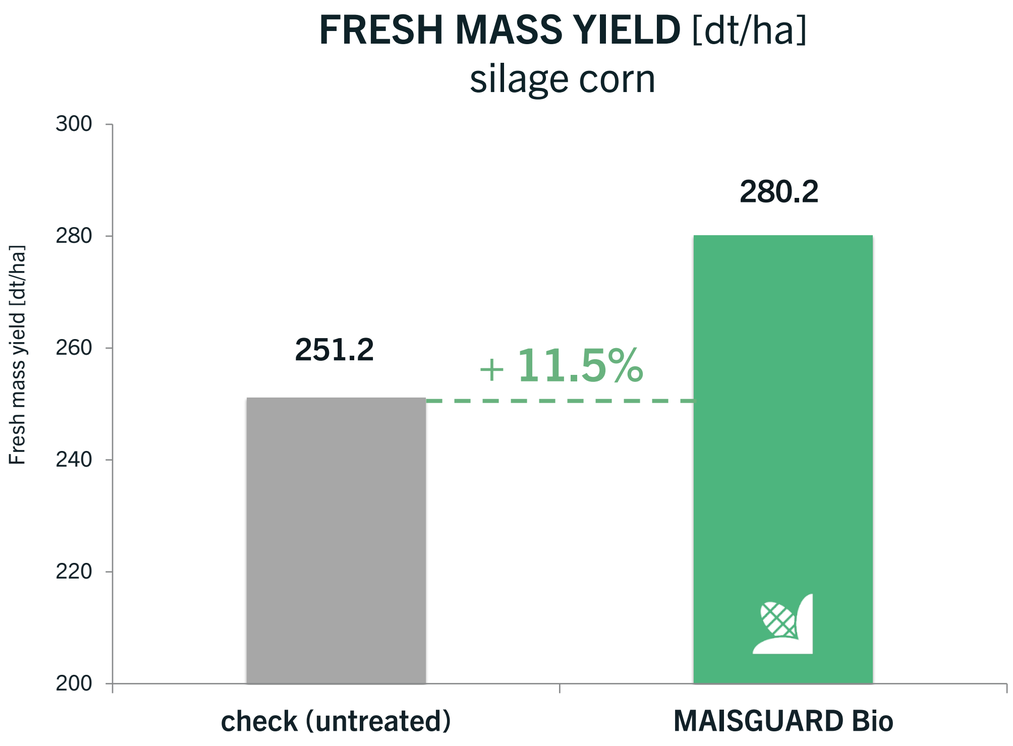
YIELD (DRY WEIGHT) [dt/ha]
silage corn

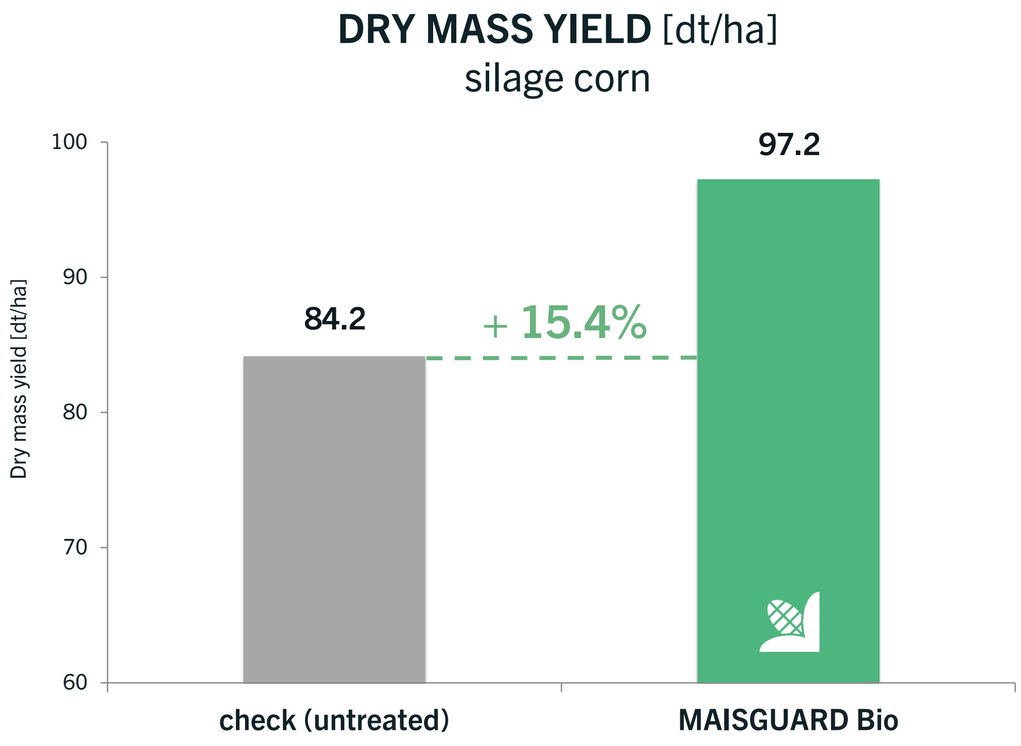


Variety: Quentin
Neu Lübbenau (Brandenburg), 2020
Plot trial

YIELD WITH MAISGUARD BIO 2020

Plot trials in Neu Lübbenau (Brandenburg)

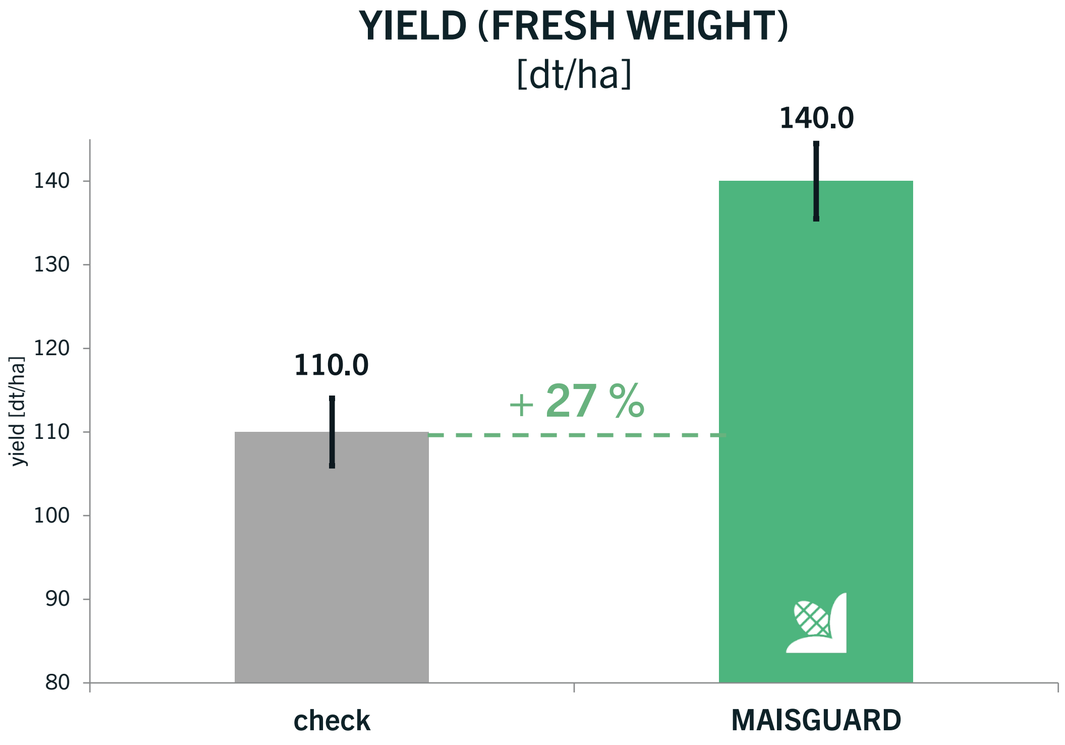


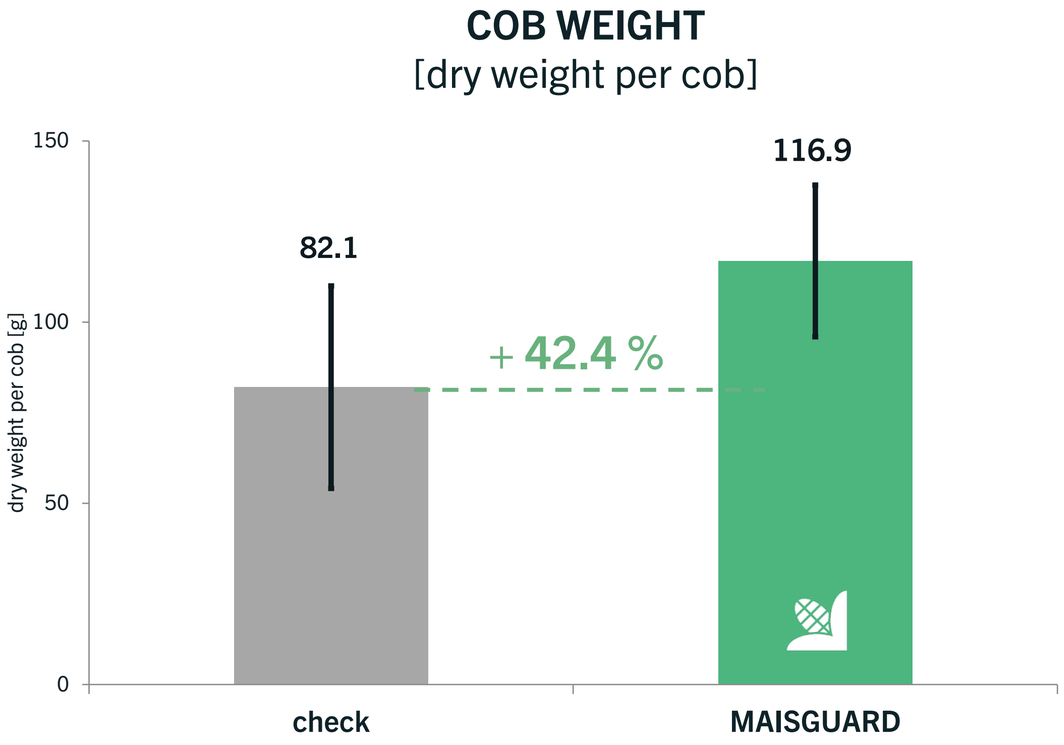


Variety: Rudint
Neu Lübbenau (Brandenburg), 2020
Plot trial

YIELD WITH MAISGUARD 2019

Strip trial in Backnang (Baden-Württemberg)



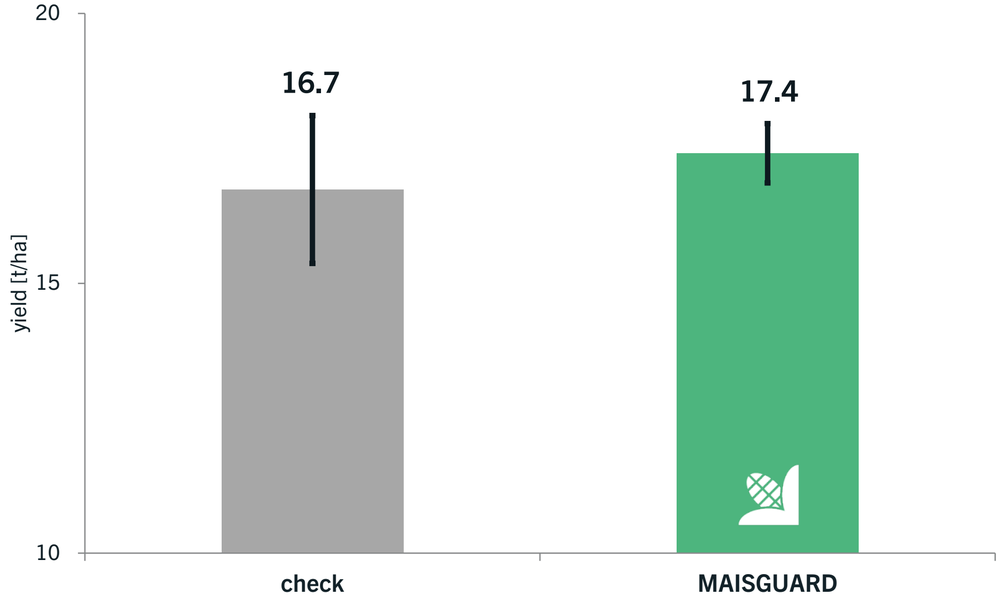


Backnang (Baden-Württemberg), 2019
Strip trial
Field trial manager: farmer Andreas Müller

GRAIN CORN YIELD WITH MAISGUARD 2019

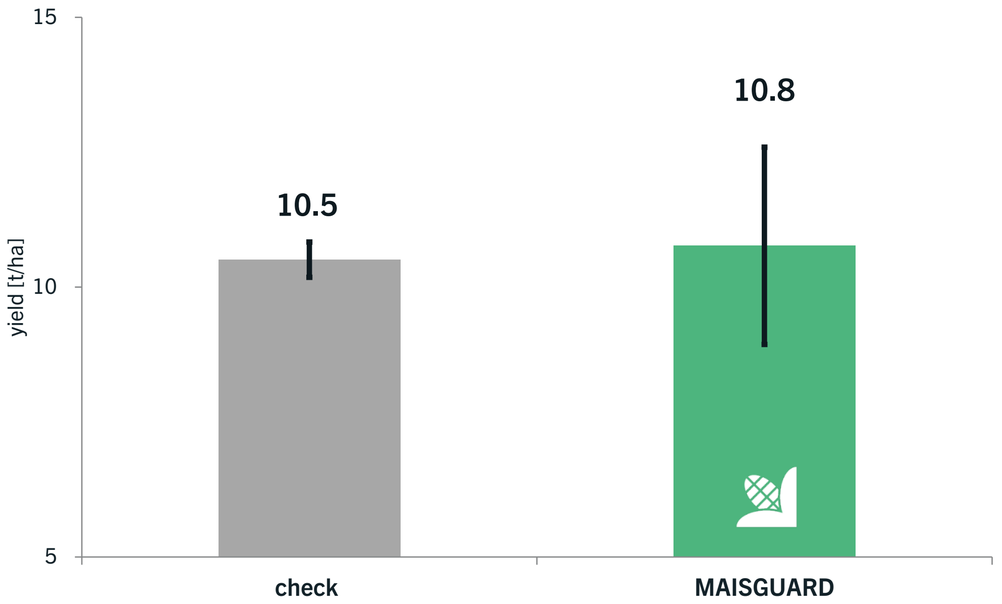
Plot trials of Chamber of Agriculture Steiermark, Austria

GRAIN YIELD [t/ha]
Wünschendorf, Austria
(14% humidity)



Variety:-, MAIS**GUARD** without chemical treatment
Wünschendorf (Austria), 2019
Plot trial, n = 3 repetitions per treatment
Field trial manager: Chamber of Agriculture Steiermark, Austria

GRAIN YIELD [t/ha]
Seiersberg, Austria
(14% humidity)



Variety:-, MAIS**GUARD** without chemical treatment
Wünschendorf (Austria), 2019
Plot trial, n = 3 repetitions per treatment
Field trial manager: Chamber of Agriculture Steiermark, Austria

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