Spinach goseed®

Technical Performance of Spinach goseed®

Cold & Moisture Stress

France, Belgium and the Netherlands are among the top seven largest Spinach-producing countries in Europe in terms of total tons produced.

While very little grows in freezing conditions, Spinach will germinate well in soil temperatures from 5°C. Spinach is known as a cool-season vegetable, and planting of Spinach in these more Northern markets can start as early as April. While Spinach copes well with lower temperatures, it is unfortunately highly sensitive to moisture, and the risks of excessive moisture are a real threat to growers in these markets.

Germains set out to test the efficacy of **Spinach goseed** in the Netherlands over the course of the 2021 growing season. Extensive trials were conducted to measure the performance of Germains **Spinach goseed** against untreated spinach seeds. Eleven different seed varieties were tested, at three trial locations (Breda, Herpen, and Venhuizen), with separate weekly plantings from July through to September.

The growing season across all three sites was generally wetter and colder, with average temperatures as low as 15°C during September and rainfall reaching up to 98mm in one month.

Where the conditions were wetter, the biggest improvements in emergence, plant stand, and final yield were observed. Across the numerous trials, **Spinach goseed** delivered an average of:

- **31% better emergence**
- **30% better plant stand**
- **21% higher final yields**

What we know about the effects of moisture and cooler temperatures on Spinach production

Spinach is more typically a cool-season vegetable and **grows well in temperatures up to 25°C** (Anderson, 2014)

Spinach seeds will **germinate well in soil temperatures from 5°C** (Antherton and Farooque, 1983)

25°C
20°C
15°C
10°C
5°C
0°C

Spinach germination is **highly sensitive to moisture** (Magnee, 2022)

Under water stress, spinach cell growth is adversely affected (Necibe, 2022)

Spinach has a shallow root system and is not very good at absorbing moisture that isn't close to the soil's surface. If the soil becomes waterlogged, the plants will become susceptible to a wide range of issues.

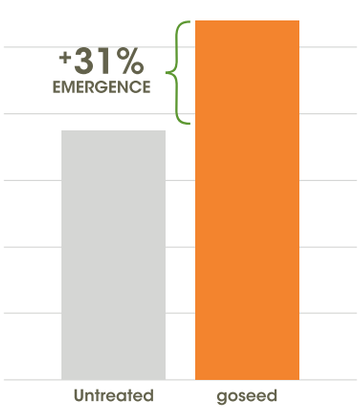
Spinach goseed®

Trials showed that using **Spinach goseed** could **significantly reduce crop losses from abiotic stress** during the early plant growth stage. Trials also showed that this could have a direct impact on final crop yields.

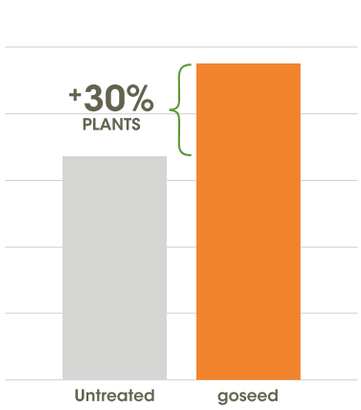
Trial Summary

Averages from Breda, Herpen & Venhuizen
July – September 2021

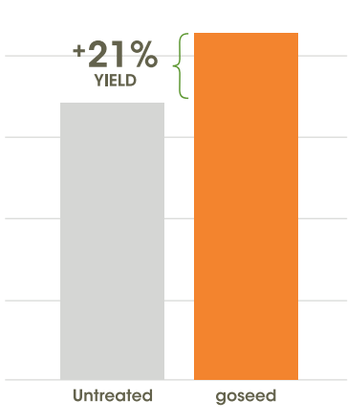
Average Emergence
26 Trials



Average Plant Stand
26 Trials



Average Yield
26 Trials



9 varieties tested. Trials planted weekly and monitored independently.

The 21% average yield improvement from using Spinach goseed equates to an additional revenue of **€4,725** per ha

The additional revenue with **Spinach goseed** has been calculated based on the following variables:

Raw seed cost:	*€160 per bag*
Sowing density:	*6,000,000 seed/ha*
Typical crop planting area:	*1 ha*
Average yield per ha:	*15 ton/ha*
Price of fresh spinach:	*€1.50 euro/kg*