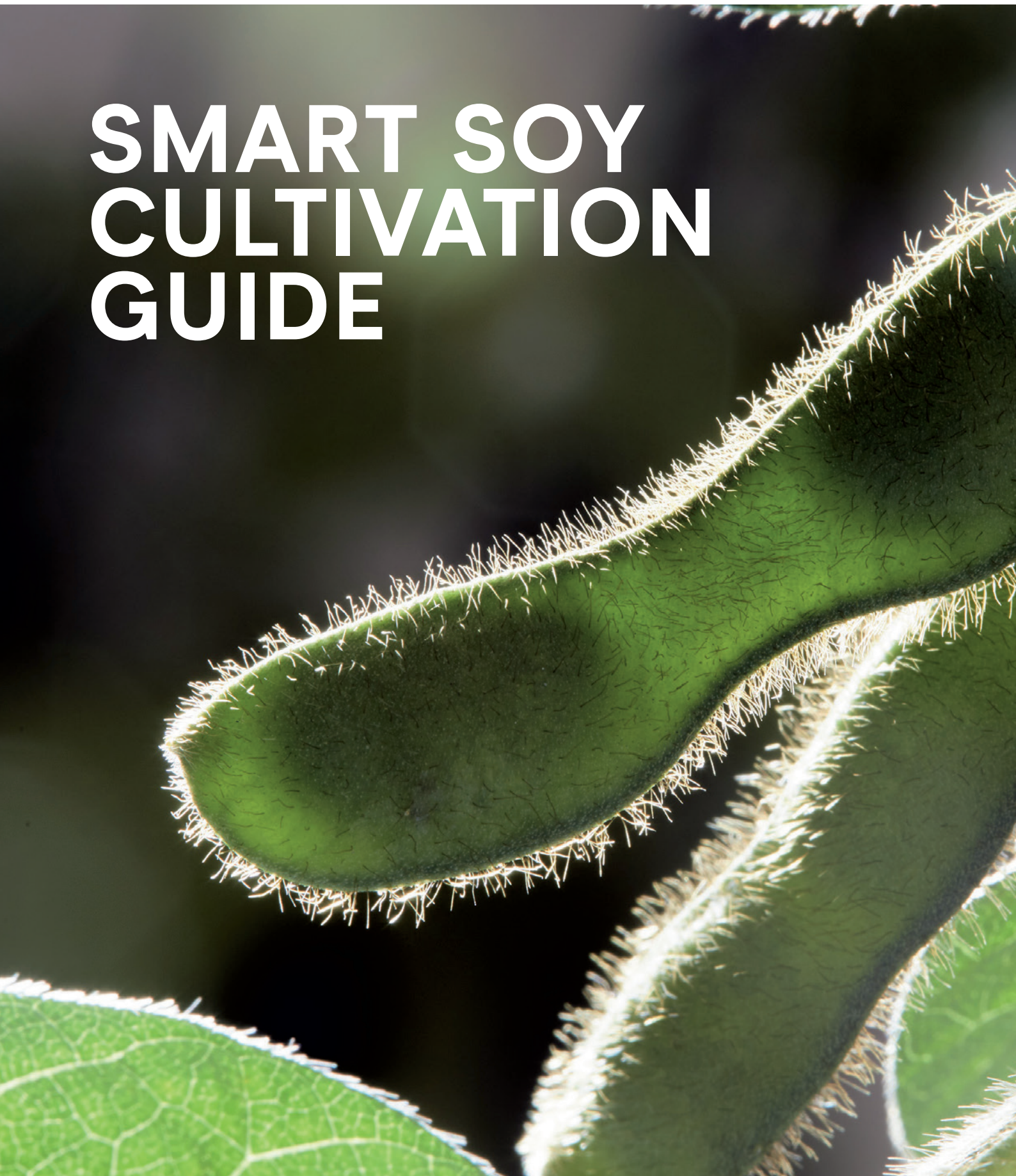


SMART SOY CULTIVATION GUIDE



GROWING THE FUTURE WITH PROTEALIS SOY



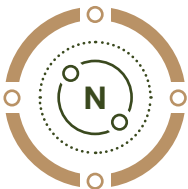
At Protealis, we believe **LEGUMES** are vital for **SUSTAINABLE, PROFITABLE FARMING**. Our innovative breeding and seed technologies **EMPOWER EUROPEAN FARMERS** to produce more plant proteins locally, reducing reliance on imports and preserving global ecosystems. Today, Europe imports over 70% of its protein crops, mainly soy from South America, at great environmental cost. By growing soy on just 10% of Europe's arable land, we could eliminate this dependency while enriching crop rotation and improving soil health.

Our soy varieties are **SPECIFICALLY TAILORED TO THE COLDER NORTHERN-EUROPEAN CLIMATE**, offering new opportunities to European farmers with high yield, robust protein content, and excellent nitrogen-fixing legume crop seeds. These crops thrive without synthetic nitrogen and support EU goals for sustainable food and feed markets. With soy providing up to 46g of protein per 100g, soy is a natural choice for farmers and food producers committed to profitability and sustainability while ensuring local supply for the fast-growing markets of plant based protein - both for sustainable food and feed applications.

At Protealis, we made it our mission to develop **THE BEST LEGUME CROP SEEDS**, supported by our **CUTTING-EDGE SEED TECHNOLOGIES** including seed coatings with proprietary yield-enhancing soil bacteria, and using advanced AI fingerprinting to predict novel seed performance and select the best traits for our future seeds.

Join us in growing (y)our future.

Benjamin Laga
CEO Protealis



LOCAL &
SUSTAINABLE



PROFITABLE



100% NON-GMO

SOY IN NUMBERS



SOY FACTS

1 SOY IS THE NR 1 PROTEIN CROP
CULTIVATED ALL OVER THE WORLD
WITH OVER 125 MILLION OF HECTARES
CULTIVATED WORLDWIDE ¹

13
MIO TONNES OF SOYBEANS RECORD
HARVEST IN 2024 IN EUROPE ²



57% OF EUROPEANS
CLAIM TO CONSUME
LEGUMES AT LEAST
ONCE A WEEK ³

¹ Statista, 2024
² DonauSoja, Nov 2024
³ Evolving appetites: an in-depth
look at European attitudes
towards plant-based eating;
www.smartproteinproject.eu,
Nov 2023

IN GOOD
CONDITIONS,
SOYBEANS IN EUROPE
CAN YIELD
BETWEEN
2.5
TO **4.5** TONNES/
HECTARE

€550 /TONNE
IN THE PAST YEARS, THE VALUE OF SOY
HAS INCREASED WITH PRICES END 2024
OF AROUND 550 EUR/TONNE ⁴

300 KG/
HECTARE
HIGH-PERFORMANCE SOY IS ON THE RISE!
BETWEEN 1990 AND 2016,
SOYBEAN YIELDS INCREASED BY
300 KG/HECTARE ⁵

+1.5%

PROTEIN CONTENT IMPROVED BY
1.5 PERCENTAGE POINTS THANKS TO
R&D INVESTMENTS IN NEW SOY VARIETIES ⁵

⁴ Donau Soja, Dec 2024
⁵ Index Mundi, November 2024

SOY IN NORTHERN EUROPE

SOY VARIETIES

IN NORTHERN EUROPE



Protealis, founded in 2021, builds on ILVO's ⁶ ground-breaking soy breeding program launched in 2012. By accelerating the commercialization of soy varieties tailored to Northern Europe, Protealis has established itself as a **PIONEER** in delivering innovative, non-GMO soy seed varieties tailored for Northern Europe.

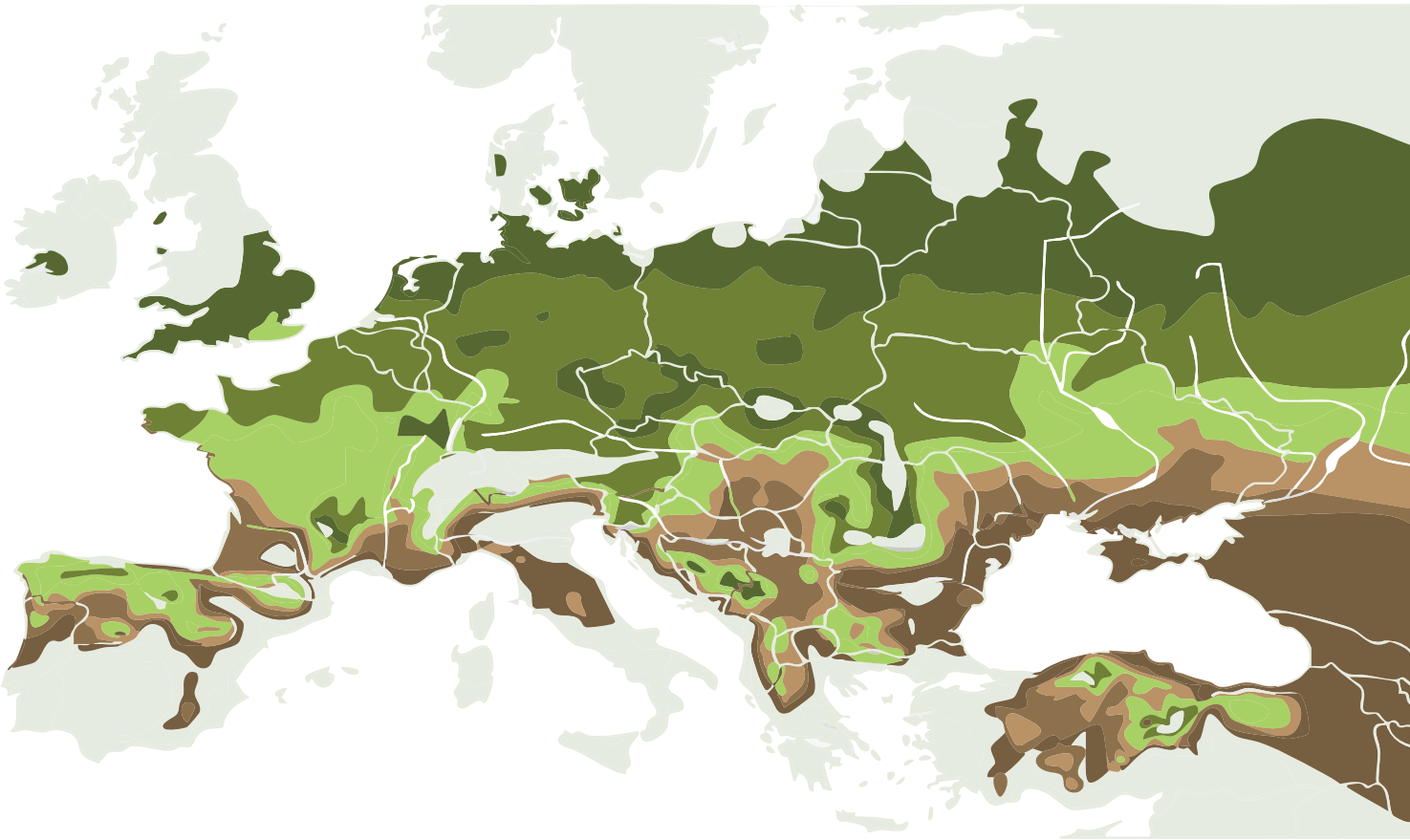


Soy cultivation in Northern Europe has advanced rapidly over the past decade with the development of **HIGH-PERFORMANCE, CLIMATE-ADAPTED VARIETIES**. Historically limited by long summer days unsuitable for traditional soybeans, early-maturing groups like 000, 0000, and 00 now enable profitable production across cooler regions.

⁶ ILVO is the Flanders Research Institute for Agriculture, Fisheries, and Food

SOY MAP OF EUROPE

MATURITY GROUPS



This map shows the distribution of soybean Maturity Groups (MG) across Europe. These zones are indicative and may vary locally. For more precise information - such as the number of days to maturity relative to a reference cultivar - please consult the national descriptive cultivar lists.

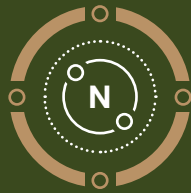
In the far north, including southern Scandinavia and Denmark, the **ULTRA-EARLY 0000 GROUP** thrives in short summers. In regions like the UK, Belgium, the Netherlands, northern France, Germany, Austria, Poland, Romania, Czech Republic, and Ukraine, the **000 GROUP** balances early maturity with high yields. Further south, in central France, southern Germany, Austria, and Hungary, the **00 GROUP** performs well, while the **0 GROUP** excels in southern France, northern Italy, and the Balkans. Here, **000 VARIETIES** are also used as a **SECOND CROP** after winter cereals or early harvests.

Today, Protealis offers a robust portfolio of 00 and 000 soy varieties and is actively developing the 00, 000 and 0000 varieties to expand its range in the coming years.

WHY CHOOSE SOY

WHAT ARE LEGUMES?

Legumes, a family of plants that include soybeans, peas, lentils, and beans, are celebrated for their nutritional and environmental benefits. Legumes form a unique partnership with soil bacteria called *Rhizobia*, enabling them to fix atmospheric nitrogen and convert it into a usable form for plants. This natural process reduces the need for synthetic nitrogen fertilizers. By integrating legumes like soy into crop rotations, farmers can boost yields, improve soil quality, and contribute to a more sustainable food system, making a great choice for achieving agricultural profitability and environmental sustainability.



LOW INPUT

Soy is a cost-effective crop to grow, as it requires no nitrogen fertilizer thanks to its natural ability to fix nitrogen from the air. Additionally, it has minimal need for fungicides and insecticides, reducing input costs and simplifying crop management.



HIGH

ECONOMIC

VALUE

With the rising demand for soy in Europe, particularly for organic and non-GMO varieties, farmers have access to strong and stable market opportunities. This makes soy an economically attractive choice for diversifying income streams.



GREAT FOR

SOIL HEALTH AND

CROP ROTATION

Soy doesn't just benefit the farmer's wallet, it also benefits the soil. By fixing nitrogen in the soil, it leaves behind residual nitrogen that enriches the land for subsequent crops. Additionally, soy disrupts weed cycles, lowers the risk of mycotoxin contamination in cereals, and helps reduce pressure from certain pests and diseases, making it an excellent addition to a crop rotation plan.



GOOD FOR

THE PLANET

As a legume, soy regenerates soils and contributes to carbon storage through increased organic matter, supporting regenerative agriculture practices.



VERSATILE USE

Soy is a multi-purpose crop, with uses ranging from food and animal feed to biodiesel and industrial products, promoting a circular economy by utilizing all parts of the plant.



Soybeans, like other legumes, fix atmospheric nitrogen through symbiosis with *Bradyrhizobium japonicum* bacteria, which form nodules on the roots. This natural nitrogen fixation, combined with soil nitrogen, eliminates the need for additional fertilizers.



CHRISTIAAN KAPPER,
Founder of SoilBase, regenerative farmer in the Netherlands (Achterhoek):

"Soy is excellent for crop rotation and regenerative agriculture. It naturally fixates nitrogen from the air and enriches the soil for the following crop through symbiosis with Bradyrhizobium bacteria. My experience with Protealis' Artemis variety showed strong, resilient plants, delivering high yields and protein content, outperforming other varieties in our climate."

SOY CULTIVATION GUIDE

SOYBEANS ARE LOW-MAINTENANCE ONCE ESTABLISHED, BUT SUCCESS HINGES ON PROPER PREPARATION AND SEEDING. MANY FARMERS FACE ISSUES BY PLANTING LATE AND OVERLOOKING KEY CULTIVATION STEPS, LEADING TO POOR RESULTS.

AVOID SETBACKS AND SET YOUR SOY UP FOR SUCCESS TODAY BY FOLLOWING OUR EASY SOY CULTIVATION GUIDE!

ABOUT SOY

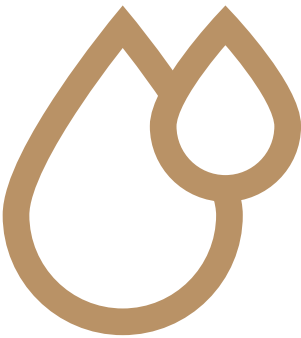
WHAT IS SOY?

Soybean, scientifically known as *Glycine max*, was first cultivated in China around 3,000 BC. Explorers introduced soybean to Europe, where it initially gained popularity as a fodder plant in the 17th century. In the early 20th century, extensive research was conducted in the US to adapt the plant to different climates and industrialize its cultivation. Today, soybean is grown on all five continents, predominantly in the Americas. In Europe, the popularity of soy has rapidly increased over the past years, together with the launch of new, more high-performing soy varieties tailored to the colder Northern European climate.



SOY IS THE
LEGUME PLANT
WITH THE HIGHEST
PROTEIN CONTENT

TO **40
45%**



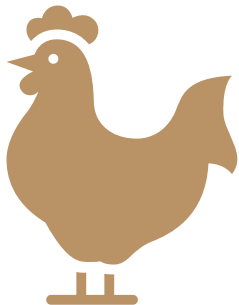
18% OIL

SOY CONTAINS APPROX. 18% OIL, MAKING IT THE MOST WIDELY CONSUMED VEGETABLE OIL GLOBALLY



**FOOD
MARKET**

SOY IS EXCELLENT FOR THE FOOD MARKET, SINCE IT CONTAINS ALL THE ESSENTIAL AMINO ACIDS OUR BODY NEEDS



**FEED
MARKET**

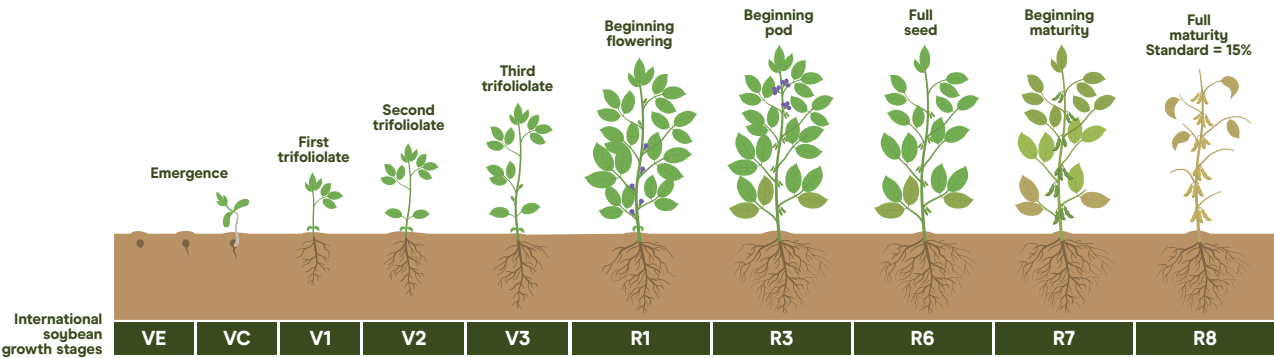
FOR THE FEED MARKET, AFTER EXTRACTING THE OIL FROM SOY, THE RESIDUE IS AN IMPORTANT LIVESTOCK PROTEIN SOURCE



SOY GROWTH STAGES

Soybean growth progresses through well-defined stages, categorized into vegetative (V) and reproductive (R) phases:

- **Germination (VE-VC):** The seed begins to grow, and cotyledons emerge above the soil surface.
- **Vegetative phase (V1-V3):** The plant develops leaves and nodes along the main stem. Fully formed leaves at successive nodes indicate its progression. Soy reaches a plant height between 80 to 100 cm.
- **Flowering (R1-R3):** Soy plants begin flowering with open blooms appearing on the main stem, marking the start of reproduction.
- **Pod development (R3-R5):** Small pods form and grow, signalling the transition to full reproductive activity.
- **Seed formation (R5-R6):** Seeds inside the pods develop and fill, contributing to yield and quality.
- **Maturity (R7-R8):** Pods change colour, leaves fall, and seeds harden, ready for harvest.



SELECTING

THE RIGHT

VARIETY



HOW TO CHOOSE THE RIGHT SOY VARIETY?

When selecting the right soy variety, it's essential to focus on key traits to ensure a successful harvest.

- **Yield stability** is essential for consistent returns
- A **high protein** content meets market demands, particularly for food and feed applications
- Opt for varieties with strong **resilience against lodging and drought**, critical for maintaining performance under challenging weather conditions
- Choose varieties suited to your **regional climate**, ensuring proper maturity and adaptation to local growing seasons

Protealis offers varieties tailored to these criteria, helping farmers achieve high yields and premium-quality crops.

STEPS TO A SUCCESSFUL SOY HARVEST

SUCCESSFUL

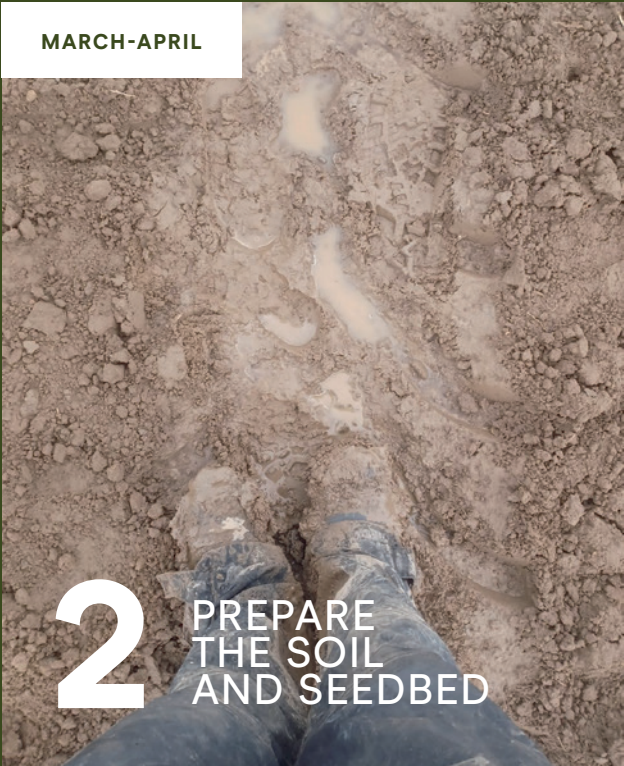
SOYBEAN HARVEST

CALENDAR

FOR NORTHERN EUROPE



1
FIELD
SELECTION



2
PREPARE
THE SOIL
AND SEEDBED

1

JAN-FEB

FIELD SELECTION

- **Field selection:** Opt for well-draining fields with a pH range of 5.5–6.5 to ensure healthy plant growth. Avoid highly calcareous soils, which can cause iron chlorosis, and prioritize fertile, medium to deep soils with good water retention for rainfed systems.
- **Crop rotation:** Soy performs best when planted after cereals like wheat, corn, or barley. This reduces disease risks, optimizes nutrient use, and minimizes weed pressure. Avoid planting soy after other legumes to prevent pathogen build-up.

2

MARCH-APRIL

PREPARE THE SOIL AND SEEDBED

- **Tillage:** Remove any cover crop if present, and prepare a well-structured and level seedbed to support even emergence, and minimize weed pressure. Soybean is susceptible to soil compaction, especially during summer droughts, so deep ploughing may be necessary for compacted soils or to break hardpan layers.
- **Residue management:** In fields with high residue, ensure proper breakdown before planting to reduce pest risks. The bean fly can cause significant losses in seedling emergence, particularly if crop residues, cover crops, or remnants of previous crops are not ploughed under early in the season.
- **Soil fertility:** Apply phosphorus (P) and potassium (K) as needed, ensuring availability during early growth. Avoid nitrogen fertilization, as it interferes with nodulation.
- **Inoculation:** Inoculate seeds with high-quality *Bradyrhizobium japonicum* to enable nitrogen fixation. This is especially critical in fields that have not previously hosted soy. Use pre-inoculated seeds or apply liquid or peat inoculants just before planting, maximum a few days. When applying too late, the bacteria in the inoculant die and become ineffective.
- **Sowing:** Sow end of April-early May, when soil temperatures consistently reach at > 10°C. Use a precision seeder for uniform depth (2–3 cm) and row spacing: 12.5–50 cm for Protealis' 000 maturity groups. Apply a sowing density of around 65-75 seeds per m².

3

MAY

PRE-EMERGENCE TREATMENTS AND WEED CONTROL

- **Weed management:** Apply pre-emergence herbicides directly after sowing to suppress early weed competition. For fields prone to specific weeds like black nightshade or lambs quarters, consider mechanical weeding or stale seedbed techniques.
- **Bird protection:** Protect emerging plants from birds with scare devices or bird repellents.
- **Pests:** Watch out for bean fly (*Ophiomyia* spp.), which may thrive in fields where crop residues have not been properly cleared.

The applicability of this information may be subject to fluctuations based on agricultural and climate factors, and variations in cultivation methodologies



MORE INFO
protealis.com/farmers

4

CHECK NODULATION AND FERTILIZATION

JUNE

- **Nodulation:** Inspect plants at the V2–V3 stage (second to third trifoliate leaf) for root nodules. Ideally, there should be around 10 nodules per plant to confirm effective nitrogen fixation.
- **Fertilization:** If nodulation is poor, meaning less than 30% of plants nodulated, contact your local agronomist for tailored advise.
- **Weed monitoring:** Conduct field checks for late-emerging weeds and apply post-emergence herbicides if needed. Mechanical weeding is also effective at this stage.

5

IRRIGATION PRACTICES AND WEED MONITORING

JULY

- **Irrigation:** Start irrigation during drought periods at the R1 stage in shallow soils or 12–15 days after flowering in deeper soils. Maintain consistent moisture levels, especially during pod filling (R3–R6), to support high yields and protein content. Reduce irrigation after R7 (start of maturity) to prevent pod splitting.
- **Diseases:** Watch for Sclerotinia if field had prior infections or in humid/warm conditions by using more tolerant varieties.

6

PREPARING FOR HARVEST

AUGUST

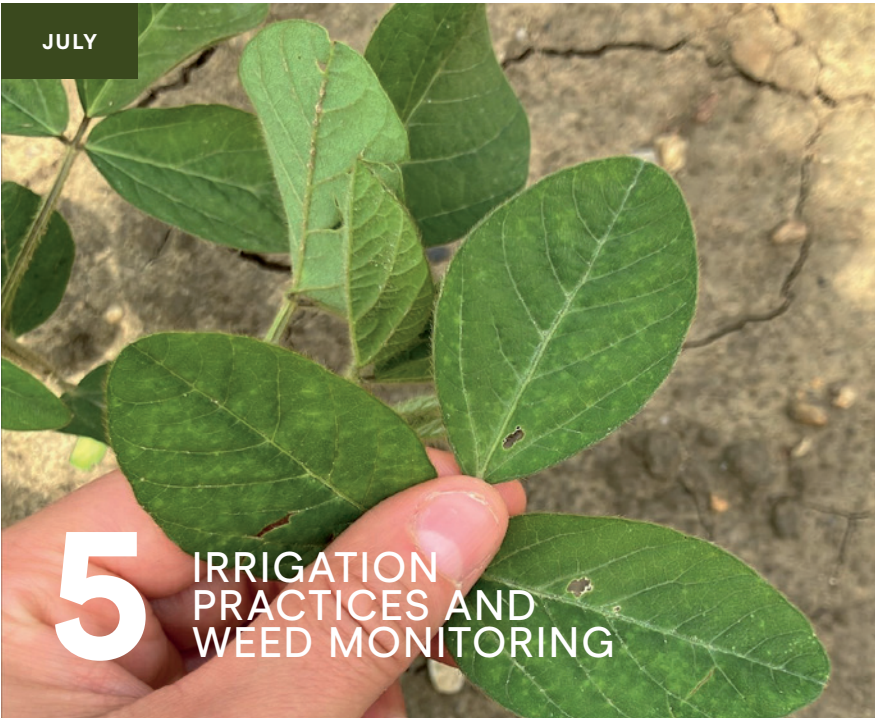
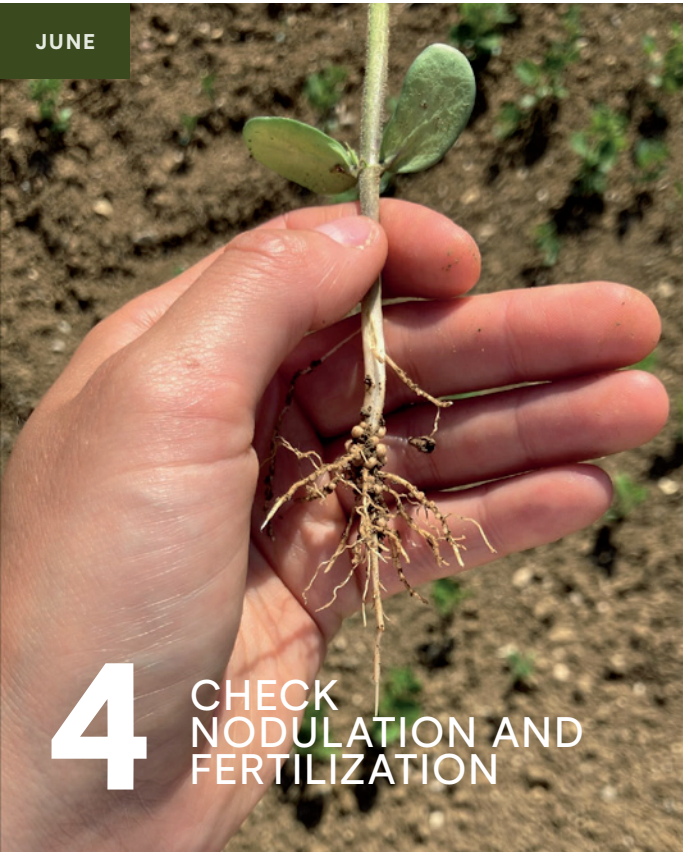
- **Maturity monitoring:** Soybeans are ready for harvest when leaves turn yellow and fall, and pods change colour from green to brown. Check seed moisture levels, aiming for 13–14% for optimal harvest and storage.
- **Equipment preparation:** Calibrate combines to minimize seed loss and damage. Adjust header height to capture low-hanging pods.
- **Pests:** Watch out for the green stink bug and treat with insecticide if needed, but not later than 15 days before harvest.

7

HARVEST AND POST-HARVEST HANDLING

SEPTEMBER-OCTOBER

- **Harvest time:** Begin harvesting when 95% of pods are mature, and seeds rattle inside the pods. Harvesting too late can lead to losses due to shattering.
- **Post-harvest:** Clean and dry harvested beans to reduce moisture below 13% for safe storage. Remove foreign matter to meet quality standards for food and feed markets. Proper storage conditions prevent mould and preserve seed quality.



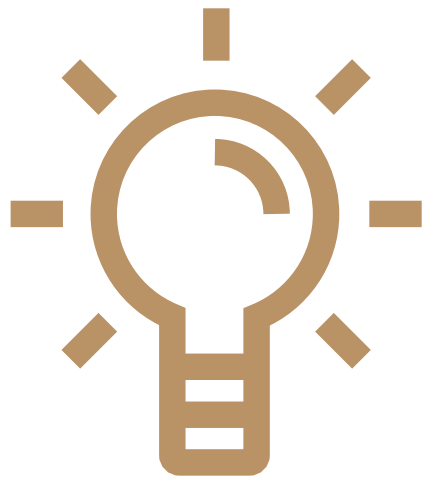
SOY

BEGINNER

MISTAKES

AND HOW TO

AVOID THEM



1

SKIPPING SOIL TESTS

Leads to nutrient imbalances. Always test soil pH (target 5.5–6.5) and adjust accordingly.

2

OVER-FERTILIZING

Nitrogen disrupts nodulation. Focus on phosphorus (P) and potassium (K) based on soil tests.

3

NOT INOCULATING SEEDS

Poor nitrogen fixation in soy-less fields. Use *Bradyrhizobium japonicum* inoculants.

4

PLANTING AT THE WRONG TIME

Cold or delayed planting reduces yields. Wait until soil is consistently >10°C.

5

IGNORING WEED CONTROL

Weeds compete for nutrients. Use pre-emergence herbicides and consider mechanical weeding.

6

UNEVEN SEEDING

Poor depth or spacing lowers germination. Use a precision seeder with uniform depth (2–3 cm).

7

NEGLECTING SEEDLING PROTECTION

Birds and pests destroy seedlings. Use deterrents and pest-treated seeds.

8

SKIPPING NODULATION CHECKS

Poor nodulation leads to weak plants. Check roots at V2–V3 for at least 10 nodules/plant.

9

WATER MISMANAGEMENT

Under/overwatering stresses plants. Irrigate during flowering and pod filling as needed.

10

LATE HARVESTING

Delayed harvest causes seed loss. Harvest when pods are 95% mature and seeds rattle.

11

POOR STORAGE

Moisture leads to mold. Dry beans to 13% moisture and clean them before storage.





MORE INFO
protealis.com/soy

ABOUT

PROTEALIS

Protealis develops superior plant protein seeds and seed technologies, optimized for the European soil and climate. Being at the forefront of sustainable agriculture, Protealis aims to empower European farmers with sustainable and resilient alternatives to traditional protein sources by developing legume seed solutions with enhanced crop yield and protein levels, while at the same time minimizing the ecological footprint.

Protealis works with a network of dedicated distributors who play a pivotal role in bringing Protealis products closer to farmers. Want to order our products, or are you interested in becoming a trusted distributor?
Contact us.

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