SEED GUIDE

COVER CROPS AND INTERCROPS

SEMICAN

COVER CROPS AND INTERCROPS

FOR HEALTHY SOILS

Through this guide, we aim to highlight the importance of cover crops, their key roles, and their contribution to soil health. Designed as a reference tool, it helps guide decision-making by supporting the selection of species or mixes best suited to agronomic objectives.

Wishing you every success!

DID YOU **know?**

Sod is an ideal model for building soil structure year round, storing carbon and, in doing so, increasing soil fertility

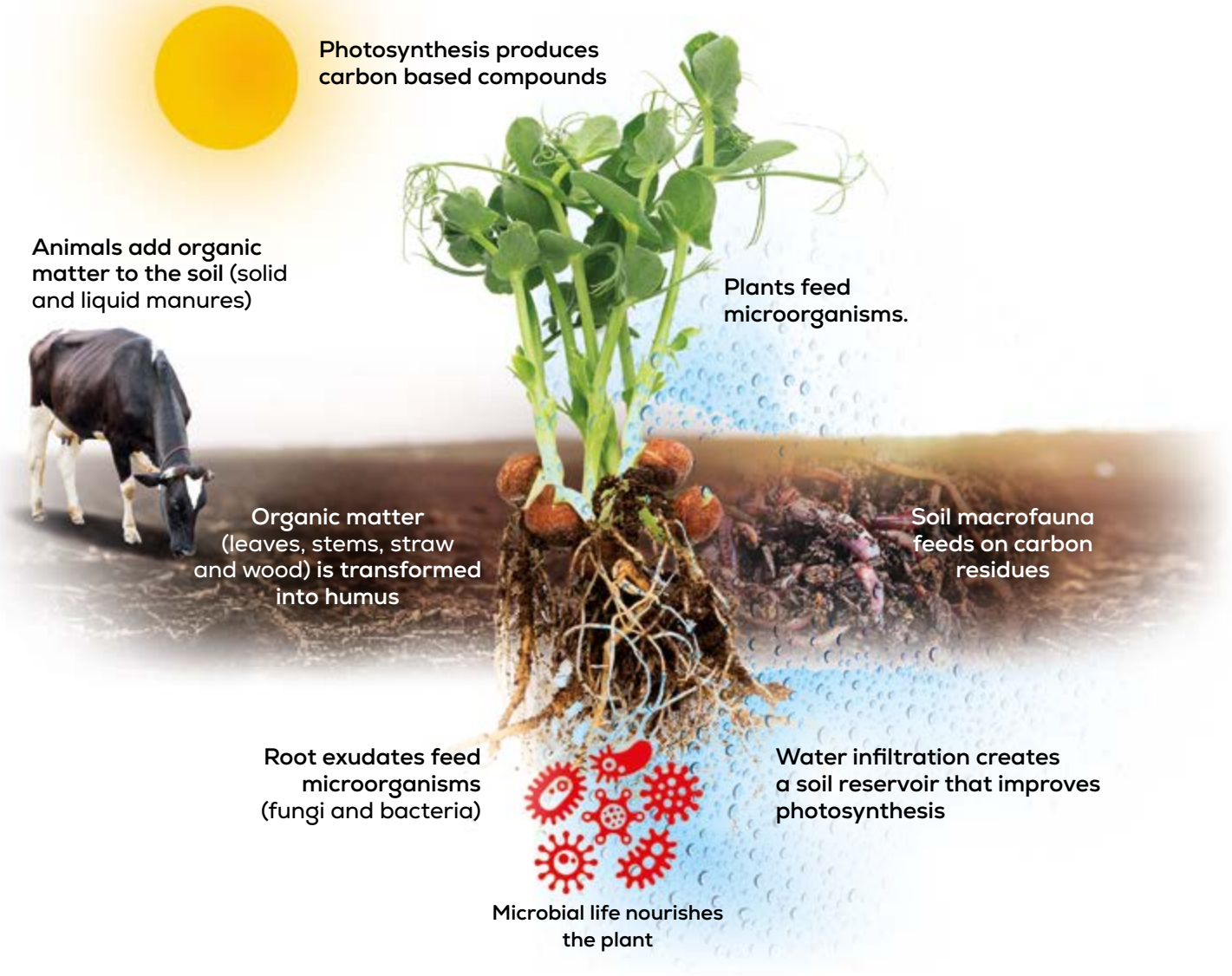
COVER CROPS ARE ONE OF THE MOST EFFECTIVE WAYS TO QUICKLY REPLICATE THE BENEFITS OF A SOD ROTATION:

- Improves soil fertility
- Promotes microbial activity
- Controls erosion and improves soil structure
- Improves water infiltration
- Recycles soil nutrients, solid and liquid manures
- Increases soil organic matter
- Improves weed control
- Reduces soil temperature
- Enhances plant biodiversity

For more fertile and higher performing soils, contact your Semican retailer, who will support you in selecting and ordering your cover crops and intercrops

SOIL
A COMPLEX MICROBIAL ECOSYSTEM

SOIL IS A COMPLEX HABITAT THAT HOSTS A WIDE DIVERSITY OF MICROORGANISMS. THIS MICROBIAL LIFE FEEDS ON CARBON-BASED COMPOUNDS PRODUCED BY PLANTS. IN RETURN, IT PLAYS A KEY ROLE BY MAKING SOIL NUTRIENTS AVAILABLE FOR PLANT UPTAKE, THEREBY SUPPORTING CROP DEVELOPMENT. THIS IS A BENEFICIAL SYMBIOTIC RELATIONSHIP BETWEEN SOILS AND CROPS.



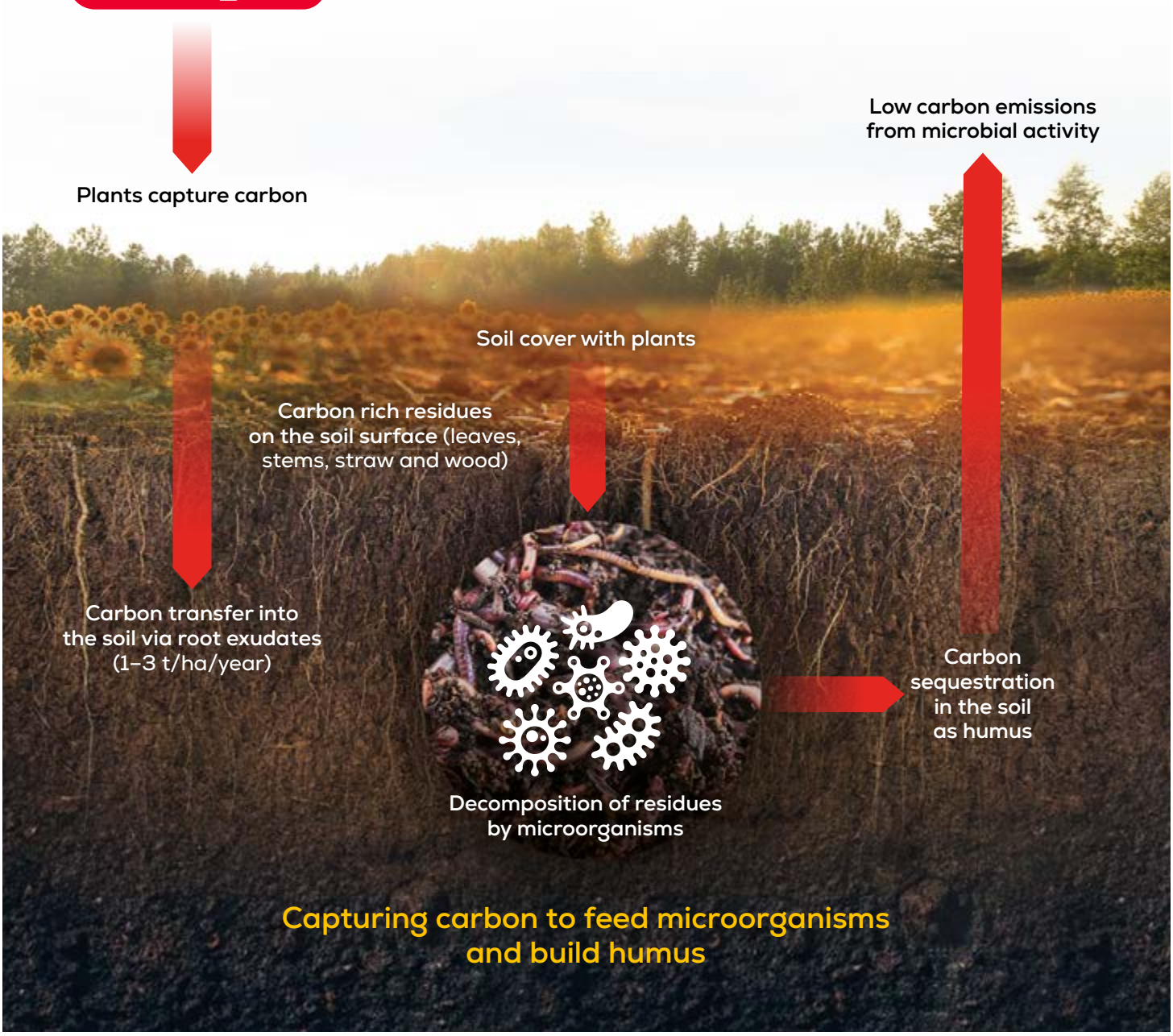
Plants feed microbial life, and in turn, microbial life feeds plants.
This symbiosis forms the lungs of the planet.

CARBON CYCLE

PLANTS CAPTURE CO_2 FROM THE ATMOSPHERE AND STORE IT LONG TERM IN THE SOIL THROUGH MICROBIAL ACTIVITY

DID YOU **know?**

Carbon is the foundation of soil fertility and productivity

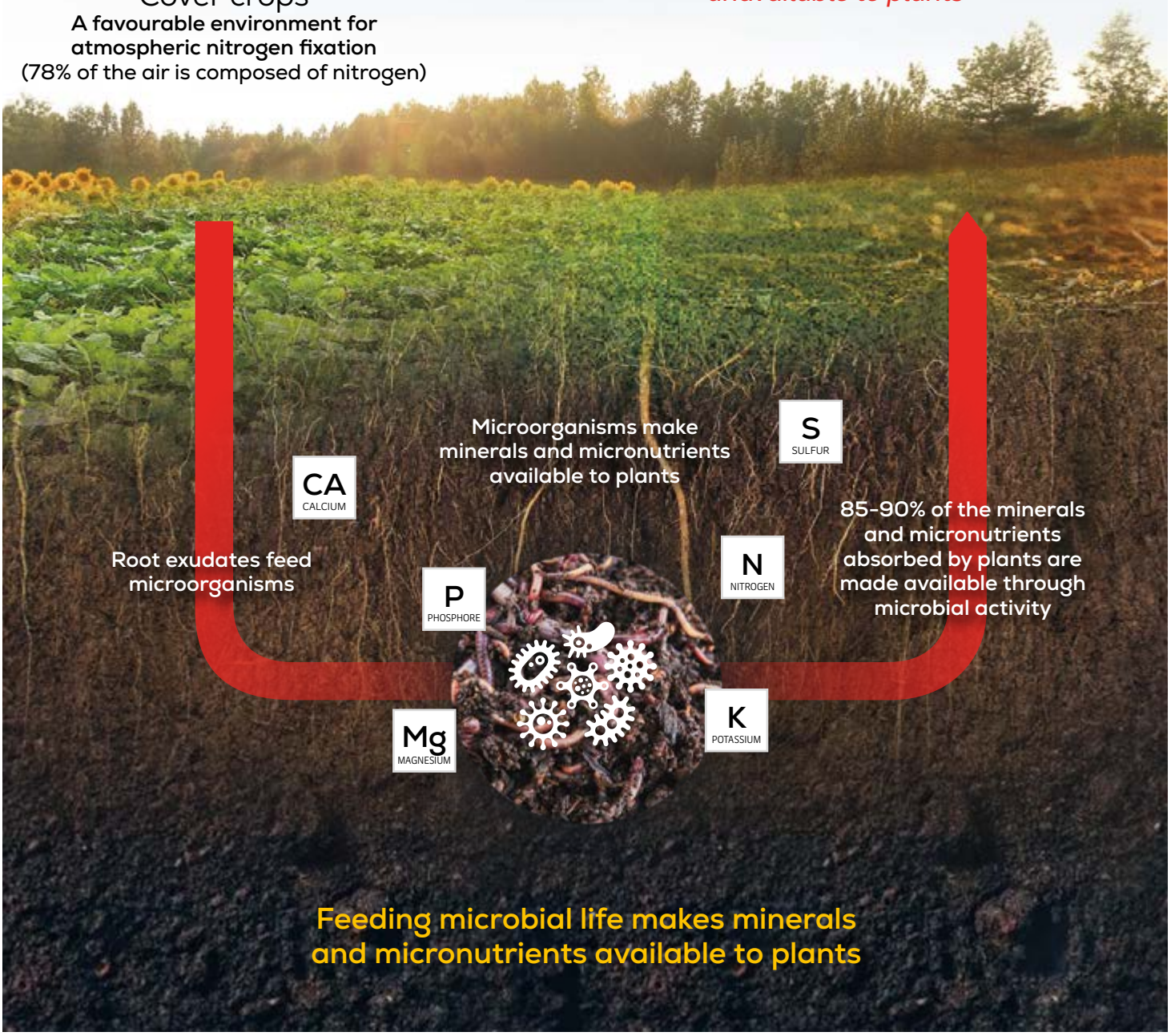


MINERAL CYCLE

COVER CROPS STIMULATE MICROBIAL ACTIVITY, MAKING MINERALS AVAILABLE TO PLANTS

DID YOU **know?**

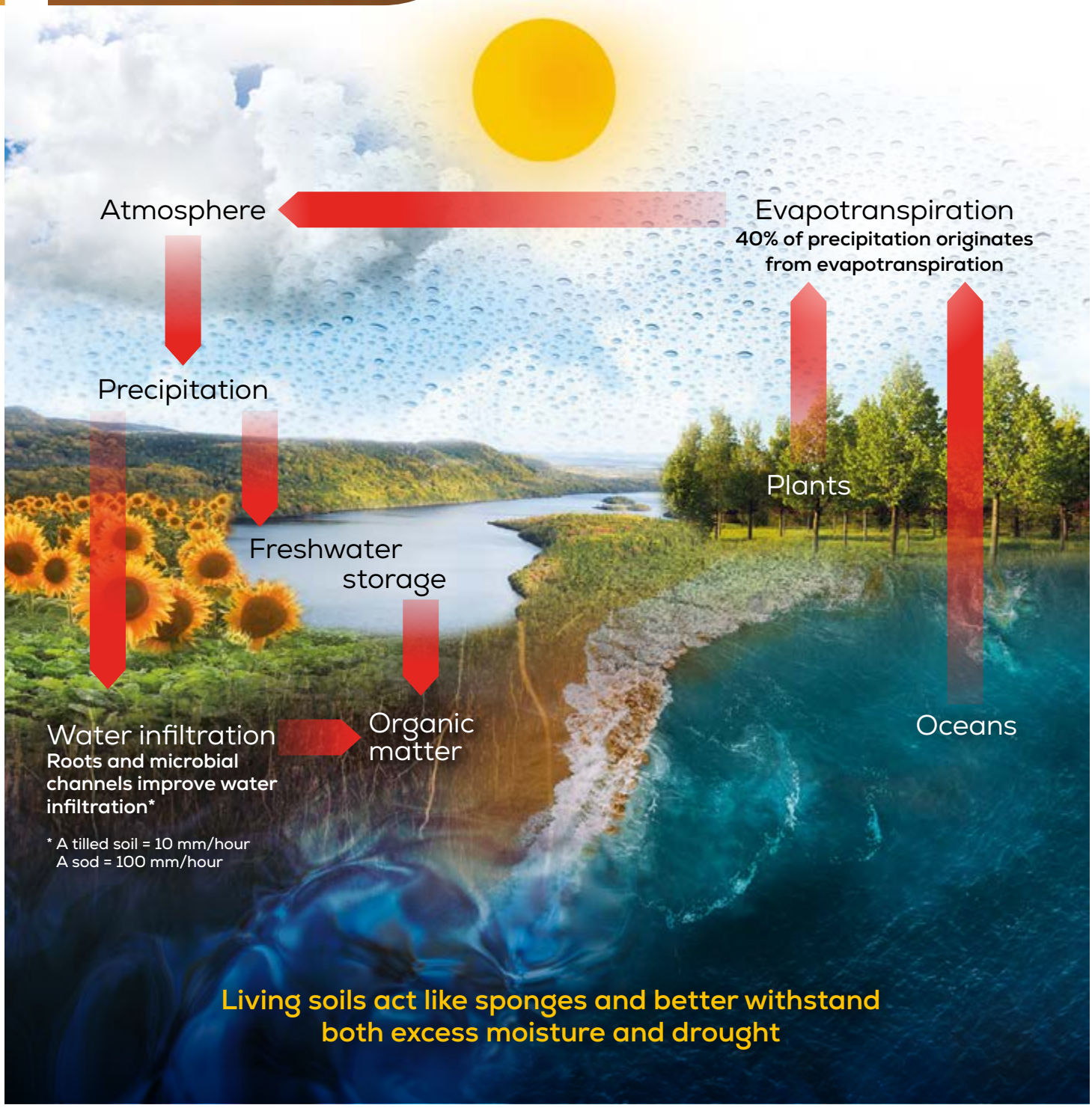
Without soil microorganisms, most minerals would remain unavailable to plants



WATER CYCLE

DID YOU **know?**

Each 1% increase in soil organic matter increases surface water storage by about 25,000 gallons per acre

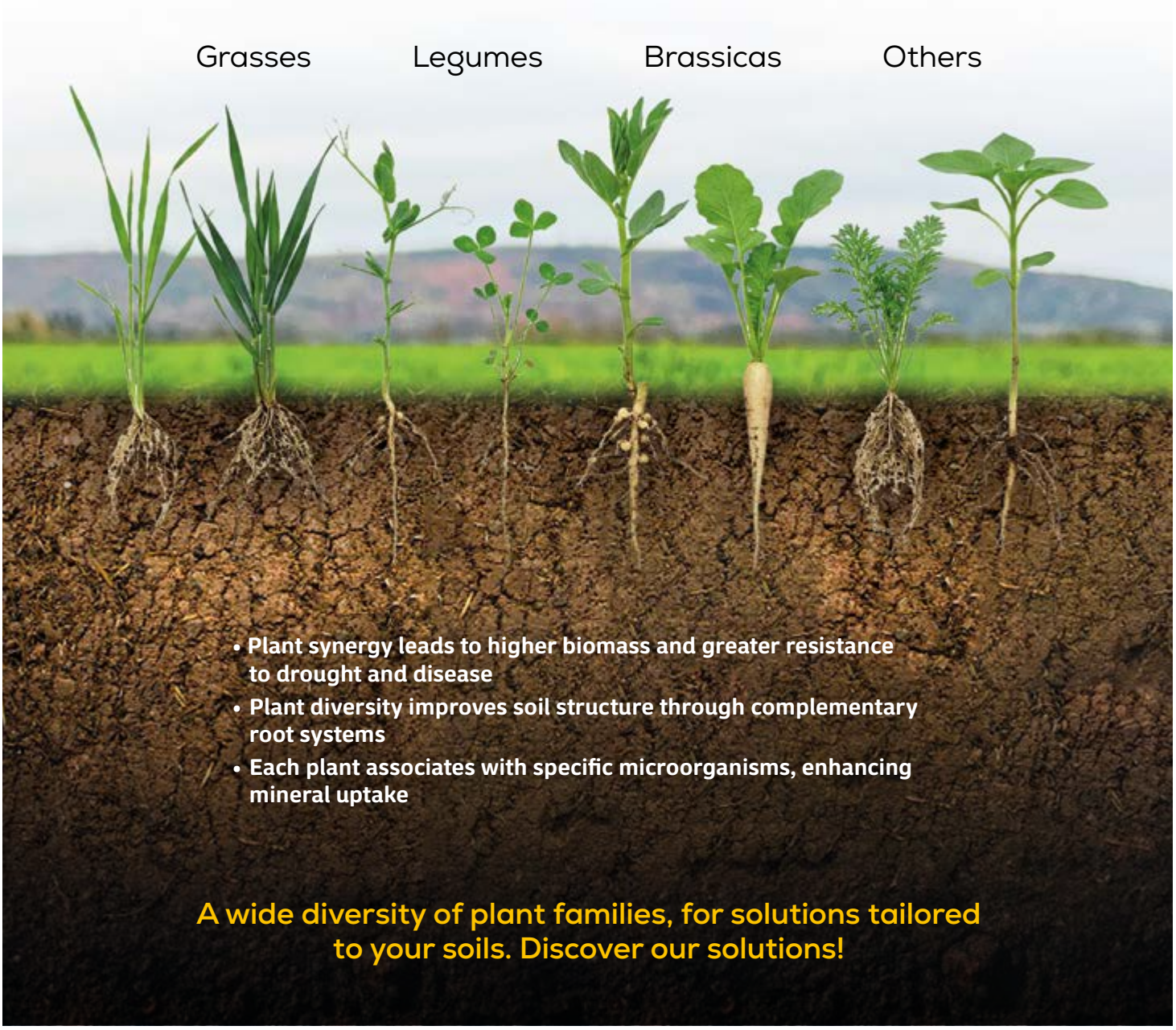


BENEFITS OF BIODIVERSITY

DIFFERENT PLANT FAMILIES, DIFFERENT ROLES

? DID YOU **know?**

Cover crop biodiversity improves soil resilience



- **Plant synergy leads to higher biomass and greater resistance to drought and disease**
- **Plant diversity improves soil structure through complementary root systems**
- **Each plant associates with specific microorganisms, enhancing mineral uptake**

A wide diversity of plant families, for solutions tailored to your soils. Discover our solutions!

PURE SPECIES LEGUMES

- Ability to fix atmospheric nitrogen through root nodules
- Positive response to Rhizobium inoculation to optimize nodulation
- Dense, soil structuring root development near the soil surface
- Good frost tolerance and the ability to maintain late season growth

Common Vetch

Seeding rate: 36-54 lb/acre
40-60 kg/ha
Frost tolerance: -8 °C

- Winter-killed annual plant
- Dense, shallow root system
- Prefers sandy soils

Hairy Vetch

Seeding rate: 18-27 lb/acre
20-30 kg/ha
Frost tolerance: -8 °C

- Winter annual:
  - Annual if seeded in spring
  - Biennial if seeded in fall
- Regrows after mowing
- Drought-tolerant once well established
- Continues to grow late into the season

Faba Bean

Seeding rate: 80-178 lb/acre
90-200 kg/ha
Frost tolerance: -5 °C

- Rapid early-season growth
- Early nodule formation for quick nitrogen production
- Dense, soil-structuring root system

Forage Pea

Seeding rate: 67-90 lb/acre
75-100 kg/ha
Frost tolerance: -9 °C

- Very rapid growth
- Suppresses weed growth
- Well suited to cold, wet conditions

Austrian Winter Pea

Seeding rate: 45-90 lb/acre
50-100 kg/ha
Frost tolerance: -8 °C

- Slower start
- Better root development than forage pea
- Less above-ground biomass
- Biennial plant that very rarely overwinters under our conditions

Crimson Clover

Seeding rate: 13-18 lb/acre
15-20 kg/ha
Frost tolerance: -13 °C

- Winter annual:
  - Annual if seeded in spring
  - Biennial if seeded in fall
- Rarely overwinters under our conditions
- Establishes faster than perennial clovers
- Small seeds fill gaps well
- Prostrate growth habit
- Suited to cool, wet climates
- Not very competitive

Sunn Hemp

Seeding rate: 18-22 lb/acre
20-25 kg/ha
Frost tolerance: -1 °C

- Tropical legume requiring heat and a long growing season
- Very drought tolerant
- No inoculant available
- Killed by the first frost

Forage Soybean

Seeding rate: 40-49 lb/acre
45-55 kg/ha
Frost tolerance: -2 °C

- New indeterminate growth soybean genetics
- Can reach 6–7 ft in long seasons (10–12 t DM/ha)
- High nitrogen return potential
- Highly drought resistant
- Not sensitive to Sclerotinia due to very late flowering

Red Clover

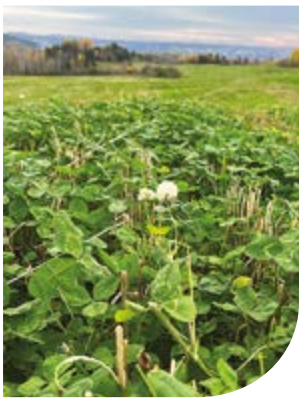
Seeding rate: 5-13 lb/acre
6-15 kg/ha
Frost tolerance: -15 °C

- Primary taproot with secondary lateral roots
- Available in two types: single-cut or double-cut
- Single-cut clover establishes more slowly, reducing the risk of overtaking the crop when intercropped in cereals
- When established in spring, can produce substantial fall biomass

White Clover

Seeding rate: 5-7 lb/acre
6-8 kg/ha
Frost tolerance: -15 °C

- Three types: Dutch (dwarf), Huia (semi-dwarf) and Ladino (giant)
- Huia is widely used for its short, creeping growth habit
- Shallow stoloniferous root system
- Small seeds are easy to establish
- Attracts pollinators



PURE SPECIES

GRASSES

- High carbon input contributing to increased soil reserves
- Development of a dense, deep fibrous root system that promotes nutrient recycling
- Efficient utilization of farm fertilizers

Spring Cereals

Seeding rate: 53-107 lb/acre
60-120 kg/ha
Frost tolerance: -3 °C

- Oats are most commonly used due to tolerance to wet and acidic soils
- Easy, rapid establishment provides weed and erosion control
- C:N ratio increases as the crop matures
- Upright growth requires higher seeding rates when seeded late

Fall Cereals

Seeding rate: 67-134 lb/acre
75-150 kg/ha
Frost tolerance: -15 °C

- Mainly rye
- Spring-seeded: provides long-lasting soil cover without heading
- Fall-seeded: used as a living cover through winter
- Can be rolled or terminated in spring for no-till seeding
- Caution: terminating a rye cover can have an allelopathic effect on corn

Italian Ryegrass

Seeding rate: 13-18 lb/acre
15-20 kg/ha
Frost tolerance: -8 °C

- Very dense root system at the surface and at depth
- Good shade tolerance
- Favor early seeding when intercropped with corn (V4–V5)
- Prefers fine- to medium-textured soils
- Annual type (Westerwold or alternative):
  - heads in the year of seeding
  - 40–80 cm tall
- Biennial type (Italian or non-alternative):
  - leafy
  - does not head in the year of seeding
  - up to 40 cm

PURE SPECIES

WARM SEASON GRASSES

- Tropical species requiring a long growing season and high temperatures
- Optimal establishment in well warmed soils (15 °C)
- Vigorous in season growth despite a slow, less competitive initial establishment
- High biomass potential despite high nitrogen requirements
- Deep, soil structuring root system

Sudangrass

Seeding rate: 13-22 lb/acre
15-25 kg/ha

Frost tolerance: -1 °C

- Better suited to cooler regions (2300 CHU)
- Flatter, finer stems than sorghum-sudangrass
- Multi-cut potential

Sorghum-Sudangrass

Seeding rate: 27-31 lb/acre
30-35 kg/ha

Frost tolerance: -1 °C

- Hybrid between grain sorghum and sudangrass
- Multi-cut potential
- Excellent biomass potential
- Can reach 10 ft. in height

Forage Pearl Millet

Seeding rate: 9-13 lb/acre
10-15 kg/ha

Frost tolerance: -1 °C

- Reduces potato Verticillium wilt incidence because nematodes reproduce very poorly on millet
- Prefers light soils and tolerates acidity

Japanese Millet

Seeding rate: 18-22 lb/acre
20–25 kg/ha

Frost tolerance: -1 °C

- Shorter, leafier plants than the previously listed warm season grasses
- More flexible nitrogen requirements
- Better suited to cooler regions (around 2300 CHU)

PURE SPECIES

BRASSICAS

- Very fast growing plants
- Taproot system that provides strong soil structuring
- High nitrogen requirements
- Presence of glucosinolates with suppressive effects on weeds and pests
- Caution with rotations involving vegetables and canola, as brassicas can host clubroot of crucifers and swede midge

Yellow Mustard

Seeding rate: 7-9 lb/acre
8-10 kg/ha

Frost tolerance: -7 °C

- Cool-season species that withstands early frosts well
- Cost-effective seed for late-season planting
- Makes good use of farm manures

Brown/Oriental Mustard

Seeding rate: 1.8-3.5 lb/acre
2-4 kg/ha

Frost tolerance: -7 °C

- Higher glucosinolate content
- Can be used for biofumigation
- Slower early establishment and later flowering

Forage Turnip

Seeding rate: 5-9 lb/acre
6-10 kg/ha

Frost tolerance: -15 °C

- Biennial plant
- Captures large quantities of nitrogen
- More cold tolerant than radish

Forage Radish

Seeding rate: 5-9 lb/acre
6-10 kg/ha

Frost tolerance: -10 °C

- Improves soil aeration
- Residues decompose quickly
- Also known as Daikon

Oilseed Radish

Seeding rate: 5-9 lb/acre
6–7 kg/ha

Frost tolerance: -5 °C

- Less developed root system than forage radish
- Leafy growth habit
- Goes to seed more quickly

Nematode-Control Radish

Seeding rate: 6-11 lb/acre
7-12 kg/ha

Frost tolerance: -7 °C

- Carwoodi radish releases a biochemical compound that stimulates cyst nematode egg hatch; nematodes attach to the radish and then starve or fail to reproduce
- High glucosinolate content for biofumigation

Forage Kale

Seeding rate: 3.5-4.5 lb/acre
4-5 kg/ha

Frost tolerance: -15 °C

- Biennial plant
- Excellent cold tolerance

Brassica

Forage Kale

Forage rape

Seeding rate: 3.5-4.5 lb/acre
4-5 kg/ha

Frost tolerance: -15 °C

- Brassica blend that helps reduce costs
- Typically includes forage kale and forage rape (Brassica Napus)

PURE SPECIES

OTHER OPTIONS

- Excellent utilization of solid and liquid manures
- Soil structuring roots
- Very effective mineral recycling
- Contribution to biodiversity

Sunflower

FAMILY: ASTERACEAE
Seeding rate: 7-9 lb/acre
8-10 kg/ha
Frost tolerance: -1 °C

- Taproot with abundant secondary roots that can grow deep
- Very rapid growth in warm conditions
- Not very competitive
- Rigid stem that allows other species to climb
- Susceptible to Sclerotinia; terminate at flowering

Phacelia

FAMILY: HYDROPHYLLACEAE
Seeding rate: 7-11 lb/acre
8-12 kg/ha
Frost tolerance: -7 °C

- Light-sensitive seed; avoid exposing seed to light
- Do not seed too deep
- Slow initial growth and low competitiveness early on
- Abundant, competitive foliage once established
- Taproot with a very fine, well-developed secondary root system that improves soil structure
- Nematicidal plants; useful for aphid control by attracting predators
- Excellent use of nitrogen from farm manures and ability to take up potassium

Buckwheat

FAMILY: POLYGONACEAE
Seeding rate: 36-53 lb/acre
40-60 kg/ha
Frost tolerance: -1 °C

- Extensive root network promotes aggregation
- Rapid growth that smothers weeds
- Indeterminate flowering and rapid seed set
- Plan a cutting for the Vitali-T Full Season mix

Chicory

FAMILY: ASTERACEAE
Seeding rate: 4-5 lb/acre
5-6 kg/ha
Frost tolerance: -25 °C

- Biennial plant
- Mobilizes large quantities of minerals
- Strong nitrogen return
- Taproot can grow very deep
- Highly drought tolerant

MYCORRHIZAL INOCULANT

AMPLIFY THE VALUE OF YOUR FORAGE AND GREEN MANURE

LALRISE PRIME

- Better crop establishment
- Increases yields of the subsequent crop
- Improves forage value and digestibility

Microbial by nature LALLEMANDPLANTCARE.COM

LALLEMAND

DECISION CHART

For late or broadcast seeding, increase aseeding rates by 20%

ANNUAL WITH MANURE

WITH OATS

CLASSIC

Mixtures	Seeding	Number of weeks of growth
Complete **Vitali-T**	50 lb/acre	5 weeks and +
All-terrain **Vitali-T**	67 lb/acre	5 weeks and +
Belgian **Vitali-T**	22 lb/acre	7 weeks and +

PREMIUM

Mixtures	Seeding	Number of weeks of growth
Full season multi-species **Vitali-T**	67 lb/acre	All season or 7 weeks and +
Balanced radish **Vitali-T**	58 lb/acre	5 weeks and +
Full season **Vitali-T**	58 lb/acre	All season or 7 weeks and +

WITHOUT OATS

CLASSIC

Mixtures	Seeding	Number of weeks of growth
Late **Vitali-T**	7 lb/acre	4 weeks and +

PREMIUM

Mixtures	Seeding	Number of weeks of growth
Combined **Vitali-T**	13 lb/acre	7 weeks and +

ANNUAL WITHOUT MANURE

WITH OATS

CLASSIC

Mixtures	Seeding	Number of weeks of growth
All-terrain **Vitali-T**	67 lb/acre	5 weeks and +
Balanced radish **Vitali-T**	58 lb/acre	5 weeks and +
Balanced **Vitali-T**	67 lb/acre	6 weeks and +

PREMIUM

Mixtures	Seeding	Number of weeks of growth
Nitrogen **Vitali-T**	67 lb/acre	6 weeks and +
Multi-purpose oat **Vitali-T**	62 lb/acre	6 weeks and +

WITHOUT OATS

CLASSIC

Mixtures	Seeding	Number of weeks of growth
Multi-purpose **Vitali-T**	45 lb/acre	6 semaines et +
Multi-use **Vitali-T**	56 lb/acre	7 semaines et +

PREMIUM

Mixtures	Seeding	Number of weeks of growth
Structuring **Vitali-T**	31 lb/acre	All season

BIENNIAL WITH MANURE

CLASSIC

Mixtures	Seeding	Number of weeks of growth
Bi-annual **Vitali-T** **without brassicas**	89 lb/acre	4 semaines et +

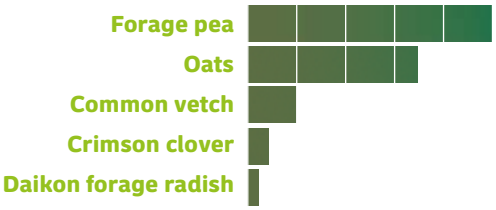
VITALI-T
MIXES

- Mixes designed to meet a wide range of needs
- Stimulation of microbial biodiversity, promoting mineral availability
- Improved resilience to climatic stresses (drought, excess moisture, diseases)
- For late or broadcast seeding, add 20% to the recommended seeding rates

Multi Purpose Oat
Vitali-T

Seeding rate: 62 lb/acre - 70 kg/ha

- Versatile
- Designed for producers without access to solid and/or liquid manure
- Excellent preceding crop for nitrogen demanding crops



Multi Purpose
Vitali-T

Seeding rate: 45 lb/acre - 50 kg/ha

- Grass free mix that takes threshing residues into account
- Terminate before radish seed maturation

Balanced
Vitali-T

Seeding rate: 67 lb/acre - 75 kg/ha

- Rapid soil cover
- Good preceding crop for nitrogen demanding crops
- Well balanced species composition

Balanced Radish
Vitali-T

Seeding rate: 58 lb/acre - 65 kg/ha

- Addition of Daikon radish for its soil decompaction effect
- Terminate before radish seed maturation

Combined
Vitali-T

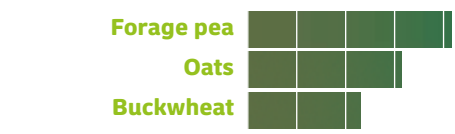
Seeding rate: 13 lb/acre - 15 kg/ha

- Good biomass production, even under drought conditions, due to drought tolerant phacelia
- Mix that makes excellent use of solid and liquid manures

All Terrain
Vitali-T

Seeding rate: 67 lb/acre - 75 kg/ha

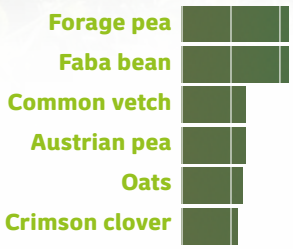
- Mix well adapted to a wide range of soil types
- Rapid growth of oats and buckwheat providing effective weed suppression
- Ability of buckwheat to extract phosphorus from the soil



Nitrogen
Vitali-T

Seeding rate: 67 lb/acre - 75 kg/ha

- Mix with a very high legume content
- Recommended when no fertilizer application is possible in the fall



Belgian
Vitali-T

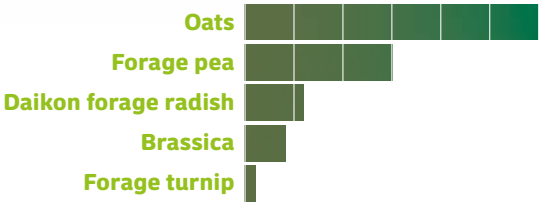
Seeding rate: 22 lb/acre - 25 kg/ha

- Mix combining three species, each with distinct characteristics
- Phacelia and sunflower to extract potassium and phosphorus from the soil, respectively
- Phacelia and oats to enhance utilization of fall applied nitrogen

Complete
Vitali-T

Seeding rate: 51 lb/acre - 57 kg/ha

- Simple mix containing the three main plant groups: grasses, legumes and broadleaf species
- Makes excellent use of solid and liquid manures
- Produces high biomass
- Brassicaceae that enhance sulfur recycling
- Potential survival of crucifer species



Multi Use
Vitali-T

Seeding rate: 56 lb/acre - 63 kg/ha

- Legume dominant mix
- Brassicas recover excess soil nitrogen
- Residues that decompose rapidly in spring
- Excellent mix ahead of cereal crops

Late
Vitali-T

Seeding rate: 7 lb/acre - 8 kg/ha

- Very fast growing mix that can be seeded very late
- Excellent for utilizing nitrogen and sulfur from solid and liquid manures
- Cost effective with fewer bags to manage
- Potential survival of crucifer species

Bi-Annual

Vitali-T

Seeding rate: 89 lb/acre - 100 kg/ha

- Mix designed to regrow the following spring
- Excellent tool for producers practicing no till seeding into living cover
- Provides strong soil cover, allowing effective weed control
- Feeds microbial life late in the fall and early in the spring
- Spring regrowth can be rolled or terminated chemically If rolled without herbicide, do not terminate before the rye flowering / pollination stage to prevent regrowth

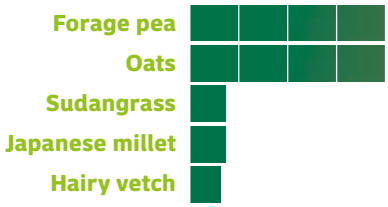
- Mixes adapted for potato production and horticulture
- Ideal for returning fields to production
- Soil regenerating effect
- Minimum of 10 weeks of growth required to properly utilize these mixes
- Full potential reached at approximately 15 weeks

Full Season

Vitali-T

Seeding rate: 58 lb/acre - 65 kg/ha

- Mix designed for potato and horticultural producers located in cooler regions
- Good balance between warm season and cool season species
- Provides high biomass input to the soil
- No need for rapid termination, as none of the species set seed quickly
- Plan one to two cuttings during the season

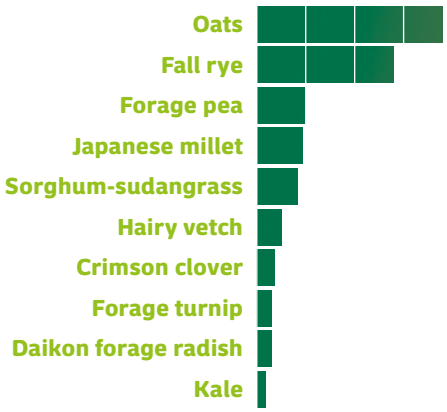


Full Season Multi Species

Vitali-T

Seeding rate: 67 lb/acre - 75 kg/ha

- Complex, well balanced mix with multiple functions
- Excellent option for potato and horticultural producers
- Provides high biomass input to the soil
- Plan one to two cuttings during the season



Structuring

Vitali-T

Seeding rate: 31 lb/acre - 35 kg/ha

- All species have a very powerful, soil structuring root system
- Highly drought resistant mix
- Provides exceptional biomass to the soil
- Delivers excellent nitrogen return through forage soybean

INTERCROPPED MIXES

- Importance of proper seeding technique to ensure good seed to soil contact
- When seeded early, seeds require moisture and light to germinate and establish
- When intercropped, clover reduces the incidence of Fusarium by preventing rain splash from reaching the grain heads
- Improves field trafficability in the fall
- Excellent nitrogen return potential from clover intercrops in cereals
- Possibility of using Italian ryegrass (biennial) as an intercrop in corn to prevent the annual type from completing its life cycle during the warm season (heading and dying)

Bi-Annual

Inter

Seeding rate: 13-16 lb/acre
15–18 kg/ha

- Dolomite ryegrass
- Chicory
- Forage turnip

Bi-Clover

Inter

Seeding rate: 5-7 lb/acre
6–8 kg/ha

- Red clover (single cut)
- White clover Huia

Fall Cereals

Inter

Seeding rate: 7 lb/acre
8 kg/ha

- Red clover (single cut)
- White clover Huia
- Chicory

Combo

Inter

Seeding rate: 13-16 lb/acre
15–18 kg/ha

- Annual ryegrass
- Forage turnip

Annual Mix

Inter

Seeding rate: 18-20 lb/acre
20–22 kg/ha

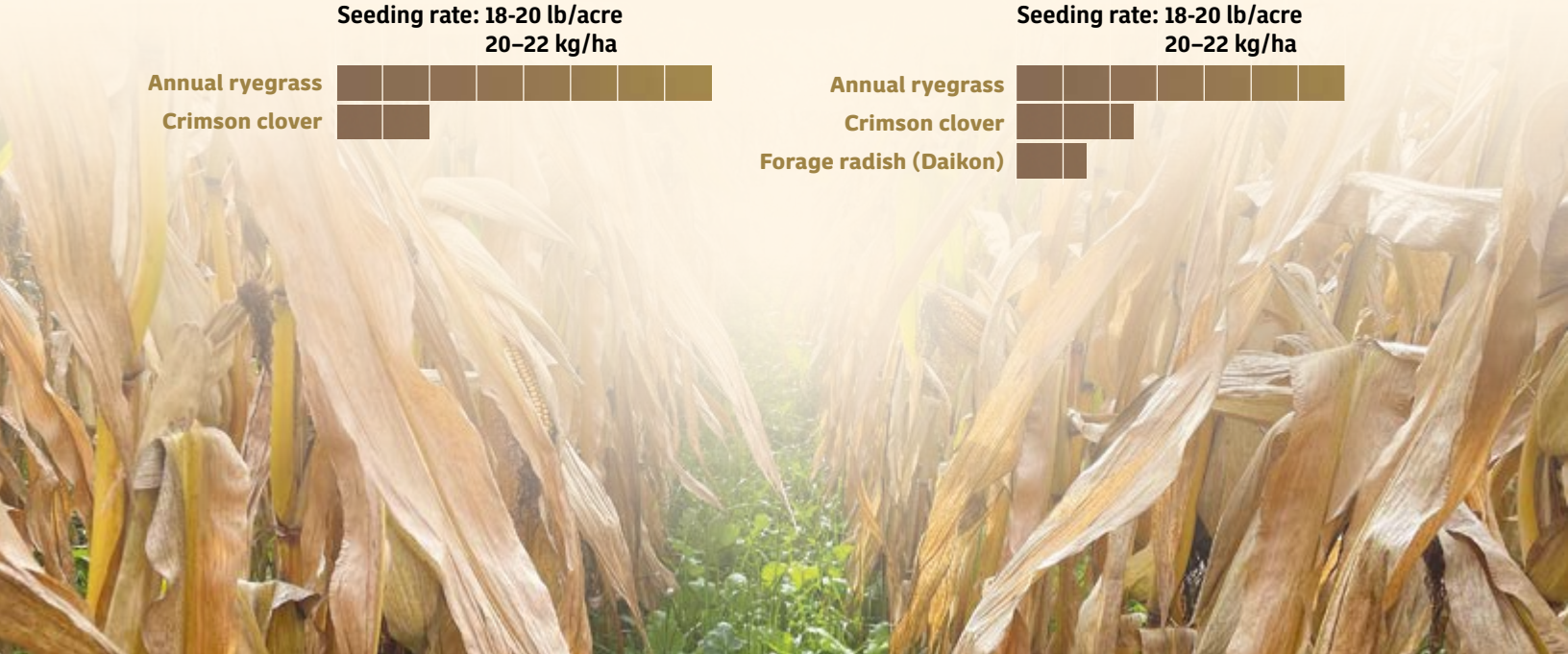
- Annual ryegrass
- Crimson clover

Annual Trio

Inter

Seeding rate: 18-20 lb/acre
20–22 kg/ha

- Annual ryegrass
- Crimson clover
- Forage radish (Daikon)



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