

AGROVIVE™

2018/2019 PRODUCT GUIDE



AGROVIVE: OUR BEGINNING

With many years of research and experiments building microbial and enzymatic platforms for the bioscience sector, the Agrovive team has discovered unique microbial strains that have demonstrated extraordinary effects on many plant species.

Sourced from aquatic environs and fens of the Coteau prairie, these microbial strains have delivered consistent yield and tonnage gains in a multitude of crops, forage and vegetables. Our microbes have been individually sequenced and publicly indexed.

PRODUCT COMPATIBILITY

Agrovive products unlock a plant's natural ability to produce hormones and metabolites that influence growth and other critical factors to production.

Hormone based products should **NOT** be applied after product inoculation without testing the effect on the plant in a small limited trial in the field. The effect of using untested hormone-based products after inoculation can significantly reduce growth and yield of the crops.

WHAT IS A MICROBIAL ENDOPHYTE AND HOW DOES IT WORK?

A microbial endophyte is a microorganism that lives inside the plants. The microbes live in the intercellular spaces and the cell walls where metabolism and cell division are regulated.

The plant maintains an available ionic state of salts and micronutrients all day. The removal of ionic state limitations within a cell allows for more pronounced cell division which results in the plant's ability to enhance the biomass, root number, leaf number, petiole and dry weight of the aerial portion.

The microbes recycle nutrients and micronutrients on a cellular level removing daily cyclic limitations to plant metabolism. By removing these limitations, the plant can continuously create metabolites such as IAA, IBA growth hormones, Pyruvate, Acetyl-CoA and other molecules necessary for reaching a plant's genetic potential.

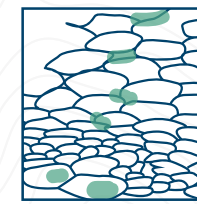
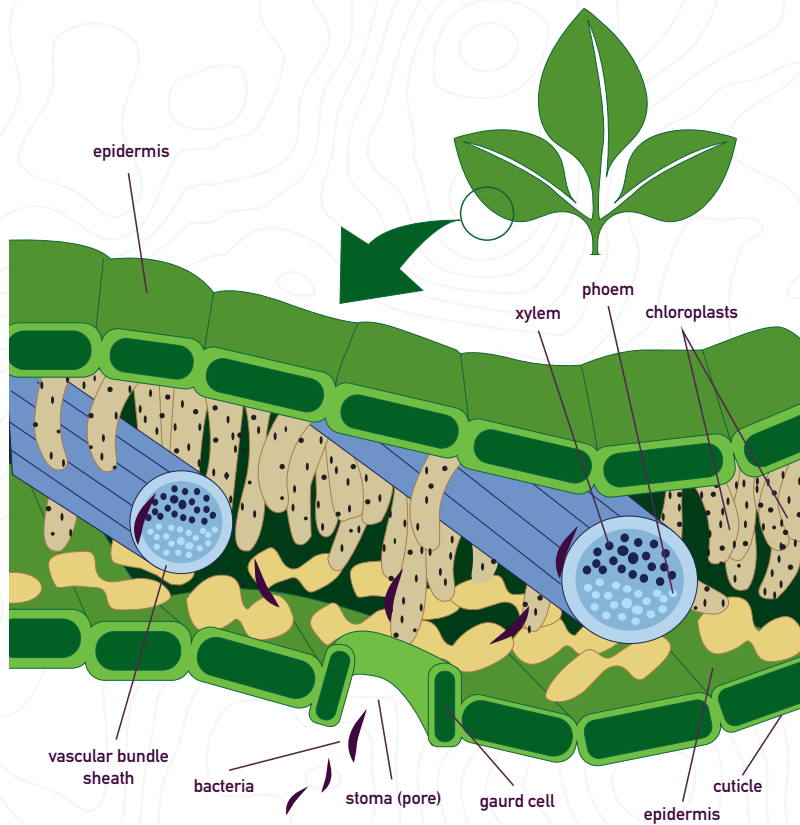
Our proprietary microbes remove limitations within the plant to allow increased growth, phosphate solubilization, nitrogen fixation and nutrient uptake.



LUXURY UPTAKE OF NUTRIENTS

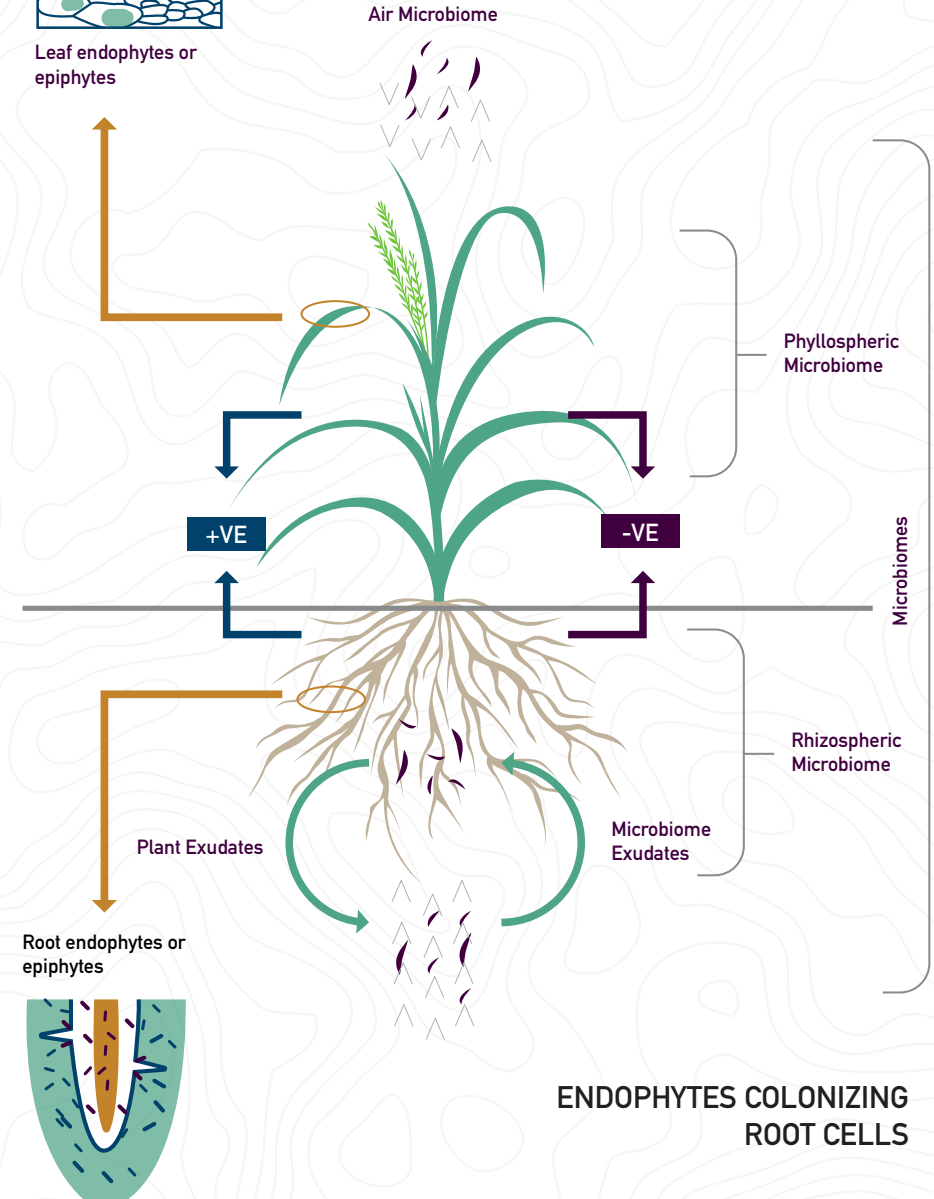
By maximizing the daily ionic state of nutrients, crops have been shown to create luxury nutrient reserves in excess of untreated plants that can be rapidly concentrated in reproductive tissues to enhance yields.

We have observed concentrations in wheat that were significantly increased over control plants prior to reproductive stages of head growth and fill. These excess nutrients were relocated to the heads at grain set.



Leaf endophytes or epiphytes

ENDOPHYTES COLONIZING LEAF CELLS



ENDOPHYTES COLONIZING ROOT CELLS



Root endophytes or epiphytes

AGROVIVE RISK MITIGATION STUDY (ARMS)

AGROVIVE MITIGATION TESTING

Agrovive products have been applied to soybean fields that have received significant hail damage in the Dakotas. We plan to conduct further testing to capture hail recovery results and data. The Agrovive Risk Mitigation Study (ARMS), managed by Agrovive, is intended to establish a database of hail-damaged soybeans and to track our foliar application as part of a Soybean Recovery Program. See full program details and sign up on our website under the Risk Mitigation Study tab.

CURRENT INDUSTRY MITIGATION APPLICATION RESULTS

Competitive risk mitigation studies have been conducted using fungicides applied to hail-damaged crops to determine if there could be an improvement to the yield for soybean plants (and corn plants). The soybean plants tested had reached a growth of at least R1. ***To date, those trials have proven that fungicides provided no significant yield increase of the damaged crops. ¹***

RESEARCH AND TRIALS

As part of our on-going R&D, we are testing additional microbial strains to determine their efficacy across multiple plant species. These trials will help to define optimal application timing and compatibility in diverse climates and soil conditions in North America.

We are working to evaluate microbial strains that can affect both plant morphology and yield increases. In addition, a large scale isolation and screening of protocols trial, involving thousands of naturally derived samples, is underway.



ALFALFA

WHAT TO WATCH FOR


- Reduces drought stress
- Broader leaves
- Increased root mass
- Stronger leaf connections
- Tighter petioles

APPLICATION RATE

FOR FOLIAR:
1 quart per acre

APPLICATION TIMING

 **NEW SEEDING**
2 weeks after emergence through crown development
(week 14-16)

 **BETWEEN CUTTINGS**
optimal foliar is 3-7 days after cutting or as soon as sufficient leaf surface area has formed

GENETICS
Do your genetics support delayed flowering?

SOYBEANS

WHAT TO WATCH FOR


- Look for more consistency of 3 and 4 beans per pod versus 1 and 2 beans per pod.
- Increased nodulation
- Increased leaf surface area
- Combats drought stress


APPLICATION RATE

FOR FOLIAR:
1 quart per acre

FOR SEED COATING:
5 oz of seedcoat per bushel

APPLICATION TIMING

 **APPLY SEED COAT**
to affect rooting and nodulation

 **APPLY AT V1 TO EARLY V2**
to affect pod bearing bean count and branching

GENETICS
Do your genetics support more pod bearing branches?

LIFECYCLE APPLICATIONS

Timing is critical to the success of any biologic inoculate. A seed coat application enhances root development and micro-nutrient uptake through the root surface, resulting in the best solubilization of nutrients, such as phosphorus.

The best way to affect tiller count, or stem girth and strength, is to time an application to when those traits are being established. For most plants, this occurs within the first few weeks of growth. Tillers are maximized as a seedcoat in small grains.

For an increase in biomass through leaf surface area and mass, apply the foliar product much later. For corn silage, a marked increase was realized with application from V5 to just prior to tassel at V7. This represents the latest application of the product in the 2017 growing season.

Alfalfa (one time application per cutting)

alphajoule™

SEED COAT



ENHANCE STAND
ESTABLISHMENT

2ND TO 3RD TRIFOLIATE



NEW PLANTING &
SPRING GREEN UP

AFTER CUTTING



APPLY WHEN AXIAL
LEAF RE-GROWTH
APPEARS

Sunflowers (one time application)

hydra^{val}

SEED COAT



ENHANCE STAND
ESTABLISHMENT &
DAMAGE RESILIENCY

V4 TO V6 FOLIAR



ENHANCE STEM STRENGTH
& LEAF SURFACE AREA

AFTER R1



NO EFFECT

To sustain the head weight or corn kernel counts, plan to time the application prior to the plant-fixing yields. With corn, plan to apply prior to the V3 stage so the plant is established and can support a greater yield.

Cereal / Forage grains (one time application per cutting)

ION^{fx}

SEED COAT



MAXIMIZES
ROOT GROWTH, TILLER
COUNT & HEAD BEARING
STEM COUNT

STAGE 1 TO 3



ENHANCES STEM STRENGTH
& HEAD WEIGHT

STAGE 4 TO 8



INCREASE LIMITED
TO BIOMASS
& TONNAGE

Soybeans (one time application)

ION^{fx}

SEED COAT



MAXIMIZES ROOT GROWTH
& STAND ESTABLISHMENT

V1 TO V2 STAGE



ENHANCES BEAN COUNT &
GENETIC DEPENDENT BRANCHING

AFTER R1



NO EFFECT

Corn (one time application)

ION^{fx}

SEED COAT



MAXIMIZES ROOT
FORMATION &
NUTRIENT UPTAKE

V1 TO V4 STAGE



INCREASES OVERALL
KERNEL COUNT &
STAND STRENGTH

V5 TO V7



ENHANCES LEAF
MASS STALK SIZE
& TONNAGE



FORAGE

WHAT TO WATCH FOR

- Increased tonnage
- Wider and longer leaves
- Increased tiller count (with early seed application)
- Maximized grain weight

APPLICATION RATE

FOR FOLIAR:

1 quart per acre


FOR SEED COATING:

5 oz of seedcoat per bushel

PLANNED FOR 2018

- | | |
|---------------|-------------|
| Triticale | Sudan Grass |
| Rye | Peas |
| Oats | Sorghum |
| Timothy Grass | |

APPLICATION TIMING

-  **APPLY SEED COAT**
to optimize root system development & tiller formation

-  **SINGLE SHOOT(S1) & EARLY TILLERING(S2)**
affects stem count, thickness & head weight

-  **TILLERING(S3) THRU LAST LEAF JUST VISIBLE(S8)**
affects biomass

SILAGE

PRODUCT BENEFITS

- Increased leaf mass (tonnage)
- Reduce daily heat stress loss
- Increased kernel fill (with early application-V3 or earlier)
- Improve nutrient transport
- Allow for greater root metabolite transport

APPLICATION RATE

FOR FOLIAR:


1 quart per acre


FOR SEED COATING:

5 oz of seedcoat per bushel

APPLICATION TIMING

-  **APPLY SEED COAT**
to influence rooting

-  **APPLY V1 THRU V3**
to affect both kernel and biomass tonnage

-  **APPLY V4 THRU V7**
to increase leaf and stalk biomass and overall tonnage



hydra^{val}[™]

ION^{fx}[™]

SUNFLOWER

WHAT TO WATCH FOR

- Increased leaf size
- Reduced leaf wilt due to drought stress
- Greater diameter of stems
- Increased pollinator activity due to more sugars in the flower
- Plant regeneration and resiliency after damage

APPLICATION RATE

FOR FOLIAR:

1 quart per acre

FOR SEED COATING:

5 oz of seedcoat per bushel

APPLICATION TIMING



APPLY SEED COAT
to optimize root
system development



**APPLY FOLIAR
BETWEEN V4 & V6**
for best results

GENETICS

- Do your sunflower genetics support:
- A. Full-sized and multiple heads?
 - B. Increased oil content?
 - C. Increased seed size?

COMING IN 2018

Additional trials
and cropping methods

CEREAL GRAINS AND WHEAT

WHAT TO WATCH FOR

- Increased head-bearing tillers
- More consistent head height at harvest
- Increased head weights
- Increased leaf size makes more sugars
- Increased straw tonnage
- Increased root mass
- Reduced daily drought & heat stress

APPLICATION RATE

FOR FOLIAR:

1 quart per acre

FOR SEED COATING:

5 oz of seedcoat per bushel

APPLICATION TIMING



APPLY SEED COAT
improves rooting and
maximizes tiller count



**FOLIAR APPLICATION
STAGE 1 TO STAGE 3**
influences tiller and
stem strength



**FOLIAR APPLICATION
STAGE 4 TO STAGE 8**
affects leaf mass and
head weights

SPRAY TIP SELECTION

TEEJET™ XR, XRC OR TEEJET TURBO

teejet.com

RED TIP	LINE PRESSURE	APPLICATION SPEED
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	20 PSI	8 MPH
	30 PSI	10 MPH
	MAX 40 PSI	12 MPH
BROWN TIP	10 PSI	12 MPH
	30 PSI	20 MPH
	MAX 40 PSI	15 MPH

APPLICATION STANDARDS

DILUTION WATER PER ACRE: 10 Gallons (37.85 acres)

RECOMMENDED SCREEN SIZE: No smaller than 50 mesh
No tip screen required

RESIDENCE TIME BEFORE RAIN: 3 hours prior

APPLICATION TEMPERATURE RANGE: 40 to 85°F (4 to 29°C)

AGROVIVE™

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