

The
PEANUT GROWER

INOCULANT GUIDE

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VERDESIAN LIFE SCIENCES

PEANUT GROWERS OF AMERICA, LET'S TALK YIELDS.

Times like these make maximizing every plant's potential more crucial than ever. We all know how important nitrogen is to achieving that potential, but do you know the best and most economical way to deliver the nitrogen that peanuts need? Inoculation. An inoculant can make all the difference for your yields and your bottom line. There's an ideal inoculant waiting. And we're here to help you find it.

Verdesian Life Sciences is proud to sponsor the 2017 Inoculant Guide, a key tool for creating an inoculant plan suitable for your farm. This issue covers not only yield enhancement information, but keys to overall plant health and efficiency with the use of fresh, active inoculants, best practices to care for inoculants, application tips and more.

When it's time to make your inoculant decision, talk to your local dealer about nitrogen-fixing Primo Power CL. With specially selected strains of rhizobia and a proprietary plant health promoter, it's designed to boost yield potential by improving plant health right from the start.

If you're looking to boost yields, contact a Verdesian Life Sciences specialist at www.vlsci.com/find-a-specialist. We'd be happy to find an inoculant that works best for you.

All the best,

KURT SEEVERS

Technical Development Manager
Verdesian Life Sciences

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For Peanuts, Nature's Way Is Best

Within each peanut seed is the potential to produce a big healthy plant capable of setting hundreds of pegs per plant that become pods containing multiple kernels inside. Reaching that maximum yield potential is only possible by providing that seed with everything it needs to germinate quickly and grow vigorously from the start. One component added in-furrow with the seed that will help the peanut plant from the beginning is an inoculant.

Inoculants Are Designed To:

- Enhance plant growth with specially selected strains of *rhizobia*
- Enable healthier plants from the start with earlier nitrogen fixation
- Maximize yield potential with increased nodulation

The whole process is natural to legumes and the most efficient and economical way to supply the crop with nitrogen. But, it all depends on whether the bacteria are in the right place at the right time. That's why adding an inoculant at planting — a fresh, newly made inoculant product containing vigorous bacteria — is the only cost-effective way to ensure the needed bacteria are present in the soil and in close proximity to the seed.

In This Guide

This issue of *The Inoculant Guide*, sponsored by Verdesian Life Sciences, offers a look at how inoculants fit into a step-by-step countdown to a successful peanut crop. Nitrogen made available to the plant maximizes yield, as research has shown that peanut plants do not respond in the same fashion to nitrogen fertilizer and can even be adversely affected.

Case studies from 2016 further amplify the need for an



added inoculant based on weather and field conditions the previous year and at planting. Plus, application insights and care and handling of inoculant products are always a good reminder.

In the end, peanut planning can begin in earnest with the knowledge and understanding that an inoculant application at planting is simply giving the natural process of this amazing legume a head start toward maximum yields. IG

CONTENTS

I-4 Countdown To Success

From Specially Selected Strains To Maximum Yields

I-5 Quick Tips

Follow These Simple Tips For Inoculant Use And Application

I-6 Using Inoculants Adds Up

Research Shows The Yield And Economic Return Of Inoculants

COUNTDOWN TO SUCCESS

Using the latest, most advanced science and technology to produce maximum yield and quality is the goal of peanut producers, university and Extension researchers and crop input companies. With an inoculant product, this means identifying the best and most active bacteria that will work quickly around the germinating seed to colonize roots and begin supplying nitrogen to the crop in a symbiotic relationship between plants and the bacteria. By adding *rhizobia* in-furrow, the technology packed into these micro-organisms help increase nitrogen-fixing root nodules, which, in turn, boosts nitrogen uptake in plants. Put simply, adding an inoculant product in-furrow at planting is a countdown to success.

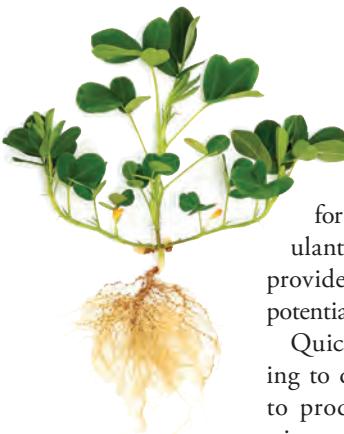


5 Specially Selected Rhizobia Strains

Stan Deal, Verdesian Life Sciences technical sales representative, says the science behind the new inoculant product Primo Power CL is centered on the seed.

"The goal is to generate a healthier plant right from the start. Primo Power CL contains multiple strains of *rhizobia* that are isolated and produced to ensure optimum performance in all conditions and to perform especially well under stress."

Phil Shelley, also a Verdesian Life Sciences technical sales representative based in Dothan, Ala., says the new inoculant product offers one of the highest *rhizobia* concentrations in the industry. "Primo Power CL delivers 4.5 billion colony-forming units of *rhizobia* per gram to the plant. This higher concentration ensures the highest level of aggressive *rhizobia* to produce larger amounts of peanut-producing nitrogen," he says.



4 More Nodules On The Roots

Peanuts that get a faster, healthier start and develop a larger root mass improve the crop's chances for reaching its genetic potential for greater yields, Deal says. "This peanut inoculant opens the door for more nodules, which provide more available nitrogen to increase the potential number of pegs and pods that are set."

Quick germination and a uniform stand, leading to quick canopy closure is ideal for the crop to produce maximum yield, but this requires nitrogen.

3 More Nitrogen For The Plant

Shelley explains that Primo Power CL aids in boosting yields by helping peanut plants reach their full potential.

"It opens the door for more nodules, which bring more nitrogen to the plant, resulting in better yield potential. A healthier plant is generated right from the start enabling the peanut seed to reach its full potential to maximize yield," he says. "Primo Power CL gives growers the confidence that the *rhizobia* bacteria is there to give their peanuts the best chance to nodulate and grow."

2

Increased Peg And Pod Set

The goal of every producer is to ensure the best conditions possible so that when the crop starts pegging, it will set the most pegs, which turn into pods, as it potentially can.

Deal says that even in less-than-ideal conditions, the specially selected strains of *rhizobia* in Primo Power CL are proven to help peanuts perform.

"Growers can be assured that they have given the peanut plant the nitrogen it needs to produce the maximum amount of pegs and pods," he says.

1

Maximum Yield

"Basically, this product is an evolution of the company's original Primo Power inoculant, which has been proven to deliver more profit per acre than other inoculant products," Shelley says. "Producers are setting their crops up for success."

By maximizing the amount of nutrients taken up by the roots and made available to the growing plant, Primo Power CL improves stand count, raising yield potential, he says.

While maximum yield is the goal of adding an inoculant product, Deal says the new inoculant offered from Verdesian Life Sciences is made with less water, making the product package lighter and handling easier. "Its concentrated liquid formulation offers a convenient, lower-use rate for more efficient application," Deal says.

As with most all inoculant products, Deal says it is compatible with most any product you would apply in-furrow.

But it's the bottom line that Deal and Shelley know is most important for producers and both say that Primo Power CL provide the most active bacteria to increase nodulation and nitrogen fixation leading to more pegs and pod set and, thereby, more yield. That's the bottom line. IG



Plant Health Benefits:

- Increased seedling vigor, including a noticeable height difference during early growth stages
- Improved stand count provides more plants for quicker canopy development and increased yield potential
- Enlarged root mass for improved water and nutrient uptake
- Additional nodulation to produce more available nitrogen to increase the potential number of pegs and pods that are set



QUICK TIPS

Jason Sarver, Mississippi State University Extension agronomist, says the proper use of inoculants has been especially important in his state because of the increase in peanut acreage. As Sarver notes, any new ground or ground out of production for four or more years should always receive an inoculant application.

"An inoculant should be used if peanut is being planted in fields that have had standing water or total saturation for extended periods. This will be more common in parts of Mississippi than in the deep sands of the Southeast and make an inoculant application important for us."

"Given the relatively low cost and the potential detrimental effects from not using it, I consider inoculants to be inexpensive insurance."

Sarver offers the following tips:

- ▶ Peanut and soybean inoculants are not the same. Make sure the product is specifically for peanuts and that it is a true inoculant.
- ▶ Inoculant products contain living organisms. Store in a cool, dry place out of direct sunlight. If using a liquid product, use non-chlorinated water as the carrier and make sure the tank is clean prior to use.
- ▶ Mix up only enough product for what you will use in a single day. If liquid is left in the tank, treat it as water the next day and add the inoculant product to create a new batch.
- ▶ Inoculants are a necessity for new ground or ground that has been out of peanut for 4+ years. It is inexpensive insurance on all ground, especially if that ground has been saturated for extended periods.
- ▶ Most liquid inoculant products are compatible with numerous in-furrow fungicides and other products for a specified time period. Read the product label or consult a company representative or Extension agent for compatibility questions.

Using Inoculants Adds Up

Using an inoculant product every year is only meaningful if it can be shown in real numbers adding to the overall bottom line of the producer. While many researchers over the years have conducted trials to show the effectiveness of inoculants, North Carolina State University Extension agronomist David Jordan has an ongoing project to show peanut yield response and economic return in fields without a history of peanuts versus fields with frequent plantings of peanuts.

Jordan recommends that growers inoculate their peanut seed or fields to ensure that adequate levels of *rhizobia* are present in each field.

Choose Assurance Over Unpredictability

"The data demonstrate that while peanut response to rotation is often predictable, response to inoculant and rotation combinations is less predictable. Therefore, peanuts should be inoculated in all years regardless of previous rotation history to minimize risk and maintain yield," he says.

The economic value of inoculation is also demonstrated in these trials.

"Assuming a commercial inoculant cost of \$8 per acre, economic return in new peanut fields at \$535 per ton was 51 times higher than the cost of the inoculant. A five-fold increase in economic return over inoculant cost was noted in fields with a recent history of peanut production."

Generally, Jordan says, a peanut plant with 15 nodules on the tap root by 40 days after emergence is showing adequate nodulation.

Long-Term Profitability

Based on his research, Scott Tubbs, University of Georgia research agronomist, offers this rule of thumb: It takes around 50 pounds per acre of peanuts to



These three peanuts were planted on May 9, with the picture taken on June 25. The two plants at the left are smaller, yellower, and with less root growth and a reduced number of nodules. Maria Balota, Virginia Tech's Tidewater AREC, says these two were planted in sorghum residue. The plant at right is bigger, greener and has more roots and nodules and was cultivated in sandier land.

pay for an inoculant application. Yield increases of more than 150 pounds per acre to more than 1,000 pounds per acre have been observed over non-inoculated peanuts in a variety of rotations, including short rotations, and in both irrigated and rain-fed conditions.

Tubbs says, "You may not see benefits from inoculants each and every year, but considering it only takes a 250 pound per acre yield bump once every three to five years to break even on an annual product application, such a decision should be an easy one for most growers to make since the chances of a profitable outcome in the long-term is much greater than not."

At times, even with the use of an inoculant product, such as when the product was not properly cared for at planting and many of the bacteria died or when soils become saturated after planting and the bacteria are adversely affected, an application of ammoni-

um nitrate may be needed. However, as Tubbs notes, yield will probably not equal a properly inoculated crop.

"On new land, inoculant failure can reduce profit by 200 pounds per acre even when 120 pounds of topdress nitrogen is applied. Foliar nitrogen applications are not cost effective and often cause unacceptable leaf burn."

This example further shows that properly applying a liquid inoculant is the best way to achieve maximum yield in the peanut crop. "It has been stated before by my predecessors and colleagues, and by me in previous years as well — an inoculant application is one of the most cost-effective 'insurance policies' at a grower's disposal," Tubbs says.

Virginia-Carolina Case Study

In 2016, the cool, wet start to the growing season in Virginia and the Carolinas was not good for effective nodulation and early peanut root growth.

Peanut Yield Response and Economic Return at a Price of \$535 per ton in Fields without a History of Peanuts versus Fields with Frequent Plantings of Peanuts (1999–2016) - David Jordan, NCSU

Inoculant Use	New Peanut Fields		Fields with a Recent History of Peanuts	
	Yield (lb per acre)	Economic return (\$ per acre)	Yield (lb per acre)	Economic return (\$ per acre)
No inoculant	3,571	39	4,282	229
Inoculant	5,133	449	4,475	273
Difference	1,562	410	193	44
Number of Trials	39	39	36	36
Years	1999–2016		1999–2016	

"Under these conditions, peanut developed only a few roots with a reduced number of nodules," says Maria Balota, assistant professor with Virginia Tech's Tidewater Agricultural Research and Education Center. "Plants were smaller and less green than 'normal' plants, in particular when planted in crop residue because this maintained soil cooler and wetter."

What can be done to prevent poor nodulation?

"One very important thing is to inoculate at planting," Balota says. "It is also important to scout for the number and size of the nodules in the first 45 days after planting."

For producers in the Virginia-Carolina region, Balota says, based on her research, the threshold of nodules a farmer should look for at two weeks after planting is an average of five big nodules on the main root; at 30 days, 70 nodules of any size on the main and

lateral roots; and at 45 days at planting a producer should be able to find an average of 130 nodules.

If poor nodulation is found at beginning flowering, which usually leads to smaller and yellowing plants, Balota says an inorganic nitrogen needs to be applied.

"Ammonium sulfate can be used up to 150 pounds of nitrogen per acre, which is about 714 pounds of ammonium sulfate per acre, and the sooner, the better." IG





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Seed Treatments
& Inoculants

NITROGEN FUELS YIELD IN PEANUTS.

PRIMO POWER CL
MAKES SURE THE
FUEL IS DELIVERED.

Nitrogen is essential to crop performance, and **Primo Power CL** inoculant delivers more of it into plants. With more nitrogen-fixing rhizobia applied, Primo Power CL boosts nitrogen intake so crops emerge quickly, grow fast and can deliver more yield. Open the door to more nitrogen, nutrients and growth with Primo Power CL.

For more information, contact your Verdesian technical sales representative or visit vlsci.com.

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