

ROLE OF BIO-N IN GININTUANG MASAGANANG ANI PROGRAM FOR CORN

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One of the mandates of BIOTECH is to search for alternative fertilizer technologies in line with the government's thrust on energy conservation



RATIONALE

- Rice and corn are staple crops of the Pilipino people.
- Corn has a variety of uses from food to feeds.
- The market price of nitrogenous fertilizers has escalated from P800.00 to more than P1,000.00 per bag.



- ⑩ > High cost and unstable supply of chemical fertilizers particularly nitrogen are limiting factors in crop production
- ⑩ > Most marginal and subsistence farmers apply none or much less of the fertilizer rates recommended for optimum growth
- ⑩ > As a result, the yield is usually below the potential of the crops

HISTORY OF BIO-N

In the latter part of 1980, there was energy crisis

BIOTECH was established, with alternative fertilizer use as one of the thrusts. Since then the search for alternative fertilizers started.

- The role of indigenous microorganisms as a possible tool to at least partially solve problems on the demand and supply of nitrogenous inorganic fertilizer problems started in 1980.
- Search for BNF in the non-legumes e.g. rice, corn and sugar cane started in the same year

- BIO-N was initially developed at Biotech in 1985 by Drs. M. Umali-Garcia and Teofila SJ. Santos

Field tests have been conducted for the 3 main crops using funds from Biotech Core, ASSP-PCARRD, DA-BAR

- Few farmers have tried but the increasing demand came about in late 1996

The Farmer Scientist Group organized by Dr. Romulo Davide is one group that started using and promoting BIO-N for corn.

Year 2003 – DA initially provided budget for the development and extension of BIO-N for value crops.

- Year 2004 – DA granted additional budget for the establishment of demonstration trials and seminars to create awareness among farmers on the possible potential of BIO-N in minimizing the use of imported inorganic fertilizers

TLRC-BIOTECH joint project has funded the take off of the promotion and commercialization of BIO-N

Currently, the quality of BIO-N is being improved through the joint efforts of Dr. M. Umali-Garcia and for. Juliet A. Anarna.

- In 1974, A Brazilian scientist, Dr. Johanna Dobreiner discovered a nitrogen-fixing bacterium, *Azospirillum* which colonizes roots of forage grasses and cereals and exert beneficial effects on their growth

- This grass-bacteria associative symbiosis differs from the legume-Rhizobium symbiosis in that the former does not form root nodules as a manifestation of the association

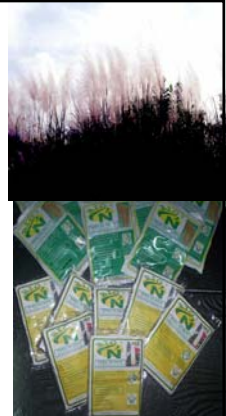
AZOSPIRILLUM

- *Azospirillum* resides mainly on zones of root elongation and bases of lateral roots while invading the root interior (Okon, 1985, Umali-Garcia, 1981)
- The discovery of the grass-bacteria association has revolutionized the interest of scientists all over the world

WHAT IS BIO-N?

- Powder inoculants that contains 2 species of nitrogen-fixing bacteria that were isolated from the roots of *Saccharum spontaneum* L., which have been screened for their effectiveness against a variety of agricultural crops

- The inoculant for corn is *Azospirillum lipoferum* that possess some 57% of the characteristics of typical culture collection strain and the rest are native characteristics



BENEFITS OF BIO-N

Enhances shoot growth and root development of host crop



•Makes plants resistant to drought and pest attack



Replaces 30 - 50% or more of the plant's total nitrogen requirement



Reduces incidence of corn ear-worm attack



Increases yield and milling recovery of corn and rice



Significant effects to inoculation can be obtained in the presence of $\frac{3}{4}$ to $\frac{1}{2}$ of the recommended amounts of inorganic N

Yield of corn (cv Pioneer) in Barili, Cebu, WS 2000

FERTILIZER TREATMENT	YIELD (tons/ha)
No fertilizer	1.3
Chicken manure	3.2
Chicken manure + urea	5.2
Chicken manure +Bio-N	5.5
Chicken manure + urea + Bio-N	5.8
Complete fertilizer (14-14-14)	4.5

Source: Dr. R Davide



Comparative response of maize as affected by BIO-N inoculation and application of chemical fertilizer



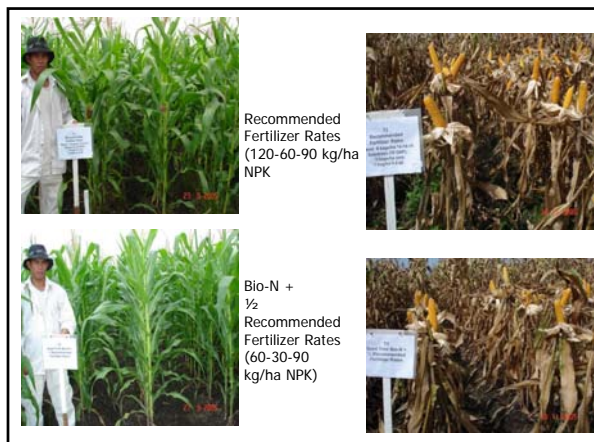
Fertility Trial in Sta Rita, Capas, Tarlac 2005 Wet Season. Monsanto



Farmer's Practice
Basal 4 bags complete
17 DAP – 3 bags urea
30 DAP – 3 bags urea

Bio-N + $\frac{1}{2}$ Farmer's Fertilizer Rates)





Directions for Using BIO-N

1. Place seeds in a suitable container and moisten with water. Pour sufficient amount of inoculants.



2. Mix thoroughly until the seeds are evenly coated; (a drop or 2 of sticker may be mixed with water to enhance adsorption of BIO-N on the seeds)



3. Sow coated seeds immediately.
4. Apply a bag of 46-0-0 or 14-14-14 to a hectare as side dress



RATE OF APPLICATION

•5-6 packets of BIO-N per hectare are recommended to inoculate seeds of rice/corn



Limitations

- Only serves as supplement for nitrogen requirement of crops
- Apply complete fertilizer to meet the other nutrient requirements.

Precaution

1. Avoid exposure of BIO-N to high temperature and direct sunlight.
2. Avoid direct contact of BIO-N with inorganic or chemical fertilizers.

TRANSFER OF BIO-N TECHNOLOGY THROUGH ESTABLISHMENT OF BIO-N MIXING PLANT

1. Dept. of Agriculture through GMA CORN PROGRAM funded BIOTECH to start the establishment of several BIO-N Mixing Plants in identified corn cluster areas to make it available to farmers
2. Two schemes of accreditation in establishment of BIO-N Mixing Plants: 1. Accredited DA regions and 2. LGUs. The Quality control being done by staff of BSWM.

REQUISITES FOR BIO-N MIXING PLANT



- BIO-N to be produced shall be in a reconstituted form at the regional level.
- Quality control is a must to protect and insure effectiveness.

Reasons for the Establishment of Mixing Plants

- To make BIO-N available to farmers any time and at a reasonable cost
 - Favorable feedback from BIO-N users
 - Increase in yield due to BIO-N application range from 30% to 200%
 - Problems on regional availability and accessibility

Regional BIO-N Mixing Plants

- 32 BIO- mixing plants have been identified and accredited
- Training of 4 batches (20 to 30 participants/batch) to man technical aspects of BIO-N production

- 14 mixing plants have been launched
 - 5 additional thru the DA-NFA Corn Dev., 4 in Mindanao and 1 in Luzon

ACCOMPLISHMENT

INFORMATION DISSEMINATION





Butuan City

Conducted four batches of training

✓ TRAINING OF 4 BACTCHES (20 to 60 PARTICIPANTS) TO MAN THE TECHNICAL ASPECTS OF BIO-N PRODUCTION

First Training on Bio-N Technology (BIOTECH-UPLB)



Provide technical assistance to the recipients



Continuous monitoring of quality visits to accredited BIO-N mixing plants



THANK YOU VERY MUCH FOR LISTENING

