NOTMAN PASTURE SEEDS range of inoculants provide fast, efficient fermentation, but not all inoculants are the same. New generation inoculants from Pioneer provide economic, faster & efficient aerobic stability. With home grown feed more important than ever, take advantage of this low cost solution to improving production.
Pioneer® Brand Products has been researching and identifying bacterial strains to be used in Silage additives and inoculants since 1978. Over this time Pioneer microbiologists have developed a wide-ranging portfolio of crop specific inoculants.

Pioneer commercialised the first inoculant containing L. buchneri in 2000, this was followed in 2003 with the first combination inoculant product 11C33. This original 11C33 product contained crop specific Lactic Acid Bacteria strains combined with L. buchneri to deliver rapid pH decline and greatly improve Pit life. In 2016 Pioneer introduced Rapid React technology products which contains a new L. buchneri strain that works rapidly to produce stable silage in just 7 days.

A 2009 study conducted in the USA by Huisden et al and published in the Journal of Dairy Science vol. 92 No.2 2009 looked at the Effect of applying molasses or inoculants at two rates on the fermentation and aerobic stability of corn silage and compared two L. buchneri containing products Pioneer 11C33 (containing Lactobacillus plantarum, L. buchneri and Enterococcus faecium) and a product containing Lallemand L. buchneri 40788 strain and Pediococcus pentosaceus 12455 strain with a bare Control and a Molasses treatment.

“The research concluded that the silage treated with all inoculant-based treatments had a similar pH value, total VFA concentration was higher in Pioneer treated silage compared to Control. Aerobic Stability was best from the Pioneer 11C33 Inoculant treatment. Microbial Counts and Aerobic Stability
Lactic Acid bacteria counts were unaffected by treatment. However Molasses treated silage had the highest mould counts whilst the Pioneer treatment had the lowest. Yeasts were 25% lower in all Inoculant treatments compared to Control & Molasses treatments, and Pioneer 1x and Pioneer 2x silages had fewer yeasts than Lallemand 1x and Lallemand 2x treatments.

Journal of Dairy Science Vol 92 No 2 American Dairy Science Association

<table>
<thead>
<tr>
<th>Similar Product</th>
<th>Strain</th>
<th>Tank Life</th>
<th>WT/bottle</th>
<th>Unit Size</th>
<th>CFU</th>
<th>g/WT</th>
</tr>
</thead>
<tbody>
<tr>
<td>LACSIL HC</td>
<td>Lactobacillus buchneri NCIMB 40788 Pediococcus pentosaceus</td>
<td>72 hours</td>
<td>250 WT</td>
<td>700g</td>
<td>2.8g = 400,000g CFU per WT</td>
<td>2.8g/WT</td>
</tr>
<tr>
<td>11C33</td>
<td>Lactobacillus buchneri Lactobacillus plantarum Enterococcus faecium</td>
<td>72 hours</td>
<td>250 WT</td>
<td>250g</td>
<td>1g = 100,000g CFU per WT</td>
<td>1g/WT</td>
</tr>
</tbody>
</table>

Fig 1. Aerobic Stability of disturbed silages with different treatments.

Research proves;

- Putting more inoculant on over and above the manufacturers specifications especially with the Pioneer product is not necessary

- The amount of applied inoculant and the efficiency of the bacteria to convert the sugars into Lactic Acid Bacteria and hence produce aerobically stable silage varies greatly. As in the study the Lallemand (1x) product was applied at 8mg/kg fresh forage whilst the Pioneer 11C33 (1x) was applied at 1.1mg/kg fresh forage and as shown in Fig 1 the 1x rate of Pioneer 11C33 was stable for longer than both the 1x and 2x rates of the Lallemand product.

- Why the label statement of CFU’s or colony forming units is only part of the story it is a mixture of the amount of CFU’s in the inoculant and the efficiency of these bacteria to get to work quickly and effectively.

- What other companies use for counts is irrelevant to the strain dosages found in Pioneer® brand inoculants and it can only be assumed that some companies have higher counts because their strains differ in activity than Pioneer strains.

“Pioneer treated silages had the best aerobic stability with an additional 19-37 hours above the Lallemand products”

During the study the samples were opened to the air to mimic an open Pit face, Control and Molasses treated silages were only stable for 25 hours whereas inoculant treated silages were stable for an additional 35-71 hours (Fig1). Pioneer treated silages had the best aerobic stability with an additional 19-37 hours above the Lallemand products. This means that the Dairy farmer can have confidence in the Pioneer treated silage to feed out silage feed requirements up to a day in advance with no adverse effects on feed quality. Also, the Pioneer label rate (1x) was stable for 11 hours longer than the double rate (2x) of the Lallemand product. See Fig 1. for aerobic stability finding’s.

Our recommendations;

- 11G22 and 11C33 Pioneer Inoculants
- Extremely good value in an agronomy package that will benefit farmers wallet
- Low cost solution to nutrient conservation
- Improves fermentation and reduces dry matter losses
- Improves fiber digestibility
- Available as a water-soluble product in packaging suitable for use in tank mixes or with the Pioneer® Appli-Pro® systems for easy and convenient application.
Low cost solutions to improving fermentation, aerobic losses and converting silage dollars to milk/beef dollars #realfarmvalue.

NOT ALL INOCULANTS ARE THE SAME

Inoculants provide fast, efficient fermentation, but not all inoculants are the same. New generation inoculants from Pioneer® provide economic, faster & efficient aerobic stability. With home grown feed more important than ever, take advantage of this low cost solution to improving production.

New generation bacteria strains
The bacteria used in these inoculants are proprietary to Pioneer and are exclusively used in only Pioneer products. No other company has access to these same strains of bacteria. Pioneer commercialised the first inoculant containing L. buchneri in 2000, this was followed in 2003 with the first combination inoculant product 11C33. Today Pioneer are using 4th-5th generation strains of L. buchneri. So not all L. buchneri strains are the same.

How does silage inoculant actually work?
Once the air has been excluded from a silage stack, anaerobic (oxygen-hating) bacteria multiply and convert sugars to acid. This process is known as silage fermentation and the acid preserves the plant material as silage. All crops contain a range of bacteria that differ in the efficiency with which they convert sugar to acid and the type of acid they produce. The most efficient bacteria produce high levels of lactic acid. A quality silage inoculant contains crop specific strains of the most efficient lactic acid producing bacteria, added to the crop at harvest time to produce high quality fermentation.

What organisms should be present in a silage inoculant?
An inoculant may contain one or more strains of lactic acid bacteria. The most common homofermentative species is Lactobacillus plantarum. Other common homofermentative species include various Lactobacillus or Pediococcus species and Enterococcus faecium. Lactobacillus buchneri is the heterofermentative species used to improve aerobic stability. Be skeptical of products containing other species.

Why shouldn’t I apply the cheapest product?
Silage inoculants appear similar simply because they contain the same genus/species information on the label (eg Lactobacillus buchneri). However just like two cows differ in the efficiency in converting grass to milk, bacteria differ in their ability to improve silage fermentation quality. Most cheap products are derived from a buying strategy of sourcing lowest-cost old generation bacterial strains, lack quality standards and label bacterial count guarantees.

What is L.Buchneri?
Pioneer Rapid React® 11C33 & 11G22 inoculant contains a proprietary L. buchneri strain to significantly improve bunklife and reduce aerobic losses at feed-out. Discovered in 1921, Lactobacillus buchneri is a heterofermentative bacteria that produces lactic acid and acetic acid during fermentation. It is used as a bacterial inoculant to improve the aerobic stability of silage. These bacteria are inoculated and used for preventing heating and spoilage after exposure to air.

New technology vs Bacteria counts (cfu/g)
What other companies use for counts is irrelevant to the strain dosages found in Pioneer ® brand inoculants. It can only be assumed that some companies have higher counts because their strains differ in activity than Pioneer strains. Pioneer microbiologists work to ensure that the bacteria that is in a Pioneer inoculant is the best it can be. Bacterial strains in silage will multiply until they achieve a population of about 1 billion cfu/gram of forage and they seldom exceed that population count. It’s the effectiveness of the buchneri strain that counts.

Inoculant and types of additives
Silage additives can be classified into five groups based on their mode of action:
- Fermentation stimulants (inoculants): promote the desired lactic acid fermentation
- Fermentation inhibitors: directly acidify or sterilise the silage, inhibiting growth of undesirable organisms.
- Aerobic spoilage inhibitors: designed to improve aerobic stability
- Nutrients: added to improve the nutrient value of the silage
- Absorbents: used to prevent effluent loss by raising the DM content of the silage and/or by absorbing moisture.
Pioneer® brand inoculants 11C33 and 11G22 with Rapid React® aerobic stability* technology are a breakthrough advancement in Integrated Feed Solutions providing stable feed in just seven days. And like all Pioneer brand inoculants, they can help maximize the value of your feed.

Achieve aerobic stability quick
Rapid React aerobic stability technology contains a special patented strain of bacteria which quickly goes into action and makes your feed ready in just seven days. Unlike other inoculants with bacteria that takes up to 60 days to convert

The benefits of this new technology include:
- Faster access to your most valuable input
- A consistently cool silage pit face
- And an extended silage pit life

Make the most of your feed
Rapid React aerobic stability technology with Lactobacillus buchneri allows you to get more out of every day and every ton by working to:
- Increase fermentation efficiency
- Minimize dry matter loss
- Reduce spoilage on the top and tails of the silage bunker or pile
- Produce consistently pleasant tasting feed

RAPID REACT™ WITH AEROBIC STABILITY TECHNOLOGY
SO FAST IT CAN KEEP UP WITH YOU READY TO FEED IN JUST 7 DAYS

Pioneer® inoculant 11C33 with Rapid React™ aerobic stability technology

AEROBI C DRY MAT TER LOSSES
PIONEER INOCULANT 11C33 WITH NEW RAPID REACT AEROBIC STABILITY TECHNOLOGY
Nine whole-plant corn silage trials

23 percent improvement at 7 days

Control ▪ Pioneer® inoculant 11C33 with Rapid React™ aerobic stability technology
Pioneer® brand 11G22 is a lucerne/grass/cereal silage inoculant designed to:

- Enhance fermentation in grass and whole plant cereal silage and deliver improved fermentation and a fermentation acid profile that minimizes aerobic dry matter losses
- Be used in grass and whole plant cereals ensiled at the proper maturity in upright, bunker or bag silos and at a dry matter between 30% and 42%

Available as a water-soluble product in packaging suitable for use in tank mixes or with the Pioneer® Appli-Pro® systems for easy and convenient application.

11G22 contains a unique blend of patented and/or proprietary strains of Lactobacillus buchneri and Lactobacillus plantarum formulated to:

- Improve silage quality providing low terminal pH and desirable VFA profile for decreased fermentation loss and enhanced aerobic stability
- Improve animal performance

Includes Rapid React® aerobic stability technology. This provides improved bunklife and stable feed in 7 days.*

- Rapid React aerobic stability technology contains a special patented strain of bacteria which quickly goes into action and makes your feed ready in just seven days. Unlike other inoculants with bacteria that takes up to 60 days to convert.
- Faster access to your most valuable input
- A consistently cool silage pit face
- And an extended silage pit life

Rapid React® aerobic technology - stable feed in 7 days
Improves fiber digestibility
Improves nutrient conservation
Significantly reduces heating on bunker/pile face
Improves fermentation and reduces dry matter loss

**Shrink Loss in Grass Silage**

<table>
<thead>
<tr>
<th>Item</th>
<th>Control</th>
<th>11G22</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM, %</td>
<td>39.55</td>
<td>40.03</td>
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<tr>
<td>pH</td>
<td>4.83</td>
<td>4.86</td>
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<tr>
<td>DM recovery, %</td>
<td>89.51&lt;sup&gt;a&lt;/sup&gt;</td>
<td>92.84&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Aerobic stability, hours</td>
<td>25.50&lt;sup&gt;a&lt;/sup&gt;</td>
<td>116.25&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>DM loss, %</td>
<td>4.37&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.07&lt;sup&gt;*&lt;sup&gt; &lt;/sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

11G22 also reduces shrink losses during feed out

Grass Silage Effects on Bunklife

When Subjected to Air

11G22 remains cool for much longer when exposed to air

Source: Pioneer Livestock Nutrition Center, Iowa. Summary of two trials. Dry matter recovery, aerobic stability, and nutrient composition were determined for uninoculated (Control) corn silage and for corn silage inoculated with Pioneer® brand 11G22 Corn Silage Inoculant (11G22).

* All values are expressed as least squares means.

** Dry matter loss as measured during the aerobic stability test.

*** Treatment means in same row without a common superscript letter differ (P < .05).
1174 GRASS SILAGE INOCULANT
PASTURE SPECIFIC BACTERIA

**Improve silage digestibility**

**Increase dry matter recovery**

**Promote a faster, more efficient fermentation**

**Increase animal performance**

**Proven multi crop inoculant**

---

**Improved Fermentation, Nutrient Retention and Digestibility**

Pioneer® brand 1174 silage inoculant is designed to help improve fermentation, retain nutrient content and enhance digestibility in ensiled forages.

**Improved Forage Quality**

1174 contains a unique blend of patented and/or proprietary strains of Lactobacillus plantarum and Enterococcus faecium formulated to improve forage quality for silage with higher energy, ferment forage faster to retain more energy and reduce dry matter losses. 1174 contains live lactic acid-producing bacteria that have been specifically selected to assist in the production of high quality silage.

**More Pounds of Milk per Ton**

1174 silage inoculant produces 103 more pounds of milk per ton of grass/legume silage and 69 more pounds of milk per ton of corn silage fed to dairy cows.

Available as a water-soluble product in packaging suitable for use in tank mixes or with the Pioneer Appli-Pro® Application Systems or as a free-flowing granular formulation for easy and convenient application. All products are available in two bottle sizes, 50WT and 250WT.

**Water Soluble:** 40G/50T (IAU5), 200G/250T (IAU7)

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**Australian Beef Feeding Trial**

<table>
<thead>
<tr>
<th>Weight gain per tonne of silage fed (kg)</th>
<th>Control</th>
<th>1174: 132kg</th>
<th>1174: 145kg</th>
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<td>100</td>
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<td>150</td>
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</tbody>
</table>

Australian beef feeding trial conducted at NSW Agriculture’s Research Centre at Wagga Wagga. An extra 13kg of beef per tonne of maize silage fed when treated with 1174 compared to untreated. Kaiser and Piltz 1998.
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Improved aerobic stability and reduced heating is relative to untreated silage. Actual results may vary. The effect of any silage inoculant is dependent upon management at harvest, storage and feedout. Factors such as moisture, maturity, chop length and compaction will determine inoculant efficacy.

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