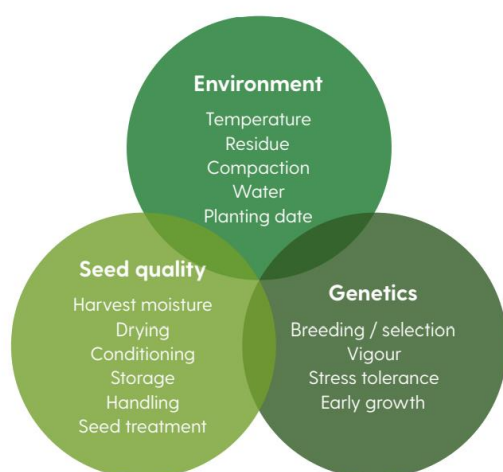


PIONEER STRESS EMERGENCE RATINGS

Research shows that the highest maize yields come from uniform stands of plants which emerge at the same time and grow to produce even plants. Three factors interact during germination and emergence and together determine how well a maize crop establishes. These are seed quality, hybrid genetics and the growing environment.



While it is possible to influence some environmental factors (e.g., soil compaction and planting date) others are virtually impossible to control. In New Zealand, spring growing conditions can be challenging with fluctuating temperatures and saturated soils.

For the past three seasons, the quest for more uniform maize seed emergence has led to increased seed quality research to help characterise the performance of individual Pioneer hybrids under cold, wet emergence conditions. As a result of this work, Stress Emergence ratings have been included in the 2022 Pioneer Maize Silage Catalogue (see page 62).

Seed quality and emergence

A number of tests can be used to quantify maize seed quality.

- Pioneer Stress Test (PST) – a proprietary vigour test which imposes extreme chilling and anaerobic stresses, beyond that of the industry standard saturated cold test.

- Saturated cold test – seed is planted into saturated trays which are kept at 10°C for seven days.
- Cold germination test – seed is planted into trays which are kept at 10°C for seven days.
- Warm germination test – seed is planted into trays which are kept at 25°C for seven days.

While warm germination tests – carried out according to International Seed Testing Association (ISTA) protocols – provide a good indication of paddock germination under ideal conditions, the proprietary Pioneer Stress Test (PST):

- Applies the highest level of vigour stress testing by providing a low temperature, waterlogged germination environment.
- Helps to further differentiate the quality of individual seed lines.
- Quantifies the impact of seed treatments on seed quality.
- Helps characterise the genetic stress tolerance of individual Pioneer maize hybrids.

Laboratory seed quality testing

Over the winter of 2019 and 2020 a total of 894 samples of New Zealand produced, commercial Pioneer maize hybrids (treated and untreated) were tested for physical purity, genetic purity, warm germination and through the Pioneer Stress Test (PST). This allowed us to characterise the relative vigour of individual hybrids under the toughest germination conditions.

Field stress emergence trials

In spring 2019, 24 hybrids were planted ultra-early at twice the normal planting depth (8.5 cm) into cold wet soils. There were a total of three Waikato and three lower North Island sites giving a total of 36 replicates per hybrid.

The Pioneer Research Team monitored the sites and measured the rate of emergence as well as the final

plant stand count. Due to the challenging establishment conditions, the mean established plant population was 82% of the planting rate. There were, however, significant differences between hybrids with an established population range of 70-90%.

Pioneer stress emergence ratings

All Pioneer seed supplied to the market is expected to establish excellent plant stands if planted well and under normal germination conditions. Data collected

from the laboratory seed quality testing exercise and the field stress emergence trials, referred to above, were used to develop the Pioneer Stress Emergence Ratings. These ratings indicate each hybrids ability to establish under challenging cold, wet growing conditions. The table below groups hybrids into three classes as a result of this research.

Stress emergence rating	Commentary	Hybrids
7-9	Very good potential to establish normal stands under stressful environmental conditions of cold, wet soils.	P7124, 38V12, P9721, P9911, P0021, P0900, P0937.
5-6	Good potential to establish normal stands under stressful conditions of cold, wet soils.	P7524, P8000, P8333, P8500, P8666, P8805, P9127, P9978, P0284, P0362, P0640, P0725, P1315, P1613 P1636, P1477W.
1-4	Below average potential to establish normal stands under stressful conditions of cold, wet soils. Should not be used if severe wet and cold conditions are expected after planting.	P9400, P0891.

Growers can be confident that every bag of Pioneer® brand maize seed they plant has been thoroughly tested in this extensive screening program and meets Pioneer’s industry-leading standards.

Pioneer® brand products are provided subject to the terms and conditions of purchasing, which are part of the labelling and purchase documents. ®, ™, SM Trademarks and service marks of Dow AgroSciences, DuPont or Pioneer, and their affiliated companies or their respective owners. ©2022 Corteva. ©2022, Genetic Technologies Limited. All Rights Reserved. The information in this publication is general in nature only. Although the information in this publication is believed to be accurate, no liability (whether as a result of negligence or otherwise) is accepted for any loss of any kind that may arise from actions based on the contents of this publication. ©2022, Genetic Technologies Limited. No part of this publication can be reproduced without prior written consent from Genetic Technologies Limited.