MODERN MAIZE VARIETIES ARE MORE WEEVIL SUSCEPTIBLE THAN LOCAL POPULATIONS WHEN STORED IN A LOCAL MANNER IN EAST TIMOR

Introduction
Maize is the staple cereal in upland areas of East Timor, mainly grown by subsistence farmers for their own consumption. Maize is normally stored on the cob in the sheath, either hanging from a tree or above a kitchen. Average maize yield is about 1.5 t/ha, barley enough to feed a farming family.

Modern higher yielding maize varieties such as Arjuna and Kalinga were introduced to East Timor over 20 years ago. These varieties have a yield potential of 6 t/ha and but have been poorly adopted as they are perceived to be susceptible to weevil attack during storage. This paper details the results of a participative research program on maize storage in East Timor, to investigate the weevil tolerance/susceptibility of new and introduced maize populations when stored under Timorese farmers conditions.

Methods
Location
The research program worked with 18 farmer groups in three regions of East Timor. One storage experiment was established at each of 18 sites and included the local maize populations and local storage methods.

Design
The typical experiment consisted of six treatments: two populations (traditional and modern) stored using three different methods. The three methods were: traditional storage of cob in sheath, storage of threshed grain in a woven poly sack, and an air-tight jerry can. Traditional storage varied with location and included storing above a fire place, hanging in a tree or storage in an elevated house that was purpose built to store grain. Each population / treatment combination was replicated twice and consisted of either 50 cobs in sheath or 2kg of threshed grain.

Results
Maize stored in air-tight jerry cans showed no weevil damage. This was true for both modern and traditional maize population, at all 18 test sites.

Local and introduced maize populations were damaged by weevils at a similar rate when stored in a sack. For this storage method, both types of maize were damaged quite quickly, with more than 50% of the seeds damaged by weevils after 21 weeks of storage. Both traditional and modern maize varieties showed similar rate of infestation with weevils when stored in a sack.

The storage of local maize in the sheath, by traditional methods, experienced very little weevil damage during the 33 weeks of testing. The modern varieties suffered more weevil damage than the local maizes. Over the last two sample times, (30 to 33 weeks after starting the storage treatments) local maizes suffered 1.5% damage due to weevils, whilst the modern varieties suffered 40% loss due to weevils.

Conclusion
Local maize populations were more resistant to storage when stored as a covered cob using a variety of local methods. When stored as threshed grain, in a poly sack, local and introduced maizes suffered similar rapid weevil attack, making the maize inedible after 15 weeks of storage.

New maize introductions to East Timor should be selected for weevil tolerance when stored in local conditions, as part of adaptation testing.

There is also great potential to increase maize farming yield and sustainability through the combined used of modern varieties and air-tight storage systems.

Authored by
Rob Williams, (left), and Acacio Guterres (right).

1 Seeds of Life, Timor-Leste Ministry of Agriculture, Forestry and Fisheries, Email rob.williams@seedsoflifetimor.org
2 National University of East Timor, Email acacio.guterres@student.curtin.edu

Introduction
Maize is the staple cereal in upland areas of East Timor, mainly grown by subsistence farmers for their own consumption. Maize is normally stored on the cob in the sheath, either hanging from a tree or above a kitchen. Average maize yield is about 1.5 t/ha, barley enough to feed a farming family.

Modern higher yielding maize varieties such as Arjuna and Kalinga were introduced to East Timor over 20 years ago. These varieties have a yield potential of 6 t/ha and but have been poorly adopted as they are perceived to be susceptible to weevil attack during storage. This paper details the results of a participative research program on maize storage in East Timor, to investigate the weevil tolerance/susceptibility of new and introduced maize populations when stored under Timorese farmers conditions.

Methods
Location
The research program worked with 18 farmer groups in three regions of East Timor. One storage experiment was established at each of 18 sites and included the local maize populations and local storage methods.

Design
The typical experiment consisted of six treatments: two populations (traditional and modern) stored using three different methods. The three methods were: traditional storage of cob in sheath, storage of threshed grain in a woven poly sack, and an air-tight jerry can. Traditional storage varied with location and included storing above a fire place, hanging in a tree or storage in an elevated house that was purpose built to store grain. Each population / treatment combination was replicated twice and consisted of either 50 cobs in sheath or 2kg of threshed grain.

Results
Maize stored in air-tight jerry cans showed no weevil damage. This was true for both modern and traditional maize population, at all 18 test sites.

Local and introduced maize populations were damaged by weevils at a similar rate when stored in a sack. For this storage method, both types of maize were damaged quite quickly, with more than 50% of the seeds damaged by weevils after 21 weeks of storage. Both traditional and modern maize varieties showed similar rate of infestation with weevils when stored in a sack.

The storage of local maize in the sheath, by traditional methods, experienced very little weevil damage during the 33 weeks of testing. The modern varieties suffered more weevil damage than the local maizes. Over the last two sample times, (30 to 33 weeks after starting the storage treatments) local maizes suffered 1.5% damage due to weevils, whilst the modern varieties suffered 40% loss due to weevils.

Conclusion
Local maize populations were more resistant to storage when stored as a covered cob using a variety of local methods. When stored as threshed grain, in a poly sack, local and introduced maizes suffered similar rapid weevil attack, making the maize inedible after 15 weeks of storage.

New maize introductions to East Timor should be selected for weevil tolerance when stored in local conditions, as part of adaptation testing.

There is also great potential to increase maize farming yield and sustainability through the combined used of modern varieties and air-tight storage systems.

Authored by
Rob Williams, (left), and Acacio Guterres (right).

1 Seeds of Life, Timor-Leste Ministry of Agriculture, Forestry and Fisheries, Email rob.williams@seedsoflifetimor.org
2 National University of East Timor, Email acacio.guterres@student.curtin.edu