COLD TOLERANCE OF VETIVER GRASS

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INTRODUCTION

In Australia, Vetiver growth was not affected by severe frost at –14ºC ground temperature

It survived for a short period at –22ºC (-8ºF) in northern China.

In Georgia (USA), Vetiver survived in soil temperature of -10ºC but not at –15ºC.

Research showed that 25ºC was optimal soil temperature for root growth, but Vetiver roots continued to grow at 13ºC at the rate of 12.6cm/day, indicating that Vetiver grass was not dormant at this temperature

Extrapolation suggested that root dormancy occurred at about 5ºC

Vétiver dies when the ground is frozen

SOME EXAMPLES

- **Survival of Vetiver under snow, field conditions**

- **Survival of Vetiver under severe frost under field conditions**
- **Survival of Vetiver under snow in pot trial**

- **Vetiver growth in cold and frost under field conditions**
- **Research results on the effect of low temperature on Vetiver shoot and root growth**

Los Angeles mountain on the Chilean Andes (Latitude 38 º South)

Vétiver was covered by snow for 2 months during winter

Regrowth after winter in the first year. Better growth could be expected in later years

Severe frost (-14^{0}C on ground surface) stopped shoot growth in winter in Australia

Regrowth after 3 months in spring

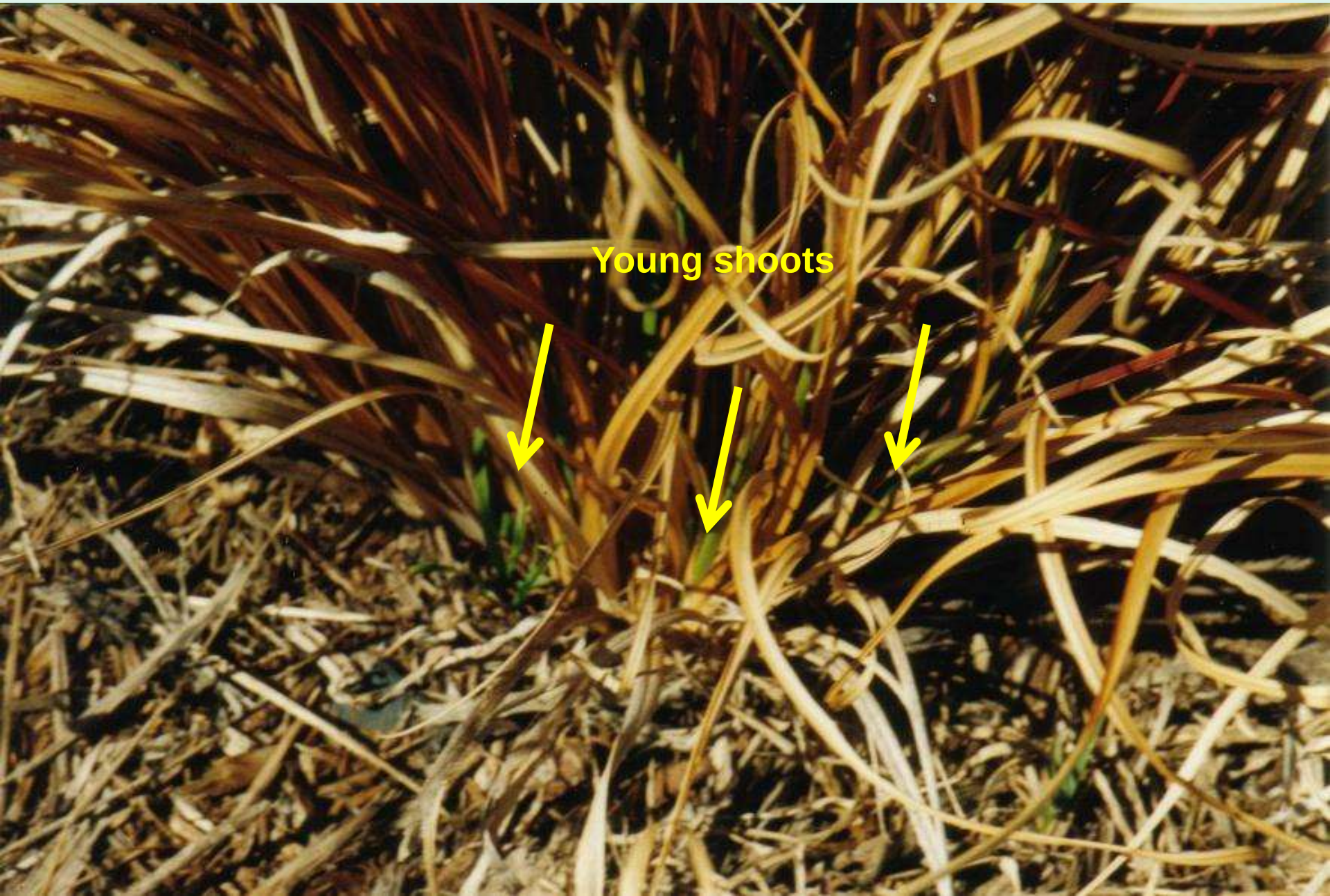
NATURAL RESOURCES

Severe and frequent frost on Australian Highland

Top growth was killed during one of the most severe winter on record with 64 frosts and ground température at -14oC

Top growth was completely dried up

Thick canopy insulated and protected young shoots in winter



Vetiver recovered and resumed vigorous growth early in spring

Summer growth at same site

VETIVER SURVIVAL UNDER SNOW

A simple trial was conducted by D. Rachmeler in January, 2015.

1- On the first occasion, vetiver was covered by 35cm of snow for 4 days

2- A second snow period, 5 weeks later, vetiver was covered by 18cm of snow.

On both occasions, night temperatures was -3 degrees C and 3C during the day

Snow cover

First occasion

Second occasion

For control one pot was taken in door during snow periods

Vetiver appearance after snow periods

Trimming after snow periods showing all the pots looked exactly the same with no difference between the pot taken inside versus those pots left outside.

Vetiver Growth In Winter Under Field Conditions

Under field conditions, when air temperature gradually drop with the onset of winter, Vetiver growth was also affected

One obvious and peculiar sign is its leaves gradually turn purplish red in colour, a typical reaction of Vetiver under stress. This can be low temperature, water stress, high salinity, extreme pH and other toxic materials

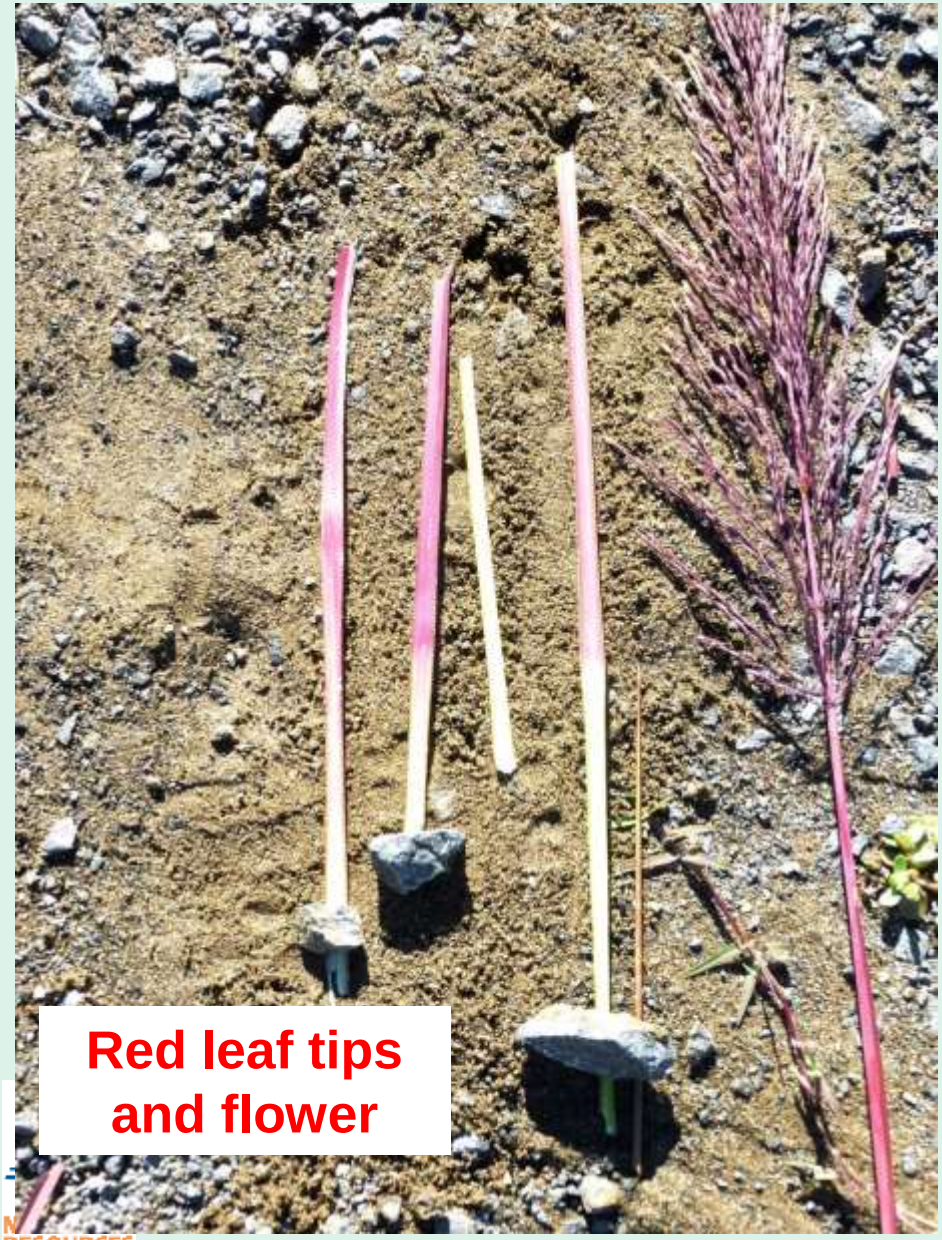
Purple colour on leaves is a typical symptom of P deficiency in most crop and orchard plants, but not necessary with Vetiver

In thick sward, growth was not severely affected by low temperature, it remained active, as it was protected by outer layers

Frosted vetiver with purple-red leaves in winter in Australia

Frost only affected plant tops and the outside plants of thick sward, the inside plants were still green and active

Frosted vetiver leaves with purple-red colour



Research on Cold Tolerance of Vetiver

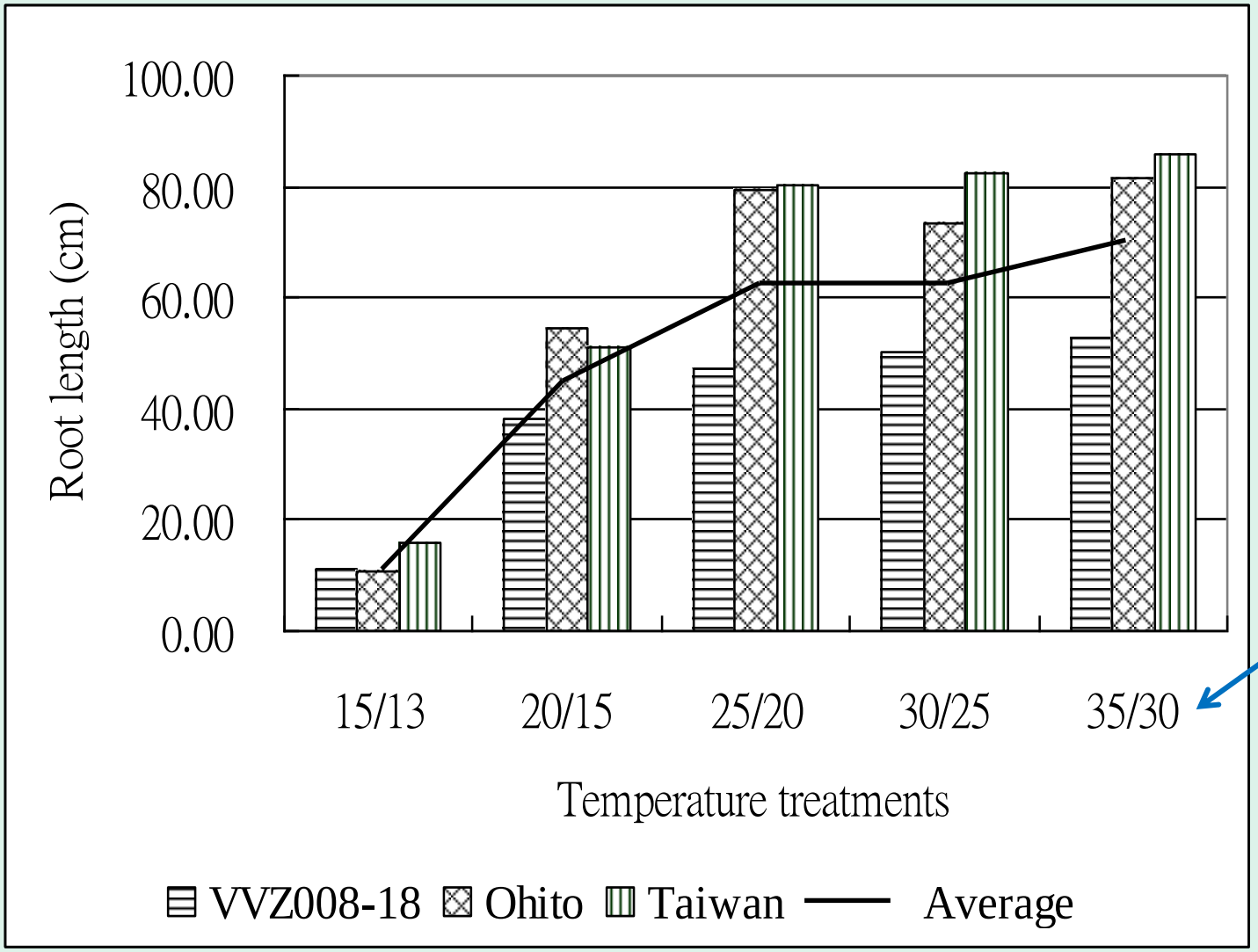
The growth characteristics of vetiver were studied in the phytotron by Dr. Yue-Wen Wang of National Taiwan University.

On average, at temperature above the 25°C, daily root growth of 3 cm was recorded.

Although very little shoot growth occurred at the soil temperature range of 15°C (day) and at 13°C (night), root growth continued at the rate of 12.6cm/day, indicating that Vetiver grass was not dormant at this temperature

Extrapolation suggested that root dormancy occurred at about 5°C (Fig.1).

Fig.1: Effect of soil temperature on the growth of Vetiver root



Temperature treatments: **day/night**

***Genotypes*: VVZ008-18, Ohito, and Taiwan, the latter 2 are basically the same as Sunshine.**

Small portable plastic house can be used to cover the planting in winter,

CONCLUSION

These slides show Vetiver can survive very cold winter, it dies when the ground is frozen. When frosted or under snow cover the outside plants of the thick sward protect the interior part, which remains green and actively treating effluent.

Normally disposal rate under these conditions is reduced by half.

To overcome this a small portable plastic house can be used in winter to cover the planting

THANK YOU