

## **Comparison of twelve vetiver cultivars for winter survival at freezing and below freezing soil temperatures.**

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In 2003, our lab (Adams et al. 2003) reported on the effects of the environment on growth, oil yields and composition for 13 vetiver cultivars. As an added note, we reported on the survival on 12 cultivars when grown year around at 1000 m, at 36° 15' 54"N, 101° 24' 21"W in Gruver, TX, USA. Due to the length of the paper and publishing it in the Journal of Essential Oil Research, it appears that much of the vetiver community have not been aware of the data on winter survival of different strains of vetiver.

Currently, the Vetiver network has a brief statement on temperature requirements:

*It is tolerant to temperatures from -15 C (5 F) to 55 C (131 F), depending on growing region. The optimal soil temperature for root growth is 25 C (77 F). Root dormancy occurs under a temperature of 5°C (41°F). Shoot growth is affected earlier; at 13°C (55°F), shoot growth is minimal, but root growth is continued at a rate of 12.6 centimetres (5 in) per day. Under frosty conditions, shoots become dormant and purple, or even die, but the underground growing points survive and can regrow quickly if the conditions improve.*

*The plant, however, cannot reliably withstand freezing conditions....vetiver is definitely limited by cold. It can take a mild freeze, but even this may be misleading.*

It seems appropriate to re-publish the data on winter survival for the 12 strains tested.

The 12 strains are conserved at ECHO, Ft. Meyers, FL and the USDA National Germplasm Repository, Subtropical Horticultural Research Station, Miami, FL. The 12 strains (see Table 1) were transplanted from robust, potted greenhouse pots into tilled soil in June 1999 in my backyard. The plot was watered by yard sprinklers as normal for grass. Observations were made in the winters of 1999-2000 and 2000-2001.

Table 1 shows the minimum air temperature (temperatures taken from nearby weather station) were a little colder in the second year (2000-2001) as were the soil temperatures. In 1999-2000, all the 12 cultivars survived. However, Malaysia (MA), and Karnataka, Malawi (KR) died back.

In 2000-2001, the slightly colder winter appears to be just at the limit for these cultivars (in this somewhat sheltered backyard location). Notice that good survival was observed for Malawi (SM), Panama B (PB) and American Vetiver Corp. (AV).

Although, Sunshine, Huffman, Capital, and Am. Vet. Corp. cultivars were found to be quite similar in their RAPDs (Adams et al. 2003), they appear to have different cold/ freezing tolerances (Table 1).

**This study shows that there are cold tolerance differences between cultivars. It may be that soil freezing at 6" depth is a critical factor in survival.**

Table 1. Comparison of winter survival at Gruver, Texas, USA, elev. 1000m, Lat. 36° 15' 54"N, Longitude 101° 24' 21"W. (NT = not tested). The most winter hardy cultivars are noted in boldface.

	<u>1999-2000</u>	<u>2000-2001</u>
Minimum air temperature	-13.3°C	-15.5°C
Min. soil temp, 2" depth	-4.6°C	-5.0°C
Min. soil temp. 6" depth	0°C	-0.5°C
Sunshine (SS)	ok	died
Huffman (HF)	ok	1 shoot, mostly dead
Capital (CP)	ok	1 shoot, mostly dead
<b>Malawi, Af. (SM)</b>	<b>ok</b>	<b>5 vigorous shoots</b>
Costa Rica (CR)	ok	died
<b>Panama B (PB)</b>	<b>ok</b>	<b>4 vigorous shoots</b>
Zombia, Malawi(ZO)	ok	1 shoot, mostly dead
Malaysia (MA)	died back	died
<b>Am. Vet. Corp. (AV)</b>	<b>ok</b>	<b>6 vigorous shoots</b>
Karnataka, Mal. (KR)	died to 1 shoot	died
Sabak Bernam, Mal.(SB)	ok	1 shoot, mostly dead
Parit Buntar (PB)	ok	1 shoot, mostly dead

#### Literature Cited

Adams, R. P., R. N. Pandey, M. R. Dafforn and S. A. James. 2003. Vetiver DNA fingerprinted cultivars: Effects of environment on growth, oil yields and composition. J. Essent. Oils 15: 363-371.