Vetiver in Thailand:
General aspects and basic studies

Nualchavee Roongtanakiat

Introduction

Natural resources in Thailand

Vetiver in Thailand:
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and
basic studies

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Problems of natural resources

- Depletion of the resources
- Environmental pollution

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Soil and water resources

Soil deterioration

- **Soil erosion**
- **Soil contamination**
- **Soil infertility**

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His Majesty the King Bhumibol Adulyadej

has promoted the initiative of using “vetiver” for soil and water conservation since 1991.

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Vetiver in Thailand

Faek or Ya Faek = Vetiver

Vetiver in Thailand

Faek or Ya Faek = Vetiver

Faek Don

Upland vetiver

Vetiveria nemoralis

Faek Hom

Lowland vetiver

Vetiveria zizanioides

Thai Vetiver Ecotypes

Faek Don

Upland vetiver

Vetiveria nemoralis

Faek Hom

Lowland vetiver

Vetiveria zizanioides

Vetiver
in
Thailand

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Suitability of vetiver ecotypes in various soil types

- **Sandy soil**

  Nakorn Sawan
  Kamphaeng Phet 1

- **Clay loam soil**

  Loei
  Surat Thani

- **Laterite soil**

  Prachuab Khiri Khan
  Songkhla 3

Vetiver
in
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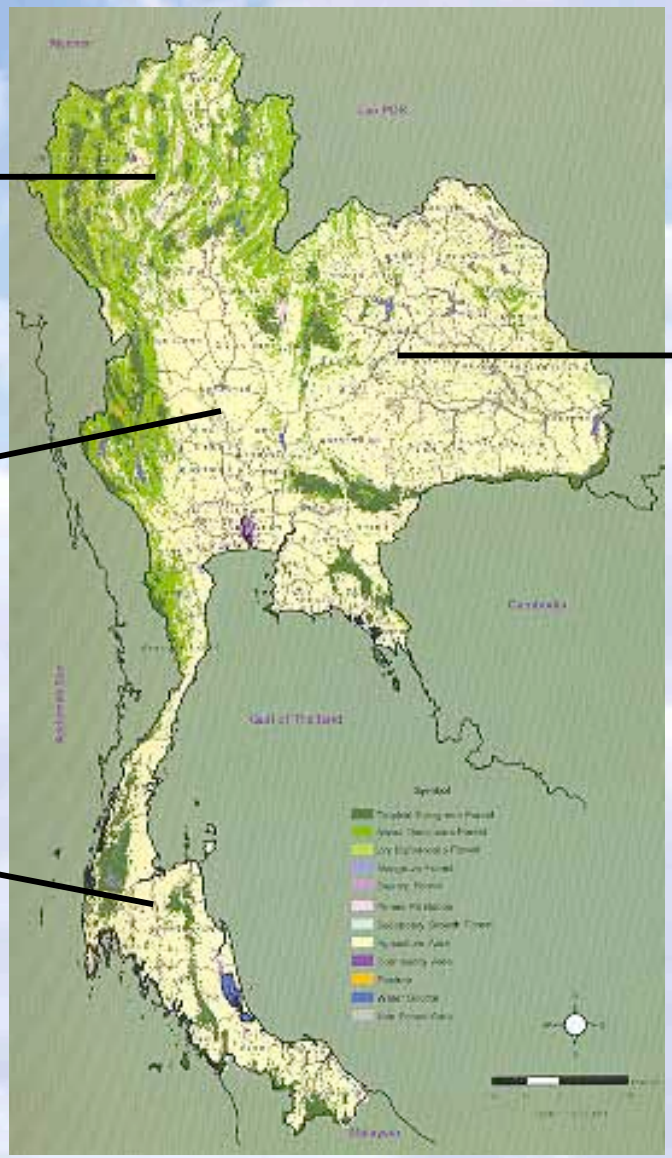
Suitability of vetiver ecotypes in different regions

North:
Nakhon Sawan
Kamphaeng Phet 1

Central and east:
Ratchaburi
Prachuab Khiri Khan

South:
Surat Thani
Songkhla 3



Northeast:
Roi Et
Songkhla 3

Research and development

The Office of Royal Development Projects Board (ORDPB)

- Knowledge dissemination
- Financial support
- Coordination and monitoring

Research and development

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Master plans of **ORDPB**

Basic and applied research
(1993-1994)

Knowledge dissemination
(1997-1999)

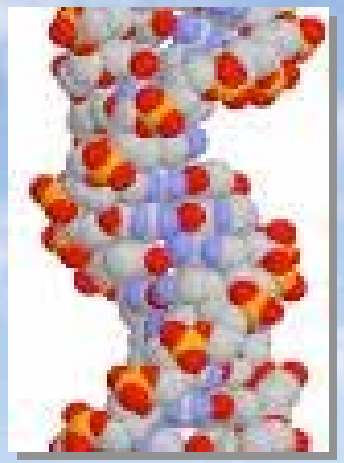
Extension and promotion
(2002-2006)

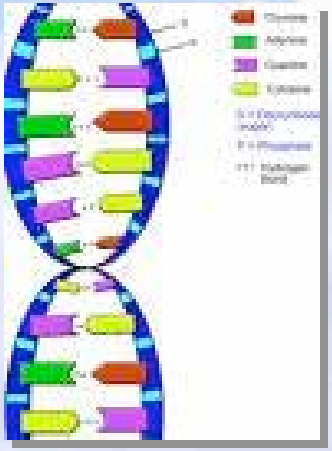
Role of Kasetsart University

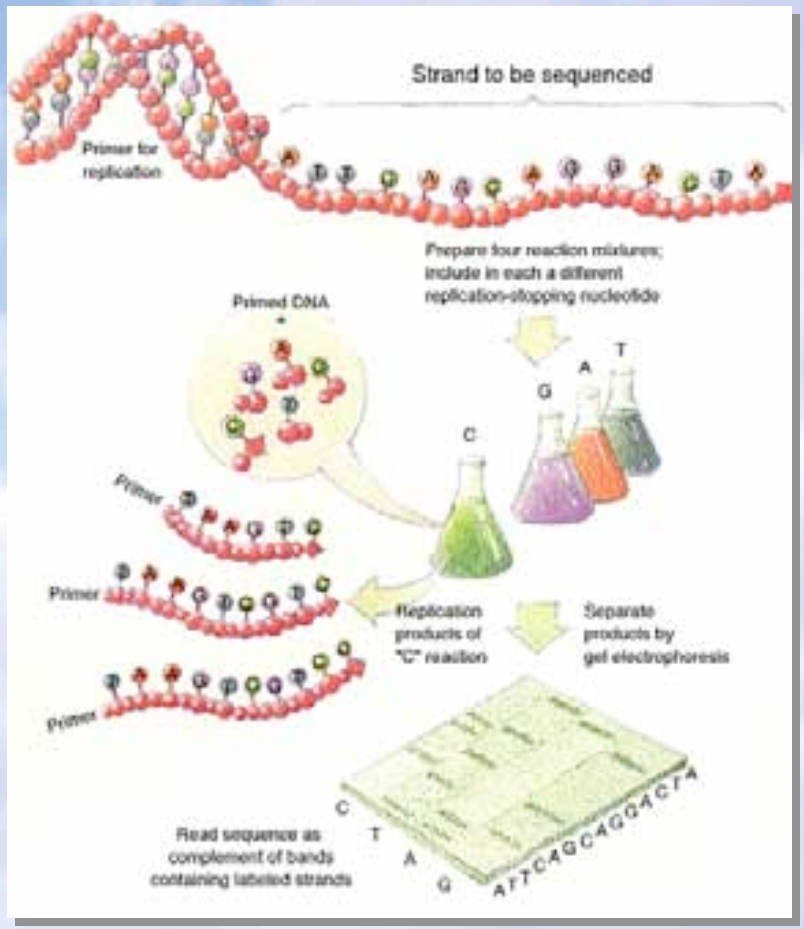
The studies on vetiver began at Kasetsart University in 1992.

Role of Kasetsart University

Genetic study







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Genetic study

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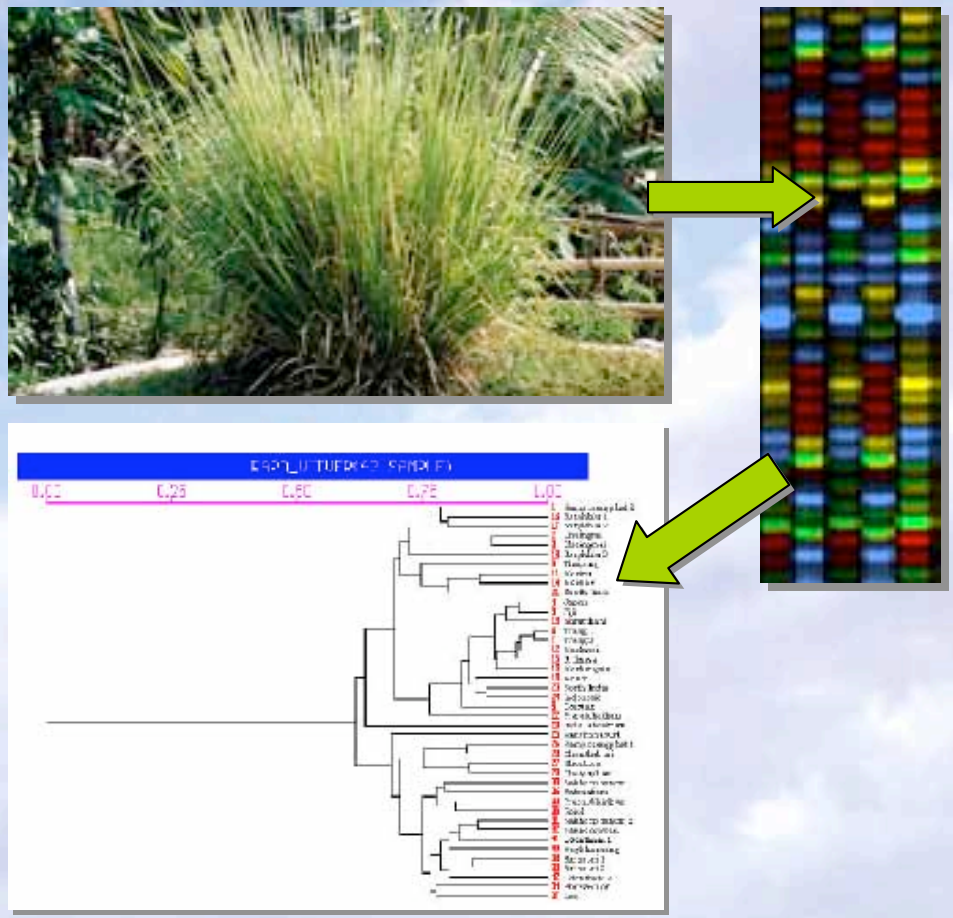
Genome analysis of Thai vetiver ecotypes



Both SSCP and RAPD analyses are sufficient to distinguish each ecotypes of Faek Don and Faek Hom. (Srifah *et al*.)

Genetic study

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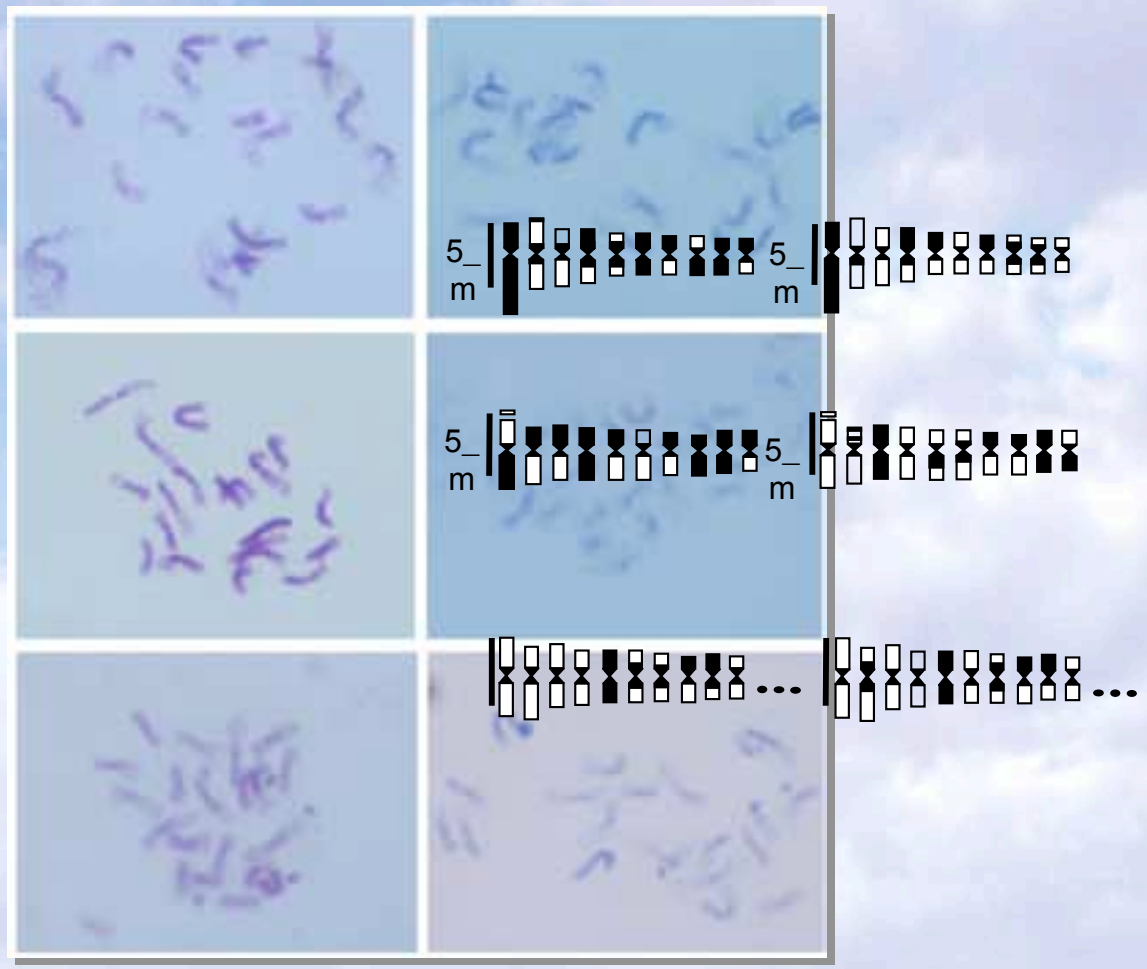
Karyomorphological study



Chromosome number = 20

Chromosome length = 1.5 – 8.4 micron. (Kongpraphon *el al.*)

Genetic study

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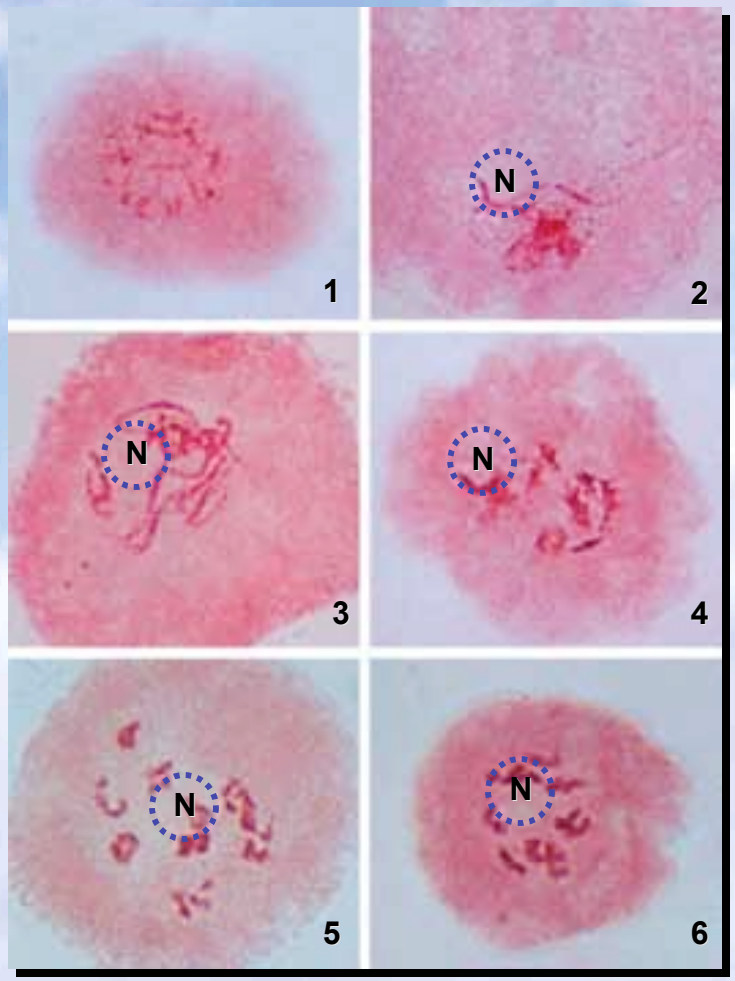
Meiosis of vetiver germplasm



Normal and abnormal chromosome behaviors of vetiver meiotic cells. (Kongpraphon *et al*.)

Role of Kasetsart University

Plant development and breeding study

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Plant development and breeding study

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Shoot apex development

Four vetiver ecotypes had similar patterns of apex development but differed in the duration and rate of each development.

(Kaveeta *et al.*)

Plant development and breeding study

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Tissue culture technique

Tissue culture technique using lateral buds gave 70% survival rate of plantlets. (Department of Botany, KU)

Plant development and breeding study

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Salt tolerance in vetiver

NaCl (%)

0

0.5

0.75

1.0

50 Gy gamma irradiated calli of Kamphaeng Phet 1 ecotype had maximum degree of salt tolerance. (Na Nakorn *et al.*)

Plant development and breeding study

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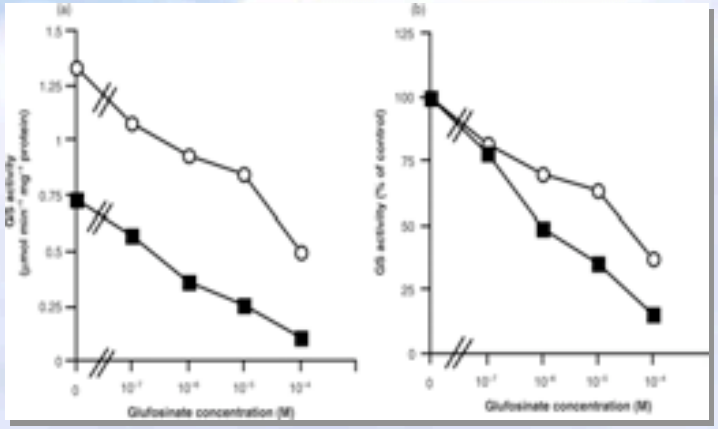
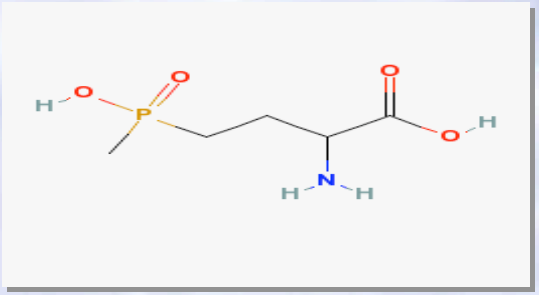
Glufosinate resistance in vetiver

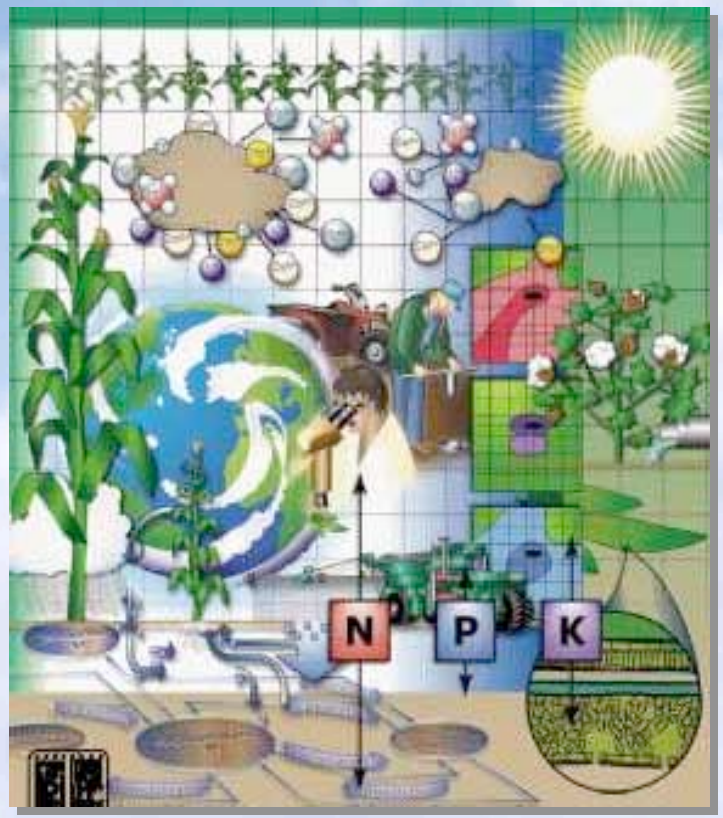




The glufosinate resistance was mainly due to increasing GS activity and its decrease in sensitivity to the herbicide. (Prasertsongkun *et al.*)

Role of Kasetsart University

Vetiver and soil fertility study



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Vetiver and soil fertility study

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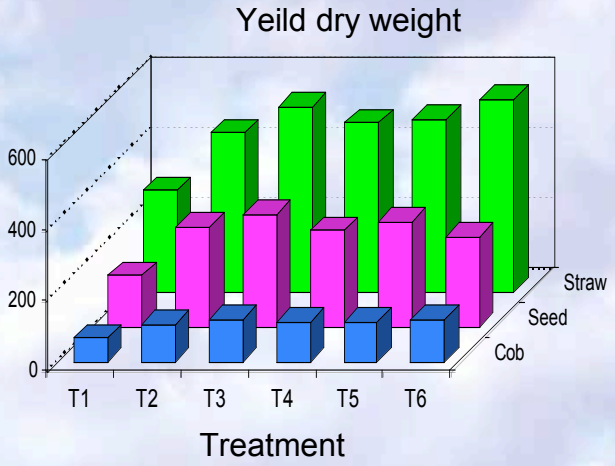
Soil fertility improvement by vetiver



- Vetiver mulching conserved topsoil moisture and increased available-N, available-P and extractable-K. (Roongtanakiat *et al.*)
- Vetiver cultivation could improve soil properties such as pH, OM, bulk density, permeability, etc. (Thatachasatid)

Vetiver
and soil fertility
study

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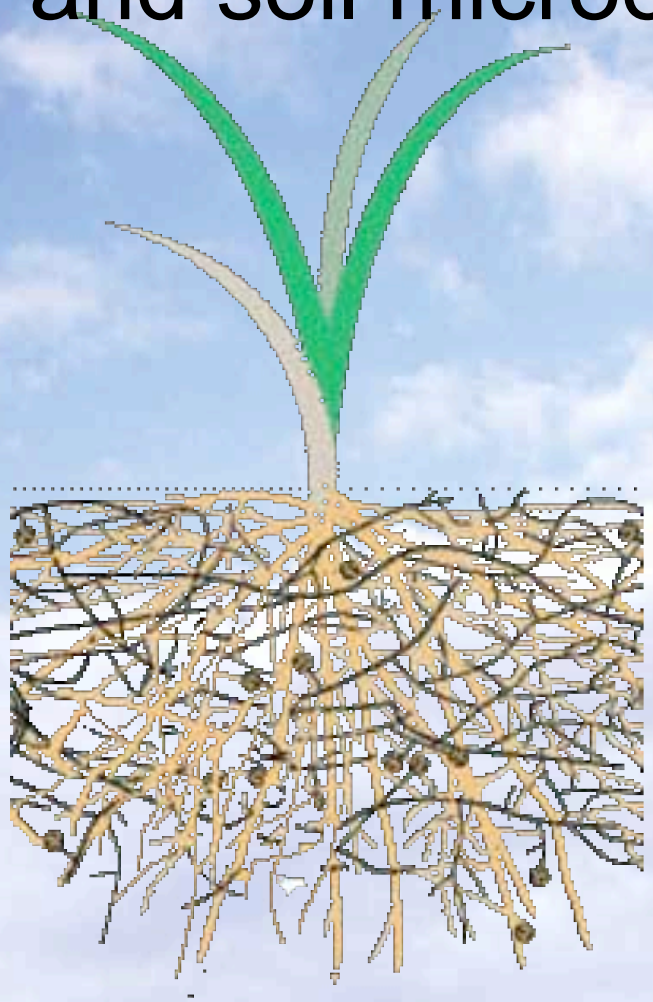
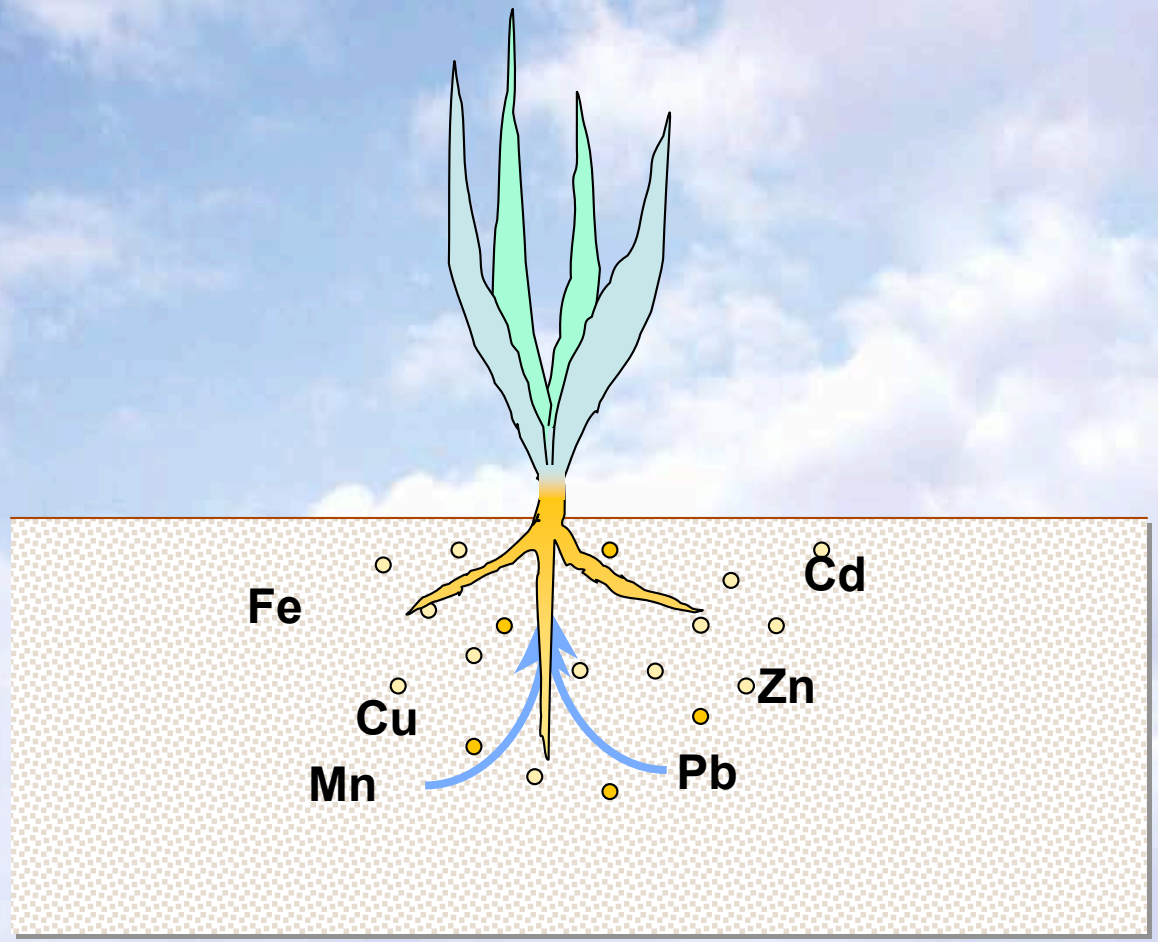
Vetiver
and soil microorganisms



The VA mycorrhiza increased vetiver biomass and nutrient uptake. (Techapinyawat *et al.*)

Role of Kasetsart University

Phytoremediation study



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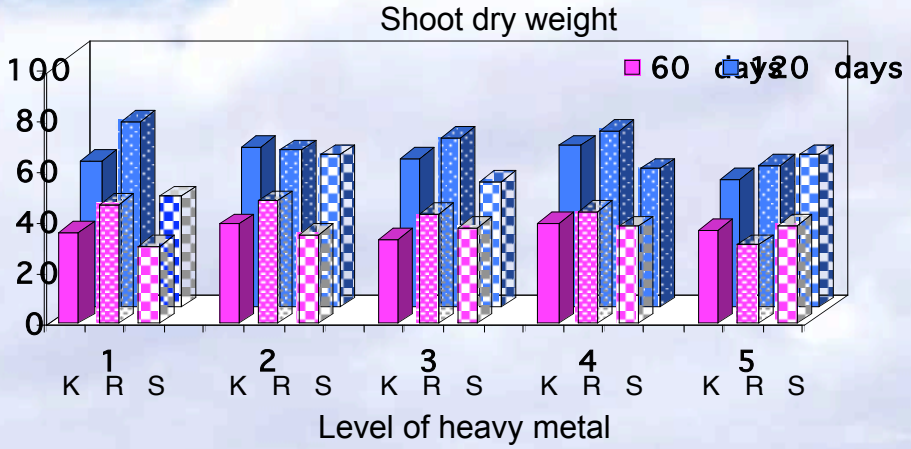
Phytoremediation study

Vetiver and heavy metal uptake



- Heavy metals did not affect the growth of vetiver.
- Vetiver is not a heavy metal hyperaccumulator plant. (Roongtanakiat and Chairoj)

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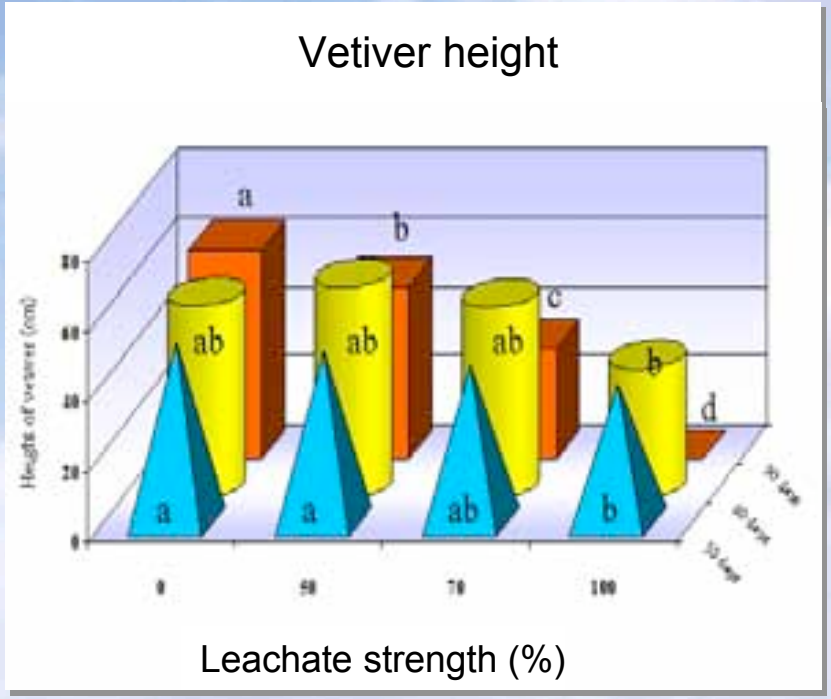
Phytoremediation study

Uptake of heavy metals from landfill leachate by vetiver



Leachate strength of landfill affected vetiver growth and heavy metal uptake. (Roongtanakiat *et al.*)

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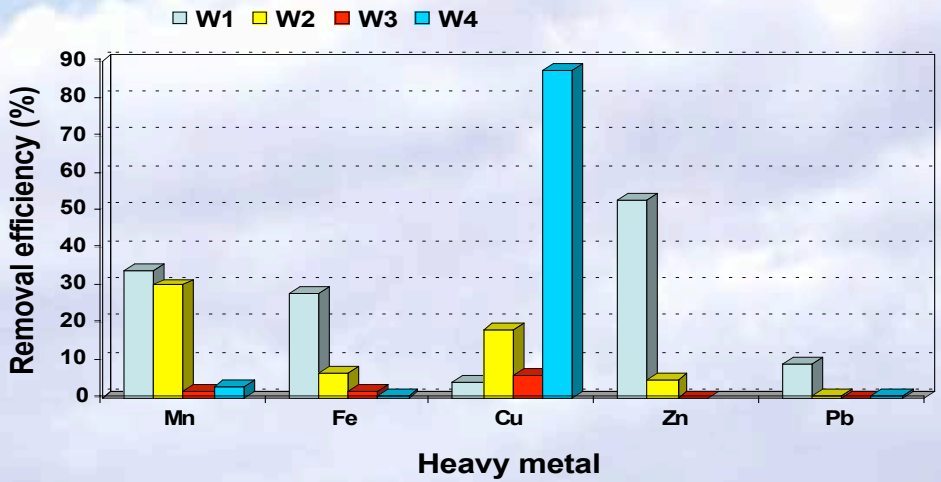
Phytoremediation study

Vetiver for wastewater treatment



- Heavy metals concentrated more in vetiver root than in shoot.
- Sri Lanka ecotype had the best growth and highest heavy metal removal efficiencies. (Roongtanakiat *et al.*)

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Conclusion

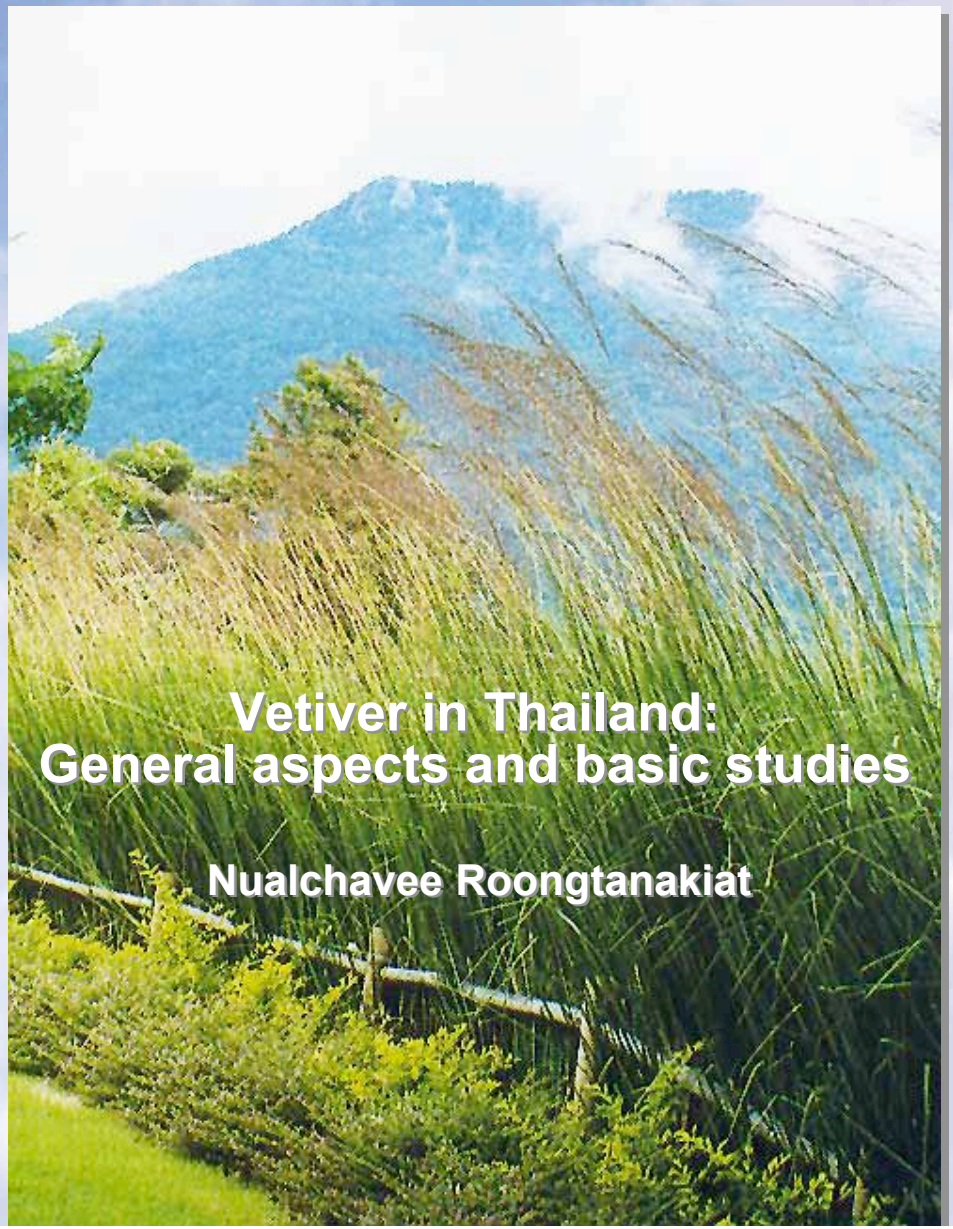
What makes vetiver work so well ?

How to enhance the potential for phytoremediation ?

How to obtain shade tolerant and cold tolerant vetiver ?

Basic research is still required to elucidate more on vetiver.

Thank you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