

VETIVER NEWSLETTER NUMBER 22

NOVEMBER 2000

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Vetiver Network Evolves: TVN Announces Organizational Changes

By Joan Miller, Coordinator - TVN

Many of you may notice the change in newsletter design, but you may not be aware of the changes which have occurred in The Vetiver Network (TVN) since publication of Vetiver Newsletter 21 in February 2000. Richard Grimshaw, President and Coordinator of TVN, moved to the Pacific Northwest Region of the United States in April. In July, Jim Smyle and I (formerly of the Latin American Vetiver Network in Costa Rica), returned to the Washington, DC area and have relieved Dick of much of the work associated with the operation of TVN. I have taken over the responsibility of TVN coordination and have set up the TVN office in our home in Arlington, Virginia (just 3 miles from Washington, DC). My responsibilities include publication of The Vetiver Newsletter, administrative duties, answering correspondence and requests of individuals, and coordinate and assist with regional and country-level network coordinators. Dick is still closely involved with TVN activities; he has been appointed Treasurer of TVN and is hoping to be able to devote more time to fundraising activities.

Other official changes have occurred in the organization of TVN as well. Dick has stepped down as President of TVN and remains Chairman of the Board, while Jim Smyle has assumed the office of President. As previously mentioned Dick has taken the newly created position of TVN Treasurer and I have been appointed to another newly created position of Vice-President and Coordinator. Mark Dafforn remains as TVN Secretary. An additional board member has also been added: Dr. Sumet Tantivejkul of Thailand.

Many of the changes reflect a new stage of development for TVN. Discussions at the Second International Vetiver Conference in Thailand in January led to the decision that it was time for others to become more directly involved in the management of TVN and that Dick needed assistance in order to improve efficiency. You can be assured that TVN is still an active organization and managed by individuals who are deeply committed to and knowledgeable of the Vetiver System. Jim Smyle authored the first nine Vetiver Newsletters when he worked at The World Bank under Dick Grimshaw. I was responsible for establishing the Latin American Vetiver Network to help promote VS in Spanish, to Mexico and Central and South America. Oscar Rodriguez of Venezuela has assumed the position of Coordinator of the LAVN.

I look forward to comments, suggestions and correspondence from TVN members; please to not hesitate to write us. - [Return to top](#) -

Message From Dick Grimshaw

This 22nd newsletter is a milestone in TVN's history. We have a new newsletter format and a new team operating TVN. I know that Jim Smyle and Joan Miller will do an excellent job in taking TVN and the Vetiver System to new heights. They will be able to do this because TVN and its affiliated networks (last count 24) truly represent an international effort to deal with soil and water conservation, and the stabilization and rehabilitation of man made problems relating to soil and water. Nowadays most of the new Vetiver initiatives are being made by national network members, and we rely more and more on these people to undertake these initiatives and take responsibility for the results.

Since Jim Smyle and I started networking Vetiver information in 1989, communication systems have changed dramatically as a result of the Internet. Thus we have been able to communicate rapidly and effectively assuring quick decisions and rapid turn round of information. TVN's homepage has become an important source of information and receives more than 1500 hits a month. Over this same period a few but important institutions including the **World Bank, the Royal Danish Government, the Wallace Genetic Foundation, the William H. Donner Foundation Inc., and The Royal Development Projects Board of Thailand** have been extremely generous in providing grant funds and/ or services to support the world-wide Vetiver initiative. In addition, practically every bilateral and multilateral donor agency has included the Vetiver System in their projects where relevant.

I would like to make special mention of **His Majesty the King of Thailand's** Vetiver initiative. His understanding of the technology and his conviction of its value for Thailand resulted in: a huge research undertaking, practical applications and demonstrations in Thailand, the generous sharing of information through two Thai-sponsored international Vetiver conferences and the training of foreign Vetiver users. In addition Thailand sponsors the Pacific Rim Vetiver Network (PRVN) that has developed into our most important affiliated network. PRVN has published some excellent technical bulletins that have been made available to TVN users around the world. We are very proud that **Her Royal Highness Princess Maha Chakri Sirindhorn** of Thailand accepted our invitation to be TVN's Patron.

In early years we relied mainly on governments to disseminate Vetiver information through their extension services; this did not always work well. More recently we focused on establishing national networks and supporting NGOs. This approach has generally worked well. Most recently we have seen important private sector involvement in the Philippines, Australia, China, Central America, Madagascar, South Africa and Thailand. We believe this involvement will expand rapidly as more companies see the value of the technology. Private sector participation has accelerated as a result of the widening range of applications of the Vetiver System, particularly for engineering.

We still have a long way to go. More research is needed to determine the limits of its use and application. We see huge potential for Vetiver in improving both quantity and quality of water, and for the rehabilitation of vast areas of land that have been destroyed in the process of mining and infrastructure development. It is a known fact that in Guangdong Province of China, 80% of all sedimentation is derived from construction sites. In that province, Vetiver Systems have been conclusively proven to be the most effective and least costly solution for rehabilitation and stabilization.

To conclude I want you to know that having handed over the Presidency of TVN to Jim Smyle I have no intention of fading from the Vetiver scene. I will remain as Chairman of the Board and for at least the next year will be TVN's Treasurer. My intention is to focus on fund raising and creating awareness amongst policy makers of the value of the Vetiver Systems. Both are important. We need to raise funds that will help support national networks either directly or indirectly; and we need to make key policy makers aware of the value of the Vetiver System in the many areas of its application. The Vetiver System is not a technology confined to the agricultural sector, but rather to practically any sector that has natural resources links.

Dick Grimshaw, Bellingham, WA., October 15, 2000 - [Return to top](#) -

Announcements

Royal Patronage for TVN:

Her Royal Highness Princess Maha Chakri Sirindhorn Of Thailand Welcomed As The Vetiver Network's Patron

In July, 2000, The Vetiver Network (TVN) received news of the acceptance of Her Royal Highness Princess Maha Chakri Sirindhorn of Thailand to serve as the patron of TVN. Richard Grimshaw, President of TVN released the following official announcement to Vetiver Network Coordinators:

I learned today that HRH Princess Maha Chakri Sirindhorn of Thailand has of July 6th, 2000 graciously accepted the invitation of TVN's Board of Directors to be the Vetiver Network's Patron.

This is indeed a great honor for us. The acceptance of HRH as Patron recognizes His Majesty the King of Thailand's great interest and support in the Vetiver Grass System, and HRH's own interest and support for this important technology.

HRH's official involvement with the world wide Vetiver initiative should be of great benefit to regional and national vetiver networks. Since your networks are affiliated to TVN she will be your Patron too. I know that you will use her patronage respectfully and wisely -- she and her support may be of great help in drawing the attention of country leaders and policy makers to the problems relating to the lack of effective soil and water conservation measures, and the importance of vetiver in mitigating many of these problems in an efficient and low cost manner, and the need for funding. On behalf of the entire membership of TVN, I would like to extend a heartfelt "Thank you" to HRH Princess Maha Chakri for her patronage. - [Return to top](#) -

Heineken Brewery Funds Training Program in Thailand

The Heineken Brewery Co. Ltd. provided a grant of \$50,000 to the Office of the Royal Development Projects Board (ORDPB) of Thailand to promote the use and utilization of the Vetiver System (VS). Heineken, in promoting its green label image and being dependent upon sources of clean water for its product has chosen to support environmentally beneficial technologies; especially those that involve the conservation of clean water, such as Vetiver. The Vetiver Committee of the ORDPB has decided to use this Heineken Fund for two main activities, (i) training for Thai and international participants, and (ii) dissemination of technology through publications, CD-ROMs, video tapes, etc. The main objective of the course is that after the training, the trainees will become familiar with the technology, appreciate what is being done in research, experimentation and application, and have concepts on how to promote the technology in their own regions and country environments.

The course, scheduled for 19-30 November 2000, will include lectures, laboratories, field works, and study tours on all aspects of Vetiver use and utilization. Course topics will include the importance of VS, propagation techniques and nursery management, the use of VS for both agricultural and non-agricultural activities, and alternative uses for Vetiver leaves and other plant parts. This practical, hands-on training will provide a good opportunity for trainees to learn all the techniques of propagation and planting out in the fields for different purposes. There has been great interest in the training course from regional Vetiver coordinators and individuals in attending this course. We are hoping that the success of this will lay the groundwork for further involvement from Heineken and future training courses in both Thailand and other parts of the world. - [Return to top](#) -

TVN To Print Promotional Brochures

The Vetiver System: A Proven Solution For Agriculture, Environment And Infrastructure Protection. This is the tentative title of the first of several brochures to be produced by TVN over the next year. With funding provided by The Royal Danish Government, we plan to produce a simple color brochure in English to elevate the profile of the Vetiver System for policy makers, planners, private companies, potential donors, and professionals. As a follow-up to this, a second set of brochures is planned which cover the use of VS for other technical areas: VS for Agriculture; VS for Environmental Remediation, Pollution Control, and Reclamation; and VS for Infrastructure Protection and Roads. Large quantities of these will be printed and distributed to local networks and will have space for local contacts to be added. It is hoped that it will also be available on the Web page for others to access as well. - [Return to top](#) -

TVN Receives Grants From Royal Danish Government And The William H. Donner Foundation

In the past months, two components of the "Vetiver 2000" proposal have received funding. The **Royal Danish Government, Danida** granted TVN approximately US\$108,000 to cover dissemination of VS information and technology. Another US\$100,00 was granted to TVN by the **William H. Donner Foundation** to fund the next Vetiver Awards program (to be awarded prior to 2004) and to provide matching funds for VS research projects (see page 5).

A large portion of the Danish grant (approximately 25%) has been allocated to produce another printing of the green booklet "Vetiver, The Hedge Against Erosion" in English, Spanish, and Portuguese. Additionally, TVN is funding production of the booklet in previously unavailable languages. New versions are to be available in French, Kiswahili, and Indonesian and will be produced by country Networks in order to reduce printing and distribution costs. Other funding will be used by TVN for future publications of "The Vetiver Newsletter", production and reproduction of CD-ROMS and videos, and the publication of a Vetiver System brochure for promotional use, etc. For Regional and Country Vetiver Networks we have allocated grants of US\$1,000 each for "knowledge transfer" which includes financing of the development, production and distribution of promotional and technical instruments such as newsletters, homepages, CD-ROM production and replication, brochure development, etc.

During the past few months, TVN has been fortunate to receive renewed funding from another of our key donors. The **Wallace Genetic Foundation** has provided US\$76,000 of which \$61,000 will be used for special research, under the responsibility of **Dr. Paul Truong** of Queensland, Australia, relating to Vetiver and water. These funds will be matched by the Government of

Queensland and the University of Southern Queensland. The balance of \$15,000 will be for research on the cold tolerant "jiji" grass in China, under the responsibility of **Dr. Liyu Xu**, coordinator of the China Vetiver Network. - [Return to top](#) -

New Technical CD-ROMs Available

Dr. **Paul Truong** (Queensland Department of Natural Resources in Brisbane, Australia) has recently released two CD-ROMS on the Vetiver System. The first, **Vetiver System Techniques**, is a collection of several of Dr. Truong's previous technical CD-ROMs as well as new topics which relate to the various uses of the Vetiver System. The content of the disk are as follows:

- Vetiver Grass System: Research, Development and Applications in Queensland, Australia (1988-1997);
- Vetiver Grass System For Flood Erosion Control, A Pictorial Record (1993-1996);
- Vetiver Grass Technology for Infrastructure Protection, A Pictorial Record (Revised Edition 1999);
- Vetiver Grass Technology for Environmental Protection: A Pictorial Essay (January 2000);
- Vetiver System for River Bank Stabilization - A Pictorial Essay (March 2000).

Included in the above are photos, text and data supporting VS for each use. The second CD-ROM, **Vetiver System Resources** includes the following and more:

- Report on the Second International Conference on Vetiver: Vetiver and the Environment (Paul Truong);
- A Look See at Vetiver Grass in Malaysia (P.K. Yoon);
- Vetiver Grass: The Plant (Paul Truong);
- The World Bank Slide Set (Dick Grimshaw and John Greenfield);
- Vegetative Barriers a New Upland Buffer Tool USDA-ARS (Seth Dabney);
- Bioengineering Conference, Manila 1999 (Paul Truong);

Copies of the CD-ROM can be purchased from TVN at a cost of US\$10 each. Please send an international money order, in US\$, made out to 'The Vetiver Network' to TVN, 3601 N. 14th

Tanzania Goes Green:

***Nyasi za Vetiva - Huhifadhi Rutuba na Unyevu wa Ardhi na Kuzuia
Mmomonyoko***

This is the title of a new translation of the green book "Vetiver Grass, The Hedge Against Erosion". This version, for those of you who are unfamiliar with the language, is the Kiswahili translation, made possible by the efforts of Anthony Makoye of the Tanzania Vetiver Network (TAVEN).

Copies may be obtained by contacting TAVEN at :

P.O. Box 31050

Dar Es Salaam

Tanzania

Tel: 255(0) 744273386

Email: vetivertz1999@hotmail.com

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Call for Preproposals:

Funding Available For Donner Foundation Vetiver System Research

Grants

The Vetiver Network is pleased to announce a continuation of its Vetiver System (VS) research grants program. In anticipation of the Third International Conference on Vetiver in China in 2004, TVN wishes to encourage research on the theme "Vetiver and Water". Through the generosity of the William H. Donner Foundation, TVN will award grants totaling \$45,000, for research on water-related aspects of Vetiver. TVN will fund **up to 50%** of the proposed research, the remaining 50% to be provided by additional sources. Applications for funding under \$2000 are strongly encouraged, and small enabling grants (\$100-1000) are especially favored, as is collaborative and interdisciplinary research. The maximum funding for an individual grant is \$9000, which with matching funds would require a total budget of at least \$18,000.

Preproposal Process

Provide TVN with a Statement of Research (less than 250 words) which describes the scope of work, including testable hypothesis and anticipated results. Clearly state total budget and amount requested from TVN. Any topic will be considered for funding; priority will be given to research on VS interrelationships with water quality, quantity, and/or distribution. (For those who are interested, the following articles by Dick Grimshaw discuss this topic: Vetiver Newsletter 22 "Vetiver and Water, an Enhanced Perspective" and http://www.vetiver.org/TVN_editors_re.htm). For preproposals considered of potential interest, TVN will request a complete research proposal; the level of detail required will depend on the size of the request and the nature of the research. Matching funds commitments (which can include both in-kind and cash contributions) must be documented prior to award. TVN may also assist, without further obligation, in providing review recommendations and contacts for potential collaboration.

Submissions

Please send all preproposals (mail, email, or fax) to

The Vetiver Network

ATTN: Donner Research Grants

3601 North 14th Street

Arlington, Virginia 22201

USA; vetiver@vetiver.org

fax: 001 (703) 243-6203

There is no deadline for submission. Further details will be posted on The Vetiver Network homepage (www.vetiver.org). - [Return to top](#) -

Vetiver On The Internet

Below are listed several web sites which include VS technology.

<http://www.wrweb.com/skylake.htm> (a project in northern Thailand using vetiver for erosion and fire control)

<http://www.jamesroe.com/rural/vetiver.htm> (A project in Oaxaca, Mexico who have developed a Vetiver program and established a nursery)

<http://www.afn.org/~afn29600/11.html> (Robert Walle, soil/water scientist worked with Vetiver and erosion control technologies in Honduras)

http://www.sedlab.olemiss.edu/uep_unit/projects/Dab_veg/index.htm (Seth Dabney of the USDA National Sedimentation Lab in Oxford, Mississippi, USA "Vegetative Barriers - A New Upland Buffer Tool". Site includes text, diagrams and photos to describe the definition, purpose and benefits of vegetative barriers, descriptions of hedge arrangements, how they function, effects on water flow and sedimentation, and more)

<http://www.chiangmai.ac.th/abstract1999/Abstract/agi/abstract/agi980062.ht>

ml (Abstract: "Free-living Nitrogen Fixing Bacteria in the Rhizosphere of Vetiver Grass ...", Faculty of Agriculture, Dept. of Soil Science, Chang Mai University, Thailand)

http://www.ostc-was.org/thaitech/99news_03.html (Article: "The Breeding of Vetiver in Plastic Tubes", Thailand Institute of Scientific and Technological Research)

<http://www.ihe.nl/he/dicea/clm32/clm3251.htm> (Vetiver technology homepage of Inter. Inst. for Infrastructural, Hydraulic and Environmental Engineering at Delft)

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Letters

China

From **Liyu Xu**, China Vetiver Network Coordinator:

In the Spring of 2000, over 30,000 Vetiver tillers were transported to Nanyang City in Henan Province, which is a northern province in China. The city is situated at 40° North latitude; the highest temperatures can reach over 40°C, and the lowest temperatures usually -10°C to -14°C, with a minimum of - 20°C. In Nanyang, although Vetiver did not grow as fast as in the southern part of China (Fujian Province for example) it still reached 150 cm in one growing season and was not equaled by any other grasses tested.

·Now Vetiver is planned to be used for stabilizing stream banks and environmental protection for the large project "Drawing Water from Yangtze River to North China Plain" that has been considered for decades and is going to be implemented because the water shortage is becoming more serious in the recent years in northern China.

From **Xia Hanping**, South China Institute of Botany, Guangzhou:

I recently had a chance to visit the main Vetiver projects conducted by Mr. Hong and Xu in the first half of this year.

The Xinfengjiang Reservoir Project conducted by Hong is composed of two parts, one is an up-slope of the highway accessing to the reservoir, about 7,000 m², accounting for approximately 90% of the total area, and the other is located on the reservoir slope, nearly 1000 m², and over

10% of the project's area.

The project was not finished until May 15th; so Vetiver only had a month of growth when I visited the site on 18 June. All in all, Vetiver planted on the highway did not grow well, and the survival rate was no more than 80% probably due to drought and high temperatures, but those planted at the reservoir had a survival rate of over 95%, in spite of the fact that it was planted later than the former, and all the seedlings were simultaneously dug up from the nursery and carried to the work site at the same time. After finishing the visit, I advised them to fill gaps by planting new seedlings, and to apply some fertilizer; which they did. This year up to the time of my visit, rainfall has been very little and the water level in the reservoir dropped from May to June! Now the Vetiver along the reservoir's banks are 7-8 m above the water level. At the time of planting the water level was only 3 m below the Vetiver. All seedlings used by Hong are bare-rooted.

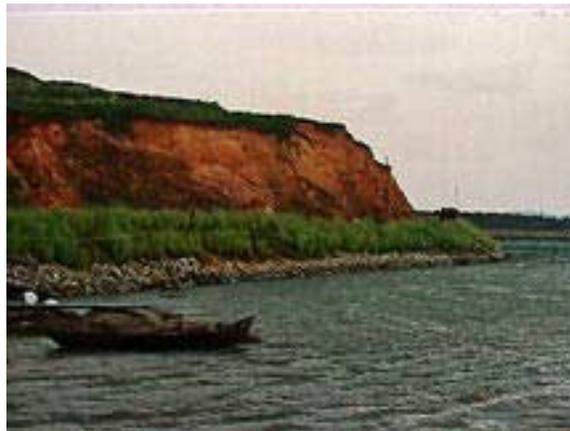


Photo: Vetiver planted on slope above the reservoir in the Xinfengjiang Reservoir Project Guangdong, China.

As to Xu's quarry project implemented in Shenzhen, it seemed to have a better result than Hong's, this is likely because:

1. Xu's project was planted earlier (by two weeks);
2. Xu used bag-seedlings;
3. Xu included other plants, including *Paspalum notatum*, *Wedelia trilobata*, *Parthenocissus* sp.; and
4. Xu got sufficient funds to establish the project whereas Hong has not received anything for his reservoir project. The head of Shenzhen Municipal Minerals Administrative Bureau was satisfied with the results after he visited the project and decided that other quarries in Shenzhen needing restoration will be handed to Xu to implement.

I am extremely busy with my work, especially after CCTV broadcast the Vetiver program in the middle of April. This also indicates that Vetiver will be very promising in southern China, particularly in Guangdong. I am very confident of Vetiver's success in China.

Philippines

From **Edwin Balbarino**, Farm and Resource Management Institute/ Philippine Vetiver Network (VETINETPHIL)

Recently, I spent one week in the Sagbayan, a mountain town selected as our site for the on-farm research project for corn. I am the project leader and will introduce Vetiver side-by-side with other corn farming technologies. From Bohol, I went to Mt. Malindang, Mizamis Occidental, Mindanao for three batches of farm planning workshops in three different areas of Malindang. A total of 75 farmers participated in the workshop and about 75% of them included Vetiver in their soil and water conservation plans. The planting materials will be supplied by the VETINETPHIL members in Mindanao. Mt. Malindang is about 2,500 meters above sea level. It is a government-declared protected area and an international NGO is working in the buffer and agricultural zones to help farmers improve their farming systems to minimize population pressure in the protected area.

I also visited a Department of Public Works and Highways road project in the town of Bonifacio that uses Vetiver to stabilize slopes.

I passed the housing sub-division project on the mountain of Cebu City which we supplied with bagged Vetiver slips to stabilize the slopes in blocks 10 and 11. Our farmers in Leyte supplied the planting materials. The delivered Vetiver (30,000) has not been planted yet because the big gullies have to be back-filled first. - [Return to top](#) -

Network News

TVN Adds National Networks

Since the last publication of The Vetiver Newsletter in February 2000, there have been 14 new national vetiver networks established, 11 of which are located in Latin America (see article this page). The other three networks outside of Latin America are the **Tanzanian Vetiver Network** (TAVEN), the **Indonesian Vetiver Network** (IDVN) and the **Indian Vetiver Network**.

TAVEN is coordinated out of Dar es Salaam, Tanzania by **Anthony Makoye**. Activities thus far

have included dissemination of a promotional document titled "Highlights on Vetiver Grass Technology" which was well received by the Tanzanian Parliamentary Environmental Committee, development of a VS promotion team, translation of "Vetiver, The Hedge Against Erosion" into Kiswahili (to be published this year), completion of "Vetiver Grass for Soil Erosion Control: A Planting Guide" (also to be published this year), and the establishment of 5 nurseries and 10 demonstration sites around Dar es Salaam with plans for expansion. Contact information: TAVEN, P.O. Box 31050, Dar es Salaam, Tanzania, Email: VetiverTz1999@hotmail.com

The Indonesian Vetiver Network, is in the process of establishing a formal NGO network coordinated by **Mr. Indrawan Suparan**. IDVN is comprised of an advisory board of three Advisors for: Research on VS, Government-related issues, and the mining sector. Coordinators for IDVN include Indrawan Suparan who is to serve as Chairman and Coordinator of IDVN and as coordinator for Java and Kalimantan; **Mr. David Booth** as coordinator for Bali and East Indonesia, and **Mr. Edison Purba** as coordinator for Medan and Sumatera. Activities have included the development of a website at: www.vetiver.bizland.com/ and the current project of translating and publishing the green book "Vetiver, The Hedge Against Erosion" into Indonesian, development of a color brochure and CD-ROM to introduce and promote VS technology in all technical areas. Contact: Indonesian Vetiver Network, Indrawan Suparan, Jl. Arco Raya Buntu B16, Cipete Selatan, Jakarta 12410, Indonesia; Fax: +62 21 769-0906; Email: isuparan@telkom.net

The Indian Vetiver network is being established as an NGO by **Rajan Gandhi** in New Delhi. This network is being developed in order to increase knowledge, awareness and interest in VS amongst everyone from farmers to government institutions to the corporate sector to NGOs to researchers, etc. Plans for the network involve publishing a wide variety of informative material (brochures, books, research); developing a reference library focusing on VS; organizing lectures, seminars and workshops; and providing field and classroom training on VS. These are just a few of the objectives outlined by the network. Currently in production is a promotional video as a cooperative effort by Mr. Gandhi and Indian filmmaker **Smita Shah**. It is hoped that this short video focusing on the benefits of VS for India will help in fundraising activities of the Indian Vetiver Network. Contact India Vetiver Network, Rajan Gandhi, 12 Amrita Shergill Marg, New Delhi 110 003, celular phone: 011 98102 92484, Email: mistral@satyam.net.in - [Return to top](#) -

CVN Sends New Years Greetings With Postcards

Dr. **Liyu Xu**, Coordinator of the China Vetiver Network, has recently received a grant through the Danish 'Information Transfer' Grants Program of the Vetiver Network for his project

"Dissemination of the Vetiver System through Postcard Distribution". Although past publications have impacted the extension efforts of VS in China, it was felt that dissemination was not wide enough nor were materials adequately shared. To strengthen dissemination efforts Liyu has proposed a low-cost method to increase visibility of VS in China. A high quality New Years postcard with pictures of uses of VS will be widely mailed during the Spring Festival Season (just prior to the planting season) which normally are exhibited in public by recipients, thus increasing their visibility. Approximately 8000 postcards will be sent to individuals in the private sector, extension stations, highway and railroad engineers and companies. This is a creative idea which we hope will produce increased interest in China. - [Return to top](#) -

Growth In The Latin American Vetiver Network

The Latin American Vetiver Network (LAVN) has undergone many changes since publication of Vetiver Newsletter 21. With the departure of Joan Miller and Jim Smyle in late June, 2000 a new coordinator was named and eleven country networks established throughout the region.

Dr. Oscar Rodriguez has taken over coordination of LAVN from Maracay, Venezuela where he is on the Faculty in the Department of Agronomy at Central University of Venezuela. He is a Professor specializing in soil and water conservation and has published numerous papers based on his research in soil conservation on hillslopes utilizing live hedges (including Vetiver), mulch and other covers. Additionally, Dr. Rodriguez developed a project funded in 1996 by TVN's Grants for NGOs Program with the Conservation Society of Aragua, which promoted the use of Vetiver hedges in the State of Aragua. As a result, Dr. Rodriguez also was awarded one of the First Prizes of The King of Thailand Awards at the International Conference on Vetiver in Thailand in January 2000.

The LAVN will continue to publish the *Boletín Vetiver* in Spanish, serve as a dissemination point for information and contacts, particularly for the country networks in the region. It is also hoped that they will develop a new Web page in Spanish for the LAVN.

In addition to the transfer of the LAVN to Venezuela, to enhance overall effectiveness, volunteer country coordinators have been found in most countries in the region to take on some of the responsibilities within their country or region. This should help improve the dissemination of literature, provide local points of contact for those interested in learning more about VS and where to obtain planting material, increasing participation and membership in LAVN, and provide better feedback to LAVN and TVN regarding Vetiver programs within each country.

The contacts for the LAVN and the eleven networks are:

<p><i>The Latin American Vetiver Network</i></p> <p><i>Dr. Oscar Rodríguez - Coordinator</i></p> <p><i>Sociedad Conservacionista Aragua</i></p> <p><i>Apartado Postal 5115</i></p> <p><i>El Limón-Maracay 2105</i></p> <p><i>Venezuela</i></p> <p><i>Tel/fax: (58) 043 831734</i></p> <p><i>Email: red_vetiver@hotmail.com</i></p>	<p><i>Venezuela</i></p> <p><i>Germán Trujillo Rada</i></p> <p><i>Red Venezolana de Vetiver / SCA</i></p> <p><i>Aptdo. 5115</i></p> <p><i>El Limón - Maracay</i></p> <p><i>Venezuela</i></p> <p><i>Tel/fax: (043) 36.18.20</i></p> <p><i>Cellular: 016-543.32.44</i></p> <p><i>Email: germantr@telcel.net.ve</i></p>
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Countries without coordinators in the region will be covered by the LAVN in Venezuela. -

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Country Reports

Vetiver Development In China In 2000

By Prof. Liyu Xu, China Vetiver Network; Nanjing - China, P.R.

(The following are some of the recent correspondence sent to TVN by Liyu Xu, Coordinator of the China Vetiver Network. We tend to print a lot of articles from China, but they have truly exhibited a wide range of uses and experiences all in a relatively short time. Much of it can be attributed to the hard work of Liyu as well as Xia Hanping, of the Southern China Botany Institute. - Ed.)

Vetiver Beautifies a County Town

Qingliu County is located in the western part of Fujian province; it is a mountainous county with its capital of over 20,000 situated along a river. A highway project included construction of a large road cut on a mountainside across the river from the town. In 1997, a landslide left much of the mountainside in the river. After the removal of hundreds of thousands of cubic meters of earth and rock, a discussion took place on how to protect huge road cuts involving up to 20,000 m² of earth. Traditionally, large road cuts are protected by concrete to stabilize the slope and prevent further sliding, which is not only costly, but an environmental issue. The county citizens did not want a huge concrete wall visible across the river which, they claimed, would "look like a tomb" when they looked out their doors. A suggestion from the Provincial Highway Bureau, led to the decision to use Vetiver to protect the cuts in conjunction with the limited use of concrete walls at the most critical sections.

Vetiver grass was planted in March and April 1999. Planting occurred in groups consisting of two rows: a pair of rows were planted along the contour with a spacing of 20 cm between planting units and 25 cm between the rows. There were 75 cm between each pair of rows. The survival rate reached 95%; the roots developed very well and it was impossible for a person to pull out a single clump just one month after planting. A dense, living fence formed after 3 - 4 months. Since the site was located on pure, semi-weathered rock containing very little soil, the Vetiver did not grow as well as in other locations, however, it did function by providing good protection. The total cost for Vetiver planting was only 45,000 Yuan RMB (about US\$ 5,487),

plus the costs of planting materials (0.1 Yuan/per tiller). The cost was only 50% of using other types of grasses. The only additional treatment the plants received was dipping the roots in a clay paste before planting (to conserve moisture), burying the plants 6-8 cm deep, and watering.



Photo: Vetiver was used in conjunction with the limited use of concrete walls at the most critical sections to stabilize and protect to protect this large roadcut. This was accepted by local citizens who felt that the usual concrete wall structure used, would "look like a tomb" when they looked out their doors.

Vetiver for Highway Protection

This site was included as part of the demonstrations during the International Workshop on Vetiver in 1997 and the 1999 Workshop on Vetiver Bio-Engineering Technology for Erosion and Sediment Control and Civil Construction Stabilization. Great progress has been made since then by both NGO and highway institutions. At the most critical section of national highway No. 205, Vetiver was planted below the road on the fill slopes in April 2000 during the rainy season, with a spacing 20 - 25 cm within rows and 1.5 m between rows. An NGO called North Fujian Agricultural High-Technology Institution contracted the project with the Highway Bureau and guaranteed that the slope with 3,000 m² should be protected and covered with vegetation within 6 months. However the slope was already covered by Vetiver and other grasses just 100 days after planting when we visited there (other grasses were interplanted to provide vegetative cover). Vetiver not only stabilized the highway embankment but also protected the state-owned barns down the slope.

In Meixian Township of Youxi County, the newly constructed LongKou Highway, was protected using Vetiver planted on a slope of over 8000 m² by the County Communication Bureau in October 1999. When we visited there in July 2000 (nine months after planting) the grass averaged 140 cm high with 10-15 tillers/clump. The highway was stabilized and the rice field down the road was also protected. The highway bureaus are enthusiastic about using Vetiver

because it has been found to be inexpensive, easy and has reduced the conflicts between the highway bureaus and farmers. Prior to the application of Vetiver grass, farmers often went looking for financial reimbursement due to losses incurred when their rice fields were buried by the sediments eroding from the highway embankments.

Vetiver Protection for Fish Ponds and Windbreaks Appeal to Farmers

Some people may remember that Madam Zhang coordinated the planting of Vetiver on Pingtan Island. Now the farmers themselves are enthusiastic about Vetiver and continue to plant hedges to protect the banks of fish ponds. Additionally the hedges filter sediment flowing into the ponds which otherwise cause problems for young fish.

Another farm application being used is to plant Vetiver along the ridges of their plots to form windbreaks to protect vegetables and crops. On Pingtan Island, strong winds lead to the planting of *Casuarina equisetifolia* windbreaks which were ineffective for crop protection. Farmers have become fond of planting Vetiver instead as windbreaks which occupies a minimal amount of land and has been observed to grow to a height of three meters high in one year. Some farmers have joined together and organized private groups which contract out their services on projects with engineering institutions. Additionally, they also encourage other farmers to plant Vetiver and provide planting materials. The Pingtan Charity Association has invited the China Vetiver Network to coordinate and organize training courses (the first of which will be held in September, 2000) to disseminate information on VS and train farmers.



Photo: Vetiver planted as a windbreak on Pingtan Island to protect a farmer's field of peanuts. Previous use of *Casuarina equisetifolia* did not function well as windbreaks.

Cut and Fill Establishment

VS can be used on both cuts and fills of embankments, but the survival and growth rates have differed significantly between the two. Generally speaking, Vetiver grows very well on fills. Experience has shown that it is important to replant if it is washed away during heavy rains and to repair any newly emerging gullies during the first few months after planting.

For cuts, huge cuts in particular, the results have been quite different, depending on soil type, slope gradient and aspect. In sections with deep soils and gentle slopes, Vetiver grows well. Other sections with thin soils and steep slopes and lots of rock fragments, soil moisture is extremely low and Vetiver growth has been very poor. Therefore when using VS on a huge cut requires different management techniques such as increased irrigation and fertilizer particularly during the first few months after planting to ensure a healthy and even hedge. Some sections may require the construction of small terraces to retain moisture, and use of containerized seedlings.

Demand for Planting Material Exceeds Supply

In addition to those projects mentioned above, the highway institutions in Fujian, Zhejiang, Jiangxi, Yuannan, and many other provinces were very busy with planting Vetiver during the Spring of 2000. In Jiangxi Province, over 10,000 m² of Vetiver was planted for highway embankment protection around the Poyang Lake in Duchang County. Similar demonstrations were established in Xingguo and Xingyu Counties. In Lishui Prefecture of Zhejiang Province, Vetiver was planted in 1999 and 2000 for highway stabilization in the mountains. VS was also used for dam stabilization and quarry re-vegetation in Guangdong Province, and on copper mine tailings and gold mines in Jiangxi and Fujian Provinces, respectively. As a result, there was an unprecedented shortage in planting materials in the spring of 2000. All of the planting materials in Fujian and Jiangxi, the two largest production provinces, were sold out and the price per tiller increased from 5 cents RMB to over 15 cents RMB. To meet the demand for planting materials, many new private companies in Fujian started to establish large scale nurseries in the autumn of 1999 and spring of 2000.

VS for Quarry Rehabilitation in Shenzheng

Shenzheng is a new city established since the economic reform. To meet the needs of construction, quarries have appeared around the city causing serious point-source erosion, and threatened production of building materials. For environmental protection, two types of slopes need revegetation; loose fill formed by particles and fragments left by quarrying which are vulnerable to collapse; and cuts formed by quarrying activities, which are difficult to excavate for planting.

In the past on the fills, local authorities planted trees along with sand-filled bags on the contour,

but the bags were decomposed within 3 months and they were washed away during the rainy season.

The Luhui Garden Engineering Co. Ltd., a private company, was contracted by the local Geology and Mining Bureau of Shenzheng City to recover and revegetate the site. They prepared ditches and planted Vetiver tillers on the loose fill, and dug holes and planted containerized Vetiver seedlings on the semi-weathered rocks of steep cuts in April 2000.

VS For Slope Stabilization

A large 8000 m² roadcut on coarse granite in Heyuan County of Guangdong Province was seriously eroded and void of vegetation. Elephant grass was planted a few years ago to rehabilitate the site, but its growth and survival rates were low. The slope was subject to erosion with numerous gullies several meters deep. The Hongri Turf & Forage Company introduced Vetiver to stabilize the slope. In April, during the rainy season, Vetiver was planted at a spacing of 1.5 m between rows and 15 cm within rows and fertilized with manure. In spite of a dry rainy season, the survival rate was 85%. In June, Vetiver was re-planted in areas where survival was low and fertilized. In August, the plants were 1.8 - 2 m high with 20 tillers per clump and the slope completely stabilized.

VS for Reservoir Landscaping

A common problem found around reservoirs is the barren strip on the shore often tens of meters high, caused by the fluctuation of the water level in the reservoir. In recent years reservoirs have become recreation sites and efforts to vegetate the banks have been unsuccessful. In the Spring of 2000 a private company established a demonstration site planting Vetiver on the unvegetated bare reservoir banks which after 4 months were greened up completely.

VS Protects Buildings

In Zhongshan (Sun Yatsen) City, building sites located on the tops and base of hills are in need of protection. Generally, concrete walls were built at the base of the hills which did nothing to stabilize the slope above where a few trees and grasses are grown. At the end of May 2000 a 45° slope of area 2000 m² was stabilized using VS on contours planted by Hongri Turf & Forage Company. Three months later the Vetiver was 1 m high and slope stabilized.

VS Information Dissemination

The private sector has been using some creative means to distribute information on VS. For example, a dance, given the theme 'clean water and blue sky', was organized by the education bureau and Luhui Garden Engineering Co. Ltd. At the Guangdong Arts Center, VS was introduced for environmental protection using the slogan "return us a blue sky, and return us

clean soil".

Cold Tolerance - "Where Vetiver Cannot Grow"

Last year, Vetiver grass was introduced to Luliang Prefecture of Shanxi Province on the Loess Plateau to see if it could grow along the Yangtze River Basin. On 25 May 1999, 10,000 tillers were planted in a carbonaceous loess-derived soil (wind blown silt deposits). The survival rate was 40% and received irrigation in June and July. Before winter, the grass was irrigated again and buried with soil. In March 2000, the grass had not started growing and it was discovered that the roots had died, likely due to low temperatures. The lowest temperature was -20.8°C last winter, and the top 46 cm of soil experienced freezing. There were 12 days where the temperature ranged from -17° to -20°C. (It should be noted though that prior to planting, the plants spent 5 days in transport and may have suffered from moisture stress. The grass was transported in bags which were ventilated; temperatures reached over 30°C, which would have aggravated moisture loss and some plants might have in dessicated soils which separated from the roots.)

In summary, Vetiver cannot be planted where soil freezes for several days, although it has been found to be tolerant to temperatures as low as - 15.9°C. (In Jiangxi Province, it has been recorded to survive and grow well after a winter where the temperature reached a low of -15.9°C.) Thus it is recommended that Vetiver be planted no further north than the Yangtze River Basin. - [Return to top](#) -

Bali Hosts Vetiver Conference

(Excerpt from 'Bali Conference Summary' by David J. Booth, founder of the Ekoturin Foundation, Bali - Indonesia)

In late May 2000, a conference sponsored by **Ekoturin Foundation's** East Bali Poverty Project was held to provide technical assistance for establishing Vetiver planted in East Bali, Indonesia and to promote the use of the Vetiver System (VS) to the Indonesian Government, NGO's and private sector individuals. Additionally, the conference served as an initiation of the East Indonesia branch of the Indonesian Vetiver Network. **Edwin Balbarino**, Coordinator of the Philippine Vetiver Network, was invited to provide technical assistance for the conference.

The 'East Bali Poverty Project' (EBPP), is a non-profit foundation with a mission to improve the lives of thousands of disadvantaged children living in abject poverty in isolated mountain villages that lack the basic rights of running water, sanitation, nutrition, education and healthcare.

There are many hectares of unfarmed land in Indonesia due to problematic farming conditions e.g. contours of land, height of land, extreme weather systems. This creates two main problems: 1) the sloping upland areas cannot be farmed as there is not a stable flat platform for cultivation; and 2) the combination of the sloping land, no trees (to act as barriers), and heavy rains creates extensive soil erosion.

One of Ekoturin's goals is to improve nutrition and aim for long-term food security by improving agriculture using the 'permaculture' system for organic farming techniques. This is where Vetiver comes in. VS can help in the transformation of steep farmland on volcanic slopes, that currently support only corn and cassava, to flatter and more arable land which can grow more nutritious crops and reduce dependency on cassava. Implementation of VS would allow natural terraces to form on the steep farmland during the monsoon season and soil fertility would be improved through the addition of compost, iodised fertilizer, and worm castings. Subsequently, a balance of fruits and vegetables is to be planted on the improved farmland.

Eighty three thousand Vetiver slips were planted in three different locations of the EBPP on the arid eastern slopes of Mounts Agung and Abang, at altitudes ranging from 900-1,200 meters, in March 2000. The main purpose of this initial batch was to control erosion on the steep mountainsides during the next rainy season. Soil type, pH, climatic conditions and topography will be recorded and designated as research sites. In these three zones, Vetiver will be monitored monthly for height and shoot multiplication. This will be an ongoing process throughout the cultivation of Vetiver in Bali. All the information collected over the first 6 months and into the future will be available for Vetiver members to analyse and evaluate.

Initial trials will include pilot farms of approximately 400 square metres. In addition to planting trees as an integral part of the permaculture system, it is hoped that eventually Vetiver will be the key to reforestation, and the start of a 'food forest', thus revitalising the ecosystem in this presently harsh environment.

The following series of questions were posed by conference participants and their responses provided by either Ed Balbarino (Philippine Vetiver Network), **David Booth** (Ekoturin) or **Richard Wendt** (a permaculture farmer with VS experience):

Q. Is there is a risk in importing species not native to Indonesia? Isn't it better to use an established crop such as lemongrass?

A. No. Lemongrass is not as strong as Vetiver - it has a shorter life expectancy and cannot withstand the same extreme environmental conditions, and thus cannot be farmed in the same manner.

Q. Is it a similar crop to Alang-Alang?

A. Yes, Vetiver is similar to Alang-Alang, but is much stronger and has many more benefits and uses.

Q. Does Vetiver have the potential to aid in the reinforcement of riverbanks and reduce landslides? (These are major problems in Indonesia during the monsoon season)

A. Yes. Vetiver has the potential to aid in this area, however this is an area for more advanced research in the future of Vetiver use in Indonesia.

Q. Vetiver was introduced to Indonesia many years ago, and failed.... this does not give us much confidence to try again.

A. Vetiver was primarily farmed for the production of oil extracted from the roots and farmers were led to believe through ignorance that it would be a sustainable source of wealth and income. However the problems arose when the demand for the oil declined and the industry collapsed. This was not the fault of the plant but an error of judgement in farming incentives and initiatives. The key to the success of Vetiver is in the application of the crop to maximise its full potential.

Q. If Indonesia is a vast country with varying degrees in environment and climate, everyone will have different natural resources to work with, is this a concern?

A. The cultivation of Vetiver is a learning process, whereby information needs to be shared in order for errors to be minimised and potential to be realized. That is why there are regional, national and international Vetiver networks throughout the world. They function as an information network for members to share previous and current farming practices and knowledge. The vision is to create a network within Indonesia to function as a basis for the cultivation of Vetiver throughout the Archipelago; it will require a network of members to work together to grow. - [Return to top](#) -

Ecuativer - Vetiver System Ready To Take On Ecuador's Environment

By Piet Sabbe, Coordinator - Ecuador Vetiver Network

On September 15th the board of Directors of the Catholic University of Ibarra approved a proposal of Mr. **Scott Wilson** to incorporate the new Ecuadorian Vetiver Network - Ecuativer into the 'Escuela de Ciencias Agrícolas y Ambientales (ECAA)' with Mr. **Piet Sabbe** as coordinator.

Up to that date Piet Sabbe, a Belgian settled in Ecuador since 1991, formerly with Fundación Golondrinas, had been promoting the Vetiver System (VS). Mr. Sabbe has many years of experience with VS on his own farm "The Bospas Forest Farm", established in 1995, with an adjoining tree nursery.

An agroforestry demonstration site with the system of induced terracing was originally applied using trees from the nursery planted on contour-lines. Mr. Sabbe was not satisfied with the performance of the tree hedges because trees are slow growing and the gaps between trunks allowed run-off. He experimented with bushes (*Cajanus cajan*, *Crotalaria* and *Desmodium*) and lemon grass, without good results.

A World Bank publication introduced him to Vetiver grass which is now a very important element of a viable and sustainable alternative to the damaging agriculture techniques currently practiced in the Mira-valley, in Northwest Ecuador, where his farm is located.

Up to 1,200 meters above sea level, Vetiver responded well to planting in all types of soil and since then Piet has systematically used Vetiver in all contour planting, to stabilize waterworks and previously eroded land at the edges of the field, and has had excellent results. Convinced of its efficiency, Piet has promoted VS, travelled throughout the country with bags of Vetiver slips and with the famous green booklet in Spanish "Vetiver, La Barrera Contra La Erosión".

As a result VS is now successfully used in at least 4 locations in the country, and is being researched by 2 companies. A shrimp producing company, eager to find a vegetative cover and reinforcement for the earth walls around the shrimp ponds, is investigating the resistance of Vetiver to different levels of salinity. A cement plant is working to define under what conditions VS can be used to reclaim their quarries using vegetation.

With the establishment of the "Red Ecuatoriana de Vetiver - Ecuativer" within the Catholic University of Ibarra an academic dimension is being added to the Vetiver story in Ecuador; students and researchers are invited to conduct research in all possible applications of Vetiver and it is hoped that a new generation of engineers will include VS in their package.

Despite the social unrest and political turmoil in Ecuador since 1997, Ecuativer is convinced that within the next several years VS will be accepted and applied as a standard method for erosion control and soil conservation by the national authorities, NGO's, and private companies and will be prepared for the next 'El Niño' in the year 2006 or 2007.



Photo: Bospas Forest Farm in the Mira Valley of Ecuador where VS is an essential component. A worker is cleaning out an irrigation canal protected by a Vetiver hedge.

Reports received in the last weeks have indicated that:

1. So far, VS has not been used on a large scale [in Ecuador].
2. Farmers and some NGO's reject the use of Vetiver because cattle do not like to eat it. In other words, the argument is that Vetiver has no economic value to them.
3. In other areas, mainly in very dry areas in the south of the country, Vetiver is only used as a fodder substitute as other grasses (such as Dhali's [*Panicum maximum*] or rye grass) do not grow in the region because of the drought. In these areas VS is not yet used for erosion control.
4. Authorities do not have any interest in VS. Many NGO's who have heard about VS but do not know the details, are reluctant to promote and use it.

Ecuativer expects to spend a lot of time and energy on promotion of VS in Ecuador. Attending conferences, writing articles for specialized magazines and setting up a homepage on the Internet will be part of the efforts to improve the understanding of VS here.

Requests for detailed information about VS in Ecuador and suggestions from readers in other parts of the world are welcome. Contact:

Ecuativer - La Red Ecuatoriana de Vetiver

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Surprise Factor In Senegal

Vetiveria zizanioides in Senegal is not well known and rarely used for its soil or moisture conservation properties. That's because it is traditionally used for purposes far from what the professional agronomist, environmentalist or engineer advises. The wild variety (*V. nigriflora*) is found along river banks and wetlands, mostly in the south. The root of the plant (*tiép* or *sep* in Wolof language) is much shorter than *V. zizanioides* and has multiple purposes. Found in urban markets sold in clumps of about 30-40 roots and 50 cm in length. It is used to disinfect and to eliminate pathogenic bacteria from water by boiling strands of the root in water. Women say that a future groom is given the "root water" to drink for a week prior to his wedding. The bride is given the water on the wedding day and is sometimes rubbed with it. A few roots are placed in a

drinking water bottle to give it "a good scen" and is given to small infants and lactating women with slight cases of diarrhea. Up until now, there has been very little Vetiver grown commercially, but that might be changing soon.

Criss Juliard

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Ghana Gold Mine To Rehabilitate With Vetiver

Normandy Ghana Gold, the operating company for the Yamfo-Sefwi gold project in their support to local communities have established approximately 50 hectares of Vetiver grass to supply future rehabilitation and erosion control at a proposed mining project. (Source: Normandy Mining Limited - 2000 Annual Report, p. 28). - [Return to top](#) -

Ecuadoran Promotes Sustainable Farming Using Vetiver System

The Vetiver Network is pleased to congratulate Vetiver Network member **Maria-Eliza Manteca Oñate** as one of five international winners of the Year 2000 **Rolex Awards for Enterprise**. **Fundacion Golondrinas**, the NGO founded by Maria-Eliza in 1996, set up a nature reserve on the Cerro Golondrinas where there also exists a model farm where improved agriculture techniques such as permaculture and agroforestry are being used to rehabilitate a very degraded region of Ecuador.

In 1997, Fundación Golondrinas received a US\$10,000 grant from TVN as part of its Grants to NGOs project. Their project had the objective of conserving natural resources and the restoration of farm land involving the introduction of Vetiver Grass technology to farmers and rural communities through a process of training and demonstration. The grant helped to fund a Vetiver nursery and to promote the Vetiver System for local adoption at the community level. The project has been successful primarily because it incorporates the participation of local farmers.

Read about the project and the Rolex Awards at: www.rolexawards.com and about Fundacion Golondrinas at: www.ecuadorexplorer.com/golondrinas. - [Return to top](#) -

Technical Papers

Observations on the Formation and Character of Vetiver Tillers

Chen Xuhui (Guizhou Academy of Agricultural Sciences, Guiyang, China and R.D. Hill (Dept. of Ecology and Biodiversity, University of Hong Kong, Hong Kong SAR, China)

Tillering speed, the quantity and quality of the Vetiver tillers will directly influence its propagation rate, the formation of hedgerows and the supply of grass for fodder and other purposes. Experiments were conducted at two sites in Guizhou Province, China, from 1995 to 1998 to examine aspects of tiller formation and methods to accelerate this process. Work was supported by the University of Hong Kong and latterly by the Kadoorie Foundation, Hong Kong.

Experiments were conducted at two sites, both subtropical. The Guiyang site is south of Guiyang City, lat. 26°35'N, long. 106°43'E, at an altitude of about 1100m a.s.l. Mean annual temperature is 15.3°C and mean annual precipitation is 1175mm. The Luodian site, to the south, is located near lat. 25°28'N, long. 106°37'E, at an altitude of approximately 560meters above sea level. There the mean annual temperature is 19°C and the mean annual rainfall is 1177mm. The climate is subtropical monsoonal with dry winters, during which little rain may fall for three or four months, with wet summers during which high-intensity rainfall episodes are characteristic. Soil moisture deficits probably occur in 4-5 months of the year.

Tillering

A single hill of Vetiver containing three tillers was planted in the nursery at Guiyang in April 1995. By the end of that year it had sprouted 33 tillers. Subsequently it was trimmed once yearly in March. Without replanting, the number of tillers counted each year in December, totaled 106, 191, 303 tillers in 1996, 1997 and 1998, respectively.

Tillering and Soil Types

Slips were planted, 2-3 per hill, at Luodian in March 1998. The same fertilizer was applied, and no irrigation was provided. Seven months after planting the number of tillers per plant averaged respectively 13.4, 16.1 and 24.2 for the three planting sites. It seems likely that these results reflect the different nutrient status of the sites; the third site especially had somewhat better organic matter and total nitrogen levels as well as substantially better P..

Tillering on Same Soil with Different Fertility Conditions

This trial was conducted at Luodian on sloping land with a Hapludult soil type, comparing tillering performance on farmland and on previously-abandoned, bare, eroded land. Whereas soil pH and total N were similar for both sites, the farmland had about 27% and 535% more available

N and P, and 32% less available K. Vetiver was planted in April 1995 and the number of tillers per plant was counted in August of each year, 1995-98. Results are given in **Table 1**.

The number of tillers per hill on the farmland was about double that on the bare, eroded land, except by 1998. By 1998 the plantings on bare land had to some degree caught up. This may suggest that on poor sites, while initial establishment and growth is slower eventually there is some degree of convergence in performance.

Table 1. Average Number of Tillers per Plant, 1995-1998

Year	On Farmland	On Bare land
1995	17.2	8.7
1996	21.9	8.8
1997	23.6	10.7
1998	19.9	11.4

Tillering and Moisture Supply

As is well known, Vetiver resists drought, capable of surviving for long periods. But during droughts it grows little or not at all so that irrigation is effective in promoting tillers. Two small plots, each containing 24 tillers were planted with an average of 2.5 tillers per hill in April 1998 at Guiyang. No fertilizer was applied. Severe drought followed from August to December. During this time the irrigated plot was watered to saturation once a month in September, October and November. In December the number of tillers per hill in the irrigated plot and an unwatered control plot was counted. On the watered plot there was an average of 23.5 tillers per hill compared with only 15.8 tillers per hill on the unwatered plot. Both plots were on good alluvial soil.

Tillering and Fertilizer Application on Poor Sloping Land

A trial conducted in 1996-1998 on the bareland Luodian HapA trial conducted in 1996-1998 on the bareland Luodian Hapludult aimed to show the difference between fertilizer application and no fertilizer application. Eight different fertilizer treatments were used - single applications of NPK, NP, NK, PK, organic manure, organic manure plus NPK (six treatments), as well as 2-split and 3-split applications of NPK. **Table 2** gives average number of tillers per hill annually.

Table 2. Tillering with and without Fertilizer (tillers per hill) on Poor Sloping Land

Time	With fert.	Without fert.
May, 1996	2.00	2.00
Aug, 1996	4.31	2.55
1997	6.77	4.22
1998	5.46	4.85

Without fertilizer, tillering was slower but by the end of the trial had to some degree caught up.

Effect of Trimming on Tiller Formation

Trimming stimulates the development of tillers. What is an appropriate period before the first trimming is important to know. A trial was conducted at the Luodian site in 1996-1997 (with three replications of each plot of five hills). Trimming at 20-30 cm began three months after planting in March 1996 and continued every month for a treatment. The number of tillers per hill, initially three, was counted in December 1996 and April 1997 for both the treated and untrimmed (control plots). Tillers were counted as "total" and as "effective" i.e. "effective" are unjointed, plantable tillers. Results are given in **Table 3**.

Table 3. Comparison of Trimmed and Untrimmed Hills (tillers per hill)

Initial Date Trimmed	No. Tillers (26/12/96)		No. Tillers (9/4/97)	
	Total	Effective	Total	Effective
14/6/96	7.7	4.7	8.5	5.4

21/7/96	8.2	5.4	8.8	6.1
22/8/96	9.2	7.8	10.2	8.6
22/9/96	12.4	11.5	13.8	13.0
25/10/96	11.3	11.3	12.5	12.5
25/11/96	11.2	11.2	12.7	12.7
Untrimmed	15.8	10.4	16.5	10.9
Note: Planting in March 1996 and no trimming after Nov. 1996				

Table 3 suggests that trimming as a means of increasing the number of usable tillers needs to be initiated at the suitable time. It is clear that for first trimming six months after planting, i.e. trimmed in September 1996, the number of tillers was the most and resulting in a higher usable tiller-rate, the benefits continuing until the following April. By contrast untrimmed plots continued to produce significant unusable material, around 33 per cent, as measured in December and the following April.

Tillering Rates (tillers per hill)

In subtropical Guizhou the usual practice is to establish Vetiver nurseries in March, at the beginning of the wet season and to plant out in the following wet season, the rainy summer being too short to ensure adequate multiplication and then to be reasonably sure of sufficient moisture at planting out. A further trial, using untrimmed material, was conducted to establish seasonal rates of multiplication.

It will be seen that although the proportion of unusable material fell somewhat as the hills matured, it was nevertheless still high, rising again by July 1997 when inflorescences formed for a second time. These data, in conjunction with those presented earlier, suggest that irrigation and early trimming may succeed in producing sufficient plantable material more quickly. Clearly, the present practice leads to the production of over-aged material though an earlier date for nursery planting would, in all likelihood, encounter the problem of excessively low temperatures.

Optimal Planting Densities in Nurseries

At present almost all Vetiver in China is planted as bare-root slips. The current planting density

in nurseries is 40 cm between rows and a hill interval of 10 cm, i.e. about 250,000 hills per hectare with three tillers per hill. Trials were conducted in 1997 and 1998 to explore the question of optimal planting density. Trial 1, with three tillers per hill, began in May 1997 and measurement in September and November. See Table 4.

Table 4. Effect of planting density on propagation rate of Vetiver

Date Measured	Planting pattern	Initial density hills (x10⁶/ha)	Tillers (x10⁵/ha)	Tillers/hill	Propagation rate
Trial I					
Sep 25 1997	0.333m x 0.200m	1.5	2.42	16.10	5.37
	0.250m x 0.167m	2.4	2.49	10.38	3.46
Nov 24 1997	0.333m x 0.200m	1.5	3.02	20.13	6.71
	0.250m x 0.167m	2.4	3.22	13.40	4.47
Trial II					
Sep 28 1998	0.333m x 0.167m	1.8	2.34	13.27	6.50
	0.250m x 0.167m	2.4	2.50	10.40	5.20
Oct 29 1998	0.333m x 0.167m	1.8	2.73	15.15	7.58
	0.250m x 0.167m	2.4	2.76	11.48	5.74
Nov 30 1998	0.333m x 0.167m	1.8	2.83	15.72	7.86

	0.250m x 0.167m	2.4	2.83	11.80	5.90
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Conclusion

In the subtropical areas of China, Vetiver is mostly propagated by the cuttings from Vetiver clumps, which consist of tillers and corresponding root systems.

Therefore, to explore the formation process and character of Vetiver tillers and the methods to speed up tillering is of great significance. The result of observations indicated that Vetiver grasses possess strong tiller ability and great resistibility to adverse growing conditions, but suitable soil type and higher fertility will promote the growth and tillering of Vetiver. Tillering ability is also affected by irrigation or fertilization under the drought conditions on the barren lands.

The trial results showed that reasonable trimming of Vetiver grasses is a effective method to speed up the sprouting of tillers, and the suitable period initial trimming is six months after Vetiver was planted. It can also be seen that Vetiver grass possesses great self-regulation ability. Although the density of Vetiver cuttings planted may be greatly different, the tiller numbers are nearly the same about six months later. The suitable density of Vetiver slips in the nursery is about $1.5 \times 10^6 \sim 1.8 \times 10^6$ plants per ha i.e. planted with a space of about 0.4m x 0.15~0.167m. As for the suitable tiller number per hill for Vetiver to be planted in nursery or field, two gives good results in terms of propagation and survival rates as well as economizing in planting material. However, further work is required to establish the relative efficiency of two tillers per hill or three in hedging up and controlling erosion.

One clear problem for the province is how to obtain tillers of the optimal age for hedgerow plantings. The current practice of holding nursery stocks over the dry season before planting out is imposed by the cool spring weather early in the Vetiver production cycle, consequent fairly slow growth and the risk of drought from July or August onwards. To shorten the production cycle may be difficult. Yet not to do so was the risk of using poorly-performing over-aged material. Winter production using irrigation is probably not feasible anywhere in the province as it is too cool. This is in contrast to southern coastal provinces such as Hainan and Guangdong where such production is certainly possible in coastal areas. Under present conditions, nursery production in the warmer coastal areas with rapid shipment inland is not feasible.

Despite the difficulties, field plantings of Vetiver have been successful in Guizhou and will continue to be so provided that poor-quality tillers are discarded. One possible means by which production may be speeded up is by the use of growth hormones in the nursery. A Hong Kong trial (Vetiver Newsletter, 20) indicated enhanced root production in the nursery although field

performance after planting out is still being evaluated. - [Return to top](#) -

Vetiver Grass: Useful Tools Against Formosan Subterranean Termites Can Be Found In Nature

Lara Maistrello and Gregg Henderson, LSU Ag. Center, Dept of Entomology, Baton Rouge, Louisiana, USA

Vetiver grass (*Vetiveria zizanioides*) is an Indian native plant whose domesticated type is cultivated worldwide in tropical and subtropical regions for its efficacy against soil erosion and for the commercial importance of its oil, extracted from the roots. People may be familiar with this plant since many soaps, perfumes and after-shave include Vetiver oil as active ingredient. Moreover, nootkatone, one of the 300 components of Vetiver oil, is used to aromatize drinks with its distinctive grapefruit flavor. What people ignore is that the same pleasant aromas can be our next, natural remedy against those exotic, tiny, whitish bugs devouring houses and any kind of wooden structures, and represent the major insect pests in the southern United States.

As part of our research on natural product efficacy against Formosan subterranean termites, we are performing experiments to test the response of *Coptotermes formosanus* to substrates and food sources treated with Vetiver oil and some of its components, like nootkatone. The results show that these compounds are able to disrupt termite behavior and physiology as a consequence of direct physical contact, ingestion, or exposure to the vapors. In the presence of this compounds termites show a "lingering behavior", remaining on the surface all clumped together, unable to organize themselves to reach potential food sources through tunneling activity or building shelter tubes. Moreover, ingestion of wood treated with Vetiver oil or nootkatone causes the progressive death of the protozoa living inside the termite gut. Killing these symbiont microorganisms, on which these insects rely on for the digestion of their wooden food, would mean a progressive decline of a termite colony through starvation, until total extinction.

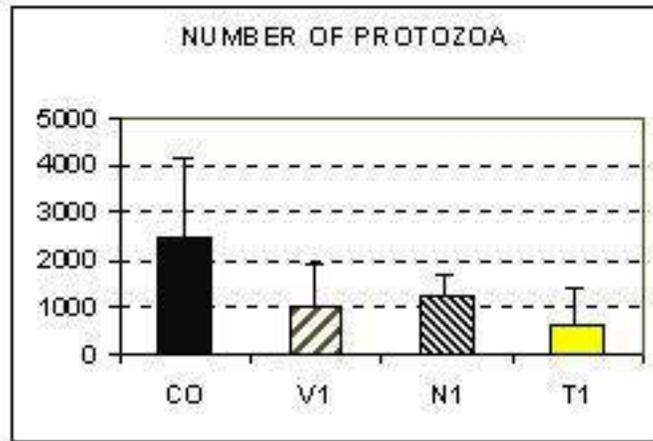


Figure 1. Tunnel length of the Formosa subterranean termites through sand to reach food source.

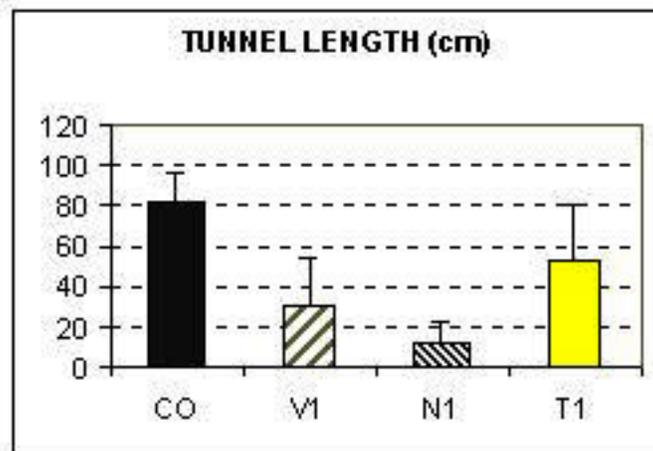


Figure 2. Protozoa population in termite gut.

Figure 1 show the results of an experiment in which Formosan subterranean termites had to tunnel through sand in order to reach the food source, a wood slice which had been treated with 1% solutions of Vetiver oil (V1) or nootkatone (N1) or Tim-Bor®, a commonly used pesticide to prevent wood damaging by termites (T1).

The effects on the protozoa population (average number of protozoa per termite gut) show that wood treated with Vetiver oil or nootkatone was as effective as the one treated with Tim-Bor®, inducing a high, significant reduction in the number of these microorganisms, indispensable to termites. - [Return to top](#) -

Laboratory Tests Of Water-absorbing Gel For Vetiver Planting

R.D. Hill (Dept. of Ecology and Biodiversity, University of Hong Kong, Hong Kong SAR, China)

In monsoonal climates, a major hindrance to the growth of Vetiver seedlings is moisture stress in winter. (It has now been established that at temperatures below about 10°C Vetiver makes little or no growth, with low growth in the 10-18°C range where water is not a limiting factor). To some degree, stress can be offset by the use of moisture-retaining materials at planting. In Hong Kong, for example, the proprietary alginate 'Alginure' has been used routinely in field trials. This note discusses the possible use of a synthetic long-chain polymer know as 'Polysorb'.

'Polysorb' is of Australian manufacture and has been used in semi-arid parts of that country as an added material when trees are planted. Its water-absorbing capacity is considerable. A laboratory test at the Department of Ecology and Biodiversity, University of Hong Kong, involved placing a weighed quantity of approximately three grams of "Polysorb" in each of eight beakers to which 250ml of tap-water was added and left to stand of 48 hours. The beakers were then inverted, allowed to drain for 24 hours and the expanded "Polysorb" weighed. The average weight increase (eight replicates) was 79.2 times with standard deviation of 3.1 times.

This encouraging result led to a further experiment using Vetiver slips. Thirty-three bundles of Vetiver slips were assembled, each containing three slips and one gram of Polysorb, wrapped loosely in newspaper. An additional 33 bundles, each containing three slips and about 80g of wet ground-up newspaper as mulch, also wrapped in newspaper, acted as the control. The bundles were set out in trays in a greenhouse and watered irregularly to simulate the local regime. No fertilizer was added.

After eight weeks growth, the bundles were opened and the number of tillers counted. The average number of tillers in the 'Polysorb' bundles was only 0.27 ($s = 0.57$) compared with 2.27 tillers per bundle for the paper mulch bundles ($s = 1.28$).

Those tillers that survived in the control bundles made good growth, most reaching half a metre from an initial 20 cm. Few tillers in the 'Polysorb' bundles survived and those that did made poor growth. The major reason for the poor performance in 'Polysorb' seems to have been mechanical stress coupled with periodical water stress. It was observed that the degree of swelling and contraction of the 'Polysorb' was so great that the slips were physically raised and lowered in the trays as the material responded to wetting and drying, much in the manner in which tree seedlings are moved by the formation of needle-ice in freeze-thaw situations.

These results do not indicate that 'Polysorb' should not be used but they do suggest that some care must be used in its use. Where soils are loose and porous, planting Vetiver with a small

quantity of 'Polysorb' mixed with the soil may be effective in improving water retention. However, in the winter-dry hard, almost indurated sedentary soils of Hong Kong - and of much of southern China - it seems possible that the very considerable swelling of 'Polysorb' when wet may exert mechanical force on the slips, inhibiting growth. Clearly the trick would be to establish an appropriate 'dose' of 'Polysorb' such that water retention is enhanced without the risk of excessive swelling and shrinkage leading to damage of the slips. - [Return to top](#) -

LSU AgCenter Researcher, Louisiana Businessman Team Up to Develop New Termite Control Material

A grassy plant used worldwide for erosion control may provide another weapon in the arsenal to combat subterranean termites, according to research conducted by the LSU AgCenter.

Dr. Gregg Henderson, an LSU AgCenter entomologist, learned of Vetiver grass's potential as a termiticide from Don Heumann, a nursery and greenhouse operator in Metairie.

"Don brought me some Vetiver plants about two years ago", Henderson said. "There was a growing interest in termites then, and I was getting a lot of calls from all kinds of people. But Don was earnest, so I took a look at what he brought." Because he was aware of the growing damage termites are causing in the New Orleans area, Heumann thought he might have uncovered a possible solution to the termite problem. "I was growing marsh grasses and other grasses in greenhouses and noticed that there were no bugs in the greenhouse with Vetiver," Heumann said. "Everyone knew it has agents against certain bugs - people used to use it in sachets to control moths - so I decided to do my own insignificant testing on termites," he added. After Heumann decided he might be on to something, he took some plants to Henderson.

Vetiver, it turned out, is both a repellent and toxic to termites. "Our first experiment was with ground roots in sand", Henderson said, explaining that termites avoided going through the sand when it was introduced into a termite colony.

Henderson's second experiment extracted oils from Vetiver roots, and the oils also repelled termites. Henderson isolated several compounds from the Vetiver oils and discovered a chemical called nootkatone was responsible for turning away termites. The substance is also found in Alaskan yellow cedar. "We've sprayed sand with nootkatone, and it's still active after one month," Henderson said. "As a contact material it repels termites, and its vapor is toxic to them."

The LSU AgCenter has filed for a provisional patent on the use of nootkatone as a termite repellent.

Henderson and Heumann are included as co-inventors along with Dr. Roger Laine of the

AgCenter's Department of Biochemistry.

Widely known for its effectiveness in erosion and sediment control, Vetiver grass is highly tolerant to extreme soil conditions and is often used to rehabilitate contaminated lands. The deep roots anchor the plant and hold soil together on hillsides and contours. The plant's ability to grow large roots in extreme conditions makes it an ideal candidate to provide large quantities of nootkatone.

The inventors expect ground Vetiver roots containing nootkatone can be mixed with other plant materials to produce garden mulches that repel termites, while extracted oils can be applied to the soil to serve as a termite barrier.

"Much mulch is actually termite food," Heumann said. "Treating it with Vetiver oils would be very effective."

Researchers are looking at nootkatone for treating wood and soil in addition to mulches. "It's a natural product," Henderson said, adding it could create an effective barrier in the soil with regular applications at low concentrations.

"We also know nootkatone will kill termites in its gaseous state, and it has low volatility like mothballs," Henderson said. "It also may be usable against other household pests such as moths and carpet beetles."

More research must be done before the product can be brought to market, the inventors said. "This has potential, but it needs to be tested," Henderson said. "No one product will solve the termite problem.

"We need an integrated pest management approach" he added.

Henderson was quick to point out the discovery of Vetiver grass as a source of a new termiticide is an example of how an inquisitive businessman working with a university researcher can bring new products to society.

"It's a perfect example of a public-private partnership," he said.

(LSU AgCenter News: www.agctr.lsu.edu/1ns0601.htm) - [Return to top](#) -

Case Study:

Miles Bentonite Mine, Queensland - Australia

(Extract from GROUNDWORK official publication of the Australian Minerals & Energy

Introduction

Commercial Minerals Limited, operates a large bentonite mine and processing plant at Gurulmundi, some 35 km north of Miles, Queensland - Australia.

One of the major ecological concerns for the mine is the effect sediment laden stormwater runoff from disturbed areas may have on surrounding catchments.

In planning for rehabilitation, it was clear that the entire area would benefit from vegetation coverage to protect the soil from erosion. Due to the high sodium content, limited available moisture and low nutritional value of the bentonite spoils, the vegetation required for rehabilitation of this site had to be a specifically resilient species.

Field trials were conducted to determine the ability of Vetiver grass to establish on highly sodic bentonite spoils and to assess the effectiveness of using Vetiver grass for erosion and sediment control, for promoting growth of other plants and for hiding signs of visible erosion.

Results

The following results were observed in the period up to 10 months from planting:

- Mulching encouraged extensive shoot growth, with an average of 3 cm/week over the first three weeks.
- Areas with extended growth from the use of fertigation techniques were found to be extremely palatable to roaming cattle.
- Heavy rain inundated the Vetiver rows, with some plants being submerged for 2.5 weeks. After the water had evaporated the plants were still in healthy condition with general height retained, but little growth occurred whilst the soil was water logged.
- Samples of the runoff water were collected upstream and downstream of the Vetiver hedges during peak flow. Tests indicated that the Vetiver hedges were effective in removing most of the solids from clay contaminated storm water.
- The amount of sediment trapped by the hedges varied with the conditions of the hedges. When the hedges were complete (with no gaps), up to 200 mm of sediment was trapped, with the sediment texture predominately made up of sand and clay and less than 5% silt.
- The hedges supported 100% soil moisture saturation within a 3.4m arc along the rows. The result, deeper cracking of the soil, increased moisture retention to a greater depth

thus promoting the establishment and growth of both sown and volunteer species.

- Monto Vetiver has flourished under the harsh conditions of the trial zone including extremes in temperature and rainfall. Growth averaged 600 mm in height and 100 mm in plant base diameter after 10 months.
- The sediment trapped by the Vetiver rows now hosts several annual and perennial species, which are currently only found upstream of the hedges within one meter of the actual rows.
- The short rows planted across the drain grew particularly well, reaching approximately 1.8m in six months. These rows were very effective in trapping sediment and stopping the scouring of the drain floor.
- Vetiver has also successfully stabilised the steep batter around the dam.

Conclusion

Results clearly demonstrate that Vetiver grass will establish satisfactorily on extremely sodic soils when adequately supplied with fertiliser and water. The hedges are effectively achieving the stated objectives of the trial, namely diffusing concentrated flows, trapping sediment (which supports other plant growth) and in reducing signs of visible erosion.

For further information contact Owen Bevan (07) 4628 2108. - [Return to top](#) -
