



***Agricultural  
Experiment  
Station***

***Resource Guide  
1994-1995***



***Agricultural Experiment Station***

College of Agriculture and Life Sciences  
University of Guam  
Mangilao, Guam 96923

***Telephone***

(671) 734-3113 or (671) 734-9511

***Fax***

(671) 734-6842

***E-Mail***

[cals-uog@uog.edu](mailto:cals-uog@uog.edu)

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## ***Welcome to AES!***

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The University of Guam, as a land-grant institution, holds a special place in higher education in the Western Pacific. The land-grant system, now 132 years old, was the first attempt by the United States to provide higher education opportunities to all of its citizens. There is at least one land-grant institution in each state and in most US territories and commonwealths. Like the University of Guam, they are all dedicated to providing the skills and knowledge necessary for the social and economic development of their home areas and this is usually done through promotion of the mechanical arts and sciences.

We, the faculty of the Guam Agricultural Experiment Station, live that dream through our research and teaching at the University of Guam. You will discover that we are a richly diverse gathering of scientists with a broad range of expertise and interests. Please allow us to join with you to reach out to today's young students so that they, too, can carry on our fine traditions in academic and scientific excellence.

***Dr. C.T. Lee***  
***Dean/Director***

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## ***Contents***

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|                             |    |
|-----------------------------|----|
| R. Muniappan                | 4  |
| Associate Director          |    |
| Entomology                  |    |
| Farouq G. Abawi             | 6  |
| Animal Science              |    |
| John W. Brown               | 8  |
| Agricultural Economics      |    |
| Jose A. Cruz                | 10 |
| Soil Science                |    |
| Enrico Neri Imperio         | 12 |
| Waste Management            |    |
| Thomas Marler               | 14 |
| Tropical Fruit Horticulture |    |
| Mari Marutani               | 16 |
| Vegetable Horticulture      |    |
| James McConnell             | 18 |
| Ornamental Horticulture     |    |
| Peter Motavalli             | 20 |
| Soil Science                |    |
| Donald M. Nafus             | 22 |
| Entomology                  |    |
| Rebecca S. Pobocik          | 24 |
| Human Nutrition             |    |
| Ilse H. Schreiner           | 26 |
| Entomology                  |    |
| Ilse U. Silva-Krott         | 28 |
| Animal Science              |    |
| Prem Singh                  | 30 |
| Agricultural Engineering    |    |
| George C. Wall              | 32 |
| Plant Pathology             |    |
| Greg Wieko                  | 34 |
| Turf Grass                  |    |
| AES Experiment Stations     | 36 |



***Office***

Room 49, second floor, Dorm One.

***Telephone***

734-9511

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## ***R. Muniappan***

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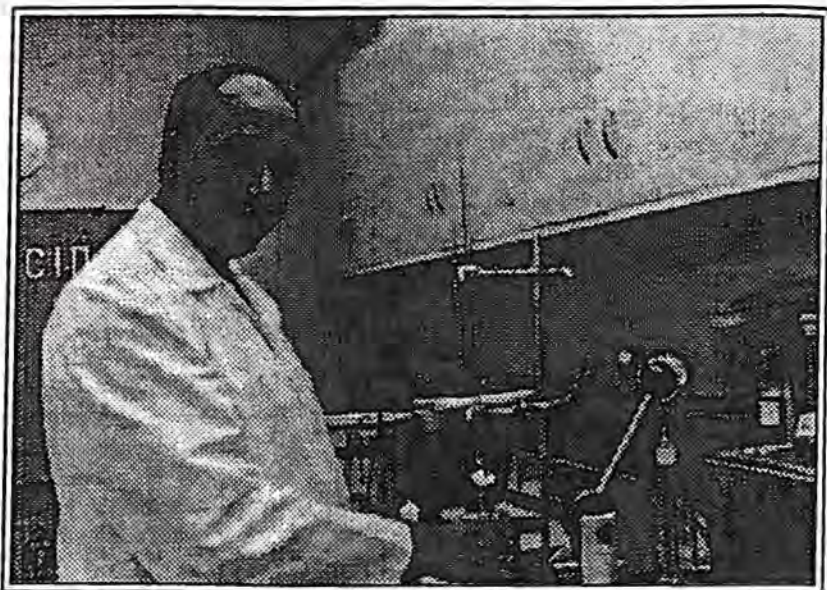
Bug bites plant, plant fights back – it's a new twist on an old theme, discovered by CALS' Associate Director Dr. R. Muniappan.

Dr. Muni, as his known by his colleagues, is one of CALS' four entomologists or insect specialists. He received his bachelor's and master's degrees from the University of Madras and his doctorate from Oklahoma State University.

Dr. Muni has spent years studying one of the world's most interesting shrubs, *Chromolaena odorata*, and its relationship with natural predators, namely the caterpillar *Pareuchaetes pseudoinsulata*. Introduction of the caterpillar to the Marianas help rid the islands of the bushy weed, but only for a time. The plant slowly began to change its chemical composition, rendering its leaves less tasty to the insect and eventually driving the insect away.

Other research projects headed by Dr. Muni include development of a transgenic cabbage plant in an effort to stave off attacks by the pest diamondback moth. The moth, introduced to Guam after World War II, is being blamed for eradicating what was once one of Guam's major cash crops, head cabbage.





***Office***

Room 48, second floor, Dorm One  
or  
the Inarajan Experiment Station

***Telephone***

734-9511 or 828-8642.

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***Farouq G. Abawi***

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When Dr. Farouq G. Abawi looks out over Guam's beautiful coastline, he doesn't see coral reefs, he sees chicken food. Dr. Abawi, an associate professor, is one of CALS' animal science experts with a specialty in poultry nutrition.

Dr. Abawi earned his bachelor's degree from American University of Beirut, and his master's and doctorate degrees from the University of Nebraska.

Dr. Abawi and his research associate, Dr. Odi Diambra, have been conducting a series of feed experiments on the residents of the noisy 900-bird poultry house at the Inarajan Experiment Station. As most island farmers know, the cost of feed accounts for 80 percent or more of a producer's overhead costs. Most chicken feed is imported from the mainland US.

So Drs. Abawi and Diambra began looking for local feed sources which could be substituted for some of the more expensive imported feed. The two most promising are crushed coral, which provides plenty of calcium for healthy eggshells and bird bones, and dried tangantangan, which offers protein and a nice coloring for the chicken meat and egg yolk.

Other research investigates the effects of fiber and feed restrictions on body weight and sexual maturity of pullets, or juvenile chickens, and the true metabolizable energy found in local feed resources of cassava and copra meal.





***Office***

Room 43, second floor, Dorm One

***Telephone***

734-9511

# *Agricultural Economics*

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## *John W. Brown*

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John Brown is doing his part to help diversify Guam's economy. As CALS's agricultural economist, his interests have led to projects with sea sponges, rabbitfish and orchids.

Dr. Brown, an associate professor, earned his undergraduate degree from Indiana University, then later graduated from North Carolina State University with his doctorate degree.

Savvy shoppers, both from Guam and broad, are sure to have seen the by-products of Dr. Brown's research in local stores. He worked with colleagues in Pohnpei to perfect packaging and marketing strategies for sea sponges, to be sold as a luxury cosmetic item. Other projects have found him studying potential markets for Guam catfish, manahac or juvenile rabbitfish, and giant Pacific clams.

Lessons learned from research into Guam's changing land-use and agricultural patterns helps Dr. Brown advise local growers and economists on how to capitalize on their resources at hand. For example, one project involved creating carry-on gift sets of island flowers targeted at tourists so they can take a bit of Guam's paradise home with them.



***Office***

Room 37, second floor, Dorm One

***Telephone***

734-9511

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### ***Jose A. Cruz***

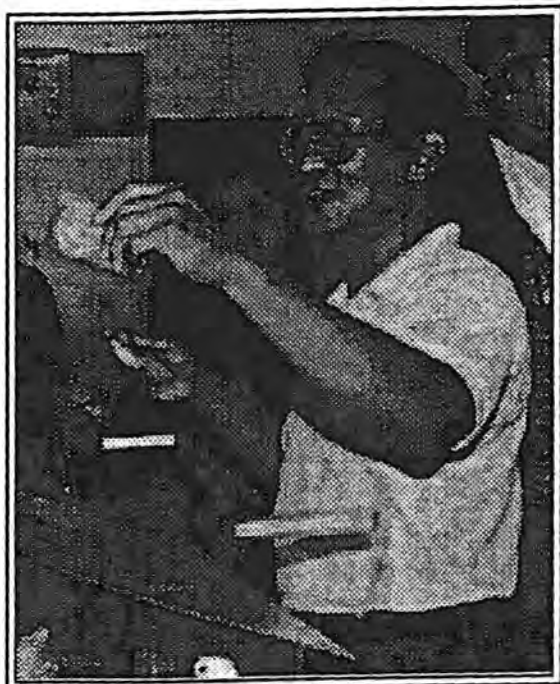
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As CALS' premier baseball star, Jose "Joe" A. Cruz has spent many a day sliding through Guam's good red dirt to a safe base. It's fitting because Mr. Cruz is one of CALS' soil and fertilizer experts and oversees the soils testing laboratory at the Inarajan Experiment Station.

Mr. Cruz received his undergraduate degree from the University of Guam and his master's degree from Colorado State University.

Mr. Cruz began his career with CALS as an extension agent specializing in informal education and farmer outreach programs before switching to a career in soils research under the Agricultural Experiment Station.

Recent projects have focused on nitrogen and potassium fertilization of cucumbers planted various soil types around Guam. Mr. Cruz also analyzes the yield differences among cucumber plots served by drip-irrigation systems and varying amounts of fertilizers.



***Office***

House 4, Dean's Circle

***Telephone***

734-2506

## **Waste Management**

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### ***Enrico Neri Imperio***

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His friends call him "Mr. Mushroom" but Dr. Enrico Neri Imperio has more than culinary interests on his mind.

Dr. Imperio earned his bachelor's degree from the University of the Philippines, his master's degree from Xavier University and his doctorate degree from the Iowa State University.

Dr. Imperio wears several hats for CALS – he is unit chairman for the Community Development Institute under the Guam Cooperative Extension as well as an AES researcher. Last year he was shared the University of Guam's special recognition for faculty of the year for community service.

Dr. Imperio's specialities include organic gardening and waste management. Widely known through Guam and the Northern Mariana Islands, Dr. Imperio has introduced hundreds of residents to the art of mushroom cultivation using a nutritious base of recycling kitchen wastes, newspapers and other biodegradable household materials for his spawn. Working with various student groups and the Marianas Resource, Conservation and Development Council, Dr. Imperio has helped several small businesses and households enter the world of gourmet mushroom cultivation.



***Office***

Room 42, second floor, Dorm One  
or  
the Yigo Experiment Station

***Telephone***

734-9511



# *Tropical Fruit Horticulture*

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## *Thomas Marler*

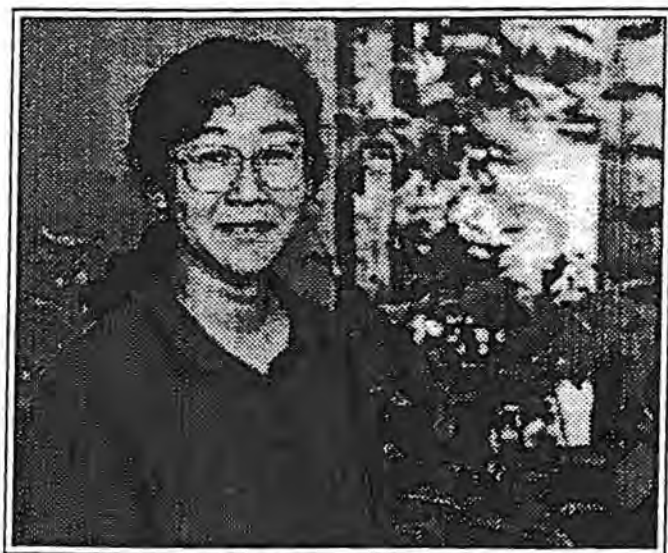
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Jackfruit, starfruit, atemoya – Dr. Tom Marler hopes to make these fruits as much household names as mangos and papayas are.

Dr. Marler's specialities are tropical fruit horticulture and plant physiology. A native son of Guam, he received his bachelor's and master's degrees from Mississippi State University and his doctorate degree from the University of Florida.

In recent years, Dr. Marler has been doing his part to bring fruit trees back to typhoon-torn Guam. His classes on mango propagation are usually standing-room-only affairs. His close relationship with foresters in the Department of Agriculture is helping to spread the "green" message and put more trees into Guam's urban areas.

Recently, his research interests have grown to include windbreak trees, maintained in an effort to slow wind-driven soil erosion, and Guam's own ifit tree. He received a Department of Defense grant last year to study the environmental stresses on the ifit in hopes of learning why Guam's symbolic tree is failing to significantly reproduce.



***Office***

Room 28, second floor, Dorm One

***Telephone***

734-9511

# *Vegetable Horticulture*

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## *Mari Marutani*

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The soils encompassing Guam's prime agricultural land are thin and porous, situated as they are atop an ancient coral reef. But Dr. Mari Marutani is working to augment our soil while protecting our aquifer.

An associate professor of horticulture, Dr. Marutani received her bachelor's, master's and doctorate degrees from the University of Hawaii at Manoa.

Dr. Marutani's main field of interest is vegetable production. Eggplant, pepper, cucumber, tomatoes — all have graced her test plots.

Now the winning star is sunn hemp, a leggy, fast growing member of the legume family. Like all legumes, sunn hemp has the ability to "fix" nitrogen into Guam's nutrient-poor soils.

In recent months Dr. Marutani has been encouraging island farmers to substitute "green" manure like sunn hemp for expensive synthetic fertilizers. Artificial fertilizers have the potential of leaching from farm fields into Guam's sole-source aquifer.



***Office***

House 1, Dean's Circle

***Telephone***

734-4787

## *Ornamental Horticulture*

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### *James McConnell*

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Nothing says "tropics" like a delicate bouquet of orchids blossoms, stunning in color and exotic in form. But not so exotic that the University of Guam can't have an orchid species named in its honor, thanks to the work of Dr. James McConnell.

An associate professor of ornamental horticulture, Dr. McConnell earned his bachelor's degree from Pennsylvania State University and his master's and doctorate degrees from the University of Hawaii at Manoa.

Ornamental horticulture, for Dr. McConnell, spans the spectrum from *Vandas* and *Dendrobiums* to zoysia and other turf grasses. His experiments on turf grass and fertilizers, which he shares with colleagues from two other university units, are important to Guam's future. With as many as 21 golf courses planned for our island home, researchers and others need to know as much as they can about turf grass, soil conditions and how different fertilizers react with them.

Dr. McConnell has also put his hobbies as a photographer and computer enthusiast to work helping colleagues produce materials for classes and workshops.



***Office***

Room 40, Dorm One

***Telephone***

734-3113

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***Peter Motavalli***

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A childhood of playing in the mud in regions as diverse as Connecticut, Iran and India evidently lead CALS' newest addition into his career as a "dirt doctor."

Dr. Peter Motavalli joined our research family in August. A man of many talents, he earned a bachelor's degree in foreign service-international affairs from Georgetown University and spent nine months as a Fulbright scholar in the Sudan before turning his interests to science. He earned a bachelor's in agronomy and master's degrees in soil science from the University of Wisconsin-Madison. He graduated from Cornell University with his doctorate degree in agronomy. He has conducted research around the world, from Brazil to India, from Colorado to Guam. An inquisitive soul, he has traveled widely through Northern Africa, the Middle East and South Asia and has a passion for Brazilian and African music.

Dr. Motavalli's specialities include soil chemistry, soil fertility and plant nutrition. He will assume leadership of the AES soil and plant testing lab and services.





***Office***

House 34, Dean's Circle

***Telephone***

734-9104

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***Donald M. Nafus***

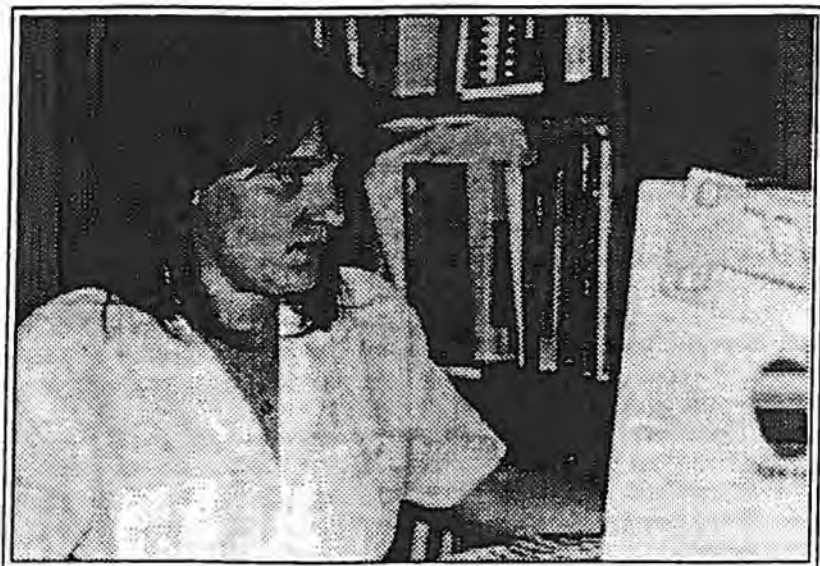
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Not many people can get excited in a positive way about termites, but then Dr. Donald M. Nafus has a different perspective than most people about Guam's ecosystem.

A professor of entomology, Dr. Nafus received his bachelor's degree from Montana State University and his master's and doctorate degrees from Cornell University. He is half of CALS' most energetic research team, sharing projects and honors with spouse Dr. Ilse Schreiner.

Dr. Nafus is a familiar figure on the where he frequently is found peering under leaves and into bushes looking for insect wonders. One of the more popular professors with students, Dr. Nafus is known to launch into impromptu lectures on the benefits insects bring into our lives, often without us knowing it.

In his formal research, Dr. Nafus is exploring the lives of such insect pests as aphids, pumpkin beetles, flame tree loopers, taro plant hoppers, beanpod borers and bean flies. He's been known to add a touch of humor to his work – such as researching whether pumpkin beetles are attracted into traps by smells or colors. And, no, beetle noses are very keen, but beetles do prefer yellow over any other color. Their all time favorite? Cadmium yellow medium!



***Office***

Room 9, first floor, Dorm One

***Telephone***

734-9354, ext. 354

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### ***Rebecca S. Pobocik***

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We are what we eat but what is really in the island diets we love so much, like tinaktak, empanada and kelaguen? Nutritionist Dr. Rebecca S. Pobocik is looking to find out.

An assistant professor, Dr. Pobocik received her bachelor's degree from Michigan State University and her master's and doctorate degrees from the University of Texas at Austin.

A familiar face in Guam's public schools, Dr. Pobocik has been researching local dietary habits, especially among several years' worth of fifth-grade students. Her research has led to reassessments of what we feed our children and how their diet can lead to health problems later in life.

More recently, Dr. Pobocik has been creating a "cultural appropriate" diet assessment by analyzing the nutritional content of many of our island foods. Local nutritionists have long been frustrated by this lack of information because traditional stateside food and nutritional standards cannot be easily applied to the typical island diet.





***Office***

House 34, Dean's Circle

***Telephone***

734-9104

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***Ilse H. Schreiner***

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Not many people keep a hive or two of pet bees by their front doors, but then Dr. Ilse H. Schreiner is a special kind of entomologist. Many island residents know her through her "puddle walk" expeditions where in the space of a small puddle, the universe of insect life is revealed.

Dr. Schreiner received her bachelor's degree from Brandeis University and her master's and doctorate degrees from Cornell.

Dr. Schreiner frequently collaborates with fellow entomologist and spouse, Dr. Donald M. Nafus on her innovative experiments.

Recent projects have looked into non-chemical ways to control some of Guam's most troublesome pests, such as the orange pumpkin beetles, aphids, taro plant hopper, flame tree loopers, and bean pod borers. Many local farmers are using pest-control techniques, such as floating row covers, first introduced by Drs. Schreiner and Nafus.

Dr. Schreiner is also conducting research on Guam's native trees, looking for reasons why they are failing to regenerate.



***Office***

Room 51, Second Floor, Dorm One

***Telephone***

734-9431



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***Ilse U. Silva-Krott***

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Adding a European charm to CALS' multicultural family is veterinarian Dr. Ilse U. Silva-Krott, who serves as CALS' assistant director and coordinator of our resident-instruction program.

Dr. Silva-Krott earned her degree as a veterinary surgeon from the Vienna Veterinary University in Austria. She later received a master's degree from the University of Washington and her doctorate degree from the University of Tennessee. Speciality areas include animal husbandry and genetics, morphologic and comparative pathology, and molecular biology.

Dr. Silva-Krott joined the AES family in January 1993 as a research associate and quickly rose to the position of assistant director, a post to which she was named in November 1993. Dr. Silva-Krott brings to CALS a international background in animal science. She has worked in London, Paris, Vienna, and Italy on wildlife, domestic animals and exotic species in zoological gardens.



***Office***

Room 41, second floor, Dorm One

***Telephone***

734-9511

# *Agricultural Engineering*

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## *Prem Singh*

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Prem Singh said he knew from his childhood days that he wanted to be an engineer. Math, science and machines – they all delighted him. Now an assistant professor of agricultural engineering, he spends his days working with gadgets of every description, from computers to irrigation systems to hand-held wind-velocity indicators.

He completed his undergraduate studies at Punjab Agricultural University, received a master's degree from the Indian Agricultural Research Institute, and graduated from North Carolina State University with a doctorate degree.

Dr. Singh's most recent projects focus on conserving Guam's finite water supply. That life-giving water which runs to freely through the limestone recharge area above Guam's aquifer can pick up hazardous amounts of fertilizer and other farm chemicals along its journey if farmers do not apply chemicals carefully.

To ease the island's dependency on farm chemicals, Dr. Singh has introduced the concepts of drip-irrigation, fertigation and chemigation to island farmers. To reduce agriculture's draw on our limited water supply, Dr. Singh has been experimenting with the dynamics of plant root growth and water uptake, data he uses to just how much water is needed per plant.



***Office***

House 34, Dean's Circle.

***Telephone***

734-9439, ext. 439

or

734-3113

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### *George C. Wall*

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George C. Wall's research projects are among the most popular with the university crowd, mostly because they get to eat the results. Dr. Wall, an associate professor, is a plant pathologist focusing on viral diseases of tropical food crops such as papaya, cucumber and watermelon.

Dr. Wall earned his bachelor's degree from the University of California, Berkeley, and master's and doctorate degrees from Texas A&M University.

Visitors to the Yigo Experiment Station have no doubt wandered in the lovely shade cast by Dr. Wall's most popular project, his research into papaya ringspot virus. More than 800 trees representing several papaya varieties were located at the Yigo sites and their fruit fed many university guests, including off-island dignitaries. The virus is a serious threat to island papaya producers since it can devastate a crop and plantation in a matter of weeks. Dr. Wall's project looks into ways to inoculate or cross-protect young trees with a milder virus strain, thereby protecting them when a more serious virus appears — a concept similar to human vaccinations against measles and like diseases.





***Office***

Room 36, second floor, Dorm One.

***Telephone***

734-9354

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***Greg Wiecko***

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The newest member of the AES research family is Dr. Greg Wiecko, who joined us in November.

Adding to our international flavor, Dr. Wiecko earned his master's degree in agriculture from Bydgoszcz University in Poland. He received his doctorate from the University of Georgia. Prior to joining us, Dr. Wiecko worked for Monsanto Agricultural Company in Europe and then for Agricultural Product, Inc., an agricultural company based in Houston, Texas. He also owned and operated a Polish-language radio program in Texas.

Dr. Wiecko's field of expertise, turf grass management, is guaranteed to keep him busy as Guam's continues to support golf courses and other recreational areas. Future plans also call for Dr. Wiecko to offer advice on weed control in turf grass environments.

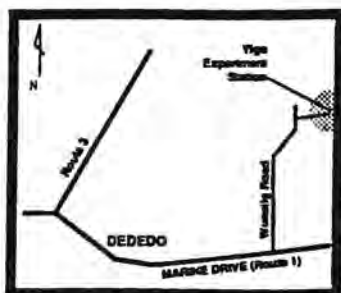


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## ***AES Experiment Stations***

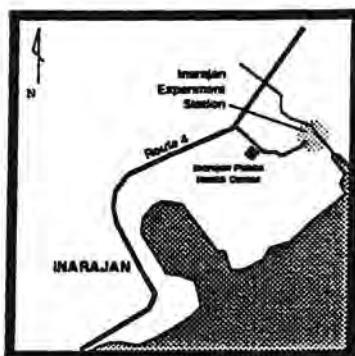
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AES researchers conduct experiments in four main research centers: Yigo Experiment Station, the Radio Barrigada US Navy-leased lands, Inarajan Experiment Station and Ija Experiment Station. The sites offer scientists easy access to Guam's bounty of natural resources, especially its soil, wind and water conditions.

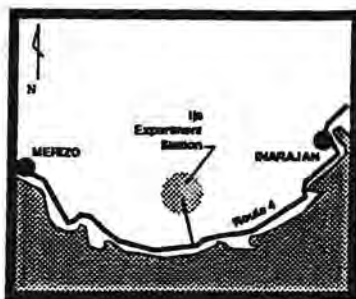


The Yigo Experiment Station entered the CALS family in 1987. It offers researchers 45 acres of flat land, constant wind and limestone soils.

Beautiful ocean views accent the 10-acre Inarajan Experiment Station. It is home to CALS' 900-bird poultry facility, the soils testing laboratory and a variety of experiments on field crops.



The wind-swept Ija Experiment Station comprises 60 acres of rolling, peaceful hills. Many of CALS' tree experiments and windbreak projects are located here.



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# ***AES Workshop Schedule 1994-95***

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|              |   |                                  |
|--------------|---|----------------------------------|
| October      | Aquariums in the classroom                            | John Brown                       |
| November     | Waste utilization composting/<br>mushroom cultivation | Enrico Neri Imperio              |
| January 1995 | Exotic fruits and crops for Guam                      | Thomas Marler                    |
| February     | The ABCs of fertilizers and<br>other soil amendments  | Peter Motavalli                  |
| March        | Recycling   | Farouq Abawi                     |
| April        | Micro-irrigation                                      | Prem Singh                       |
| May          | Alternatives to pesticides<br>for the home gardener   | Ilse Schreiner &<br>Donald Nafus |

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"Any opinions, findings, conclusions or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the U.S. Department of Agriculture or the University of Guam."

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