

For a better world



A reference in higher education and research in Brazil and around the world, ESALQ-USP ("Luiz de Queiroz" College of Agriculture), situated in the city of Piracicaba (SP), changed the history of agricultural, environmental, and social sciences in the country. We promoted agribusiness. We granted support for the development of public policies in favor of agriculture, interfered in the transformation of geographical areas, such as the Brazilian cerrado, have led researches in biotechnology and support studies to ensure food quality and quantity in order to meet the demand generated by the growth of the population, aiming at the preservation of the environment and the future of the planet.

The institution was created at the beginning of the 20th century as a dream of Luiz Vicente de Souza Queiroz (1849-1898). In 1892, he donated the São João da Montanha Farm to the Government of the State of São Paulo under the condition that an agricultural sciences school was installed there within ten years. In 1901, the Practical Agriculture School of Piracicaba, connected to the Agriculture Department of the State of São Paulo, was inaugurated.



Escola Agrícola "Luiz de Queiroz"

Já estando inaugurado este útil estabelecimento de ensino agrícola, não é fora de propósito darmos a conhecer aos interessados o programma para o mesmo organiado.

Decreto n.º 8463 A

DE 29 DE DEZEMBRO DE 1900

**CREA A ESCOLA AGRICOLA DE PIRACICABA E DA O RESPECTIVO
REGULAMENTO**

O Presidente do Estado de S. Paulo,

Em execução da Lei n.º 678 de 13 de Setembro de 1899.

Decreta :

Artigo 1.º Fica creada, na fazenda de S. João da Montanha, a Escola Agrícola Prática de Piracicaba (*), a qual se regerá pelo seguinte Regulamento :

CAPITULO I

DA ESCOLA E SEUS FINS

Artigo 2.º A Escola Agrícola Prática de Piracicaba tem por missão diffundir no Estado de S. Paulo as noções, preceitos e praticas mais uteis á agricultura por meio de lições theoreticas elementares sobre as diversas disciplinas que constituem o seu programma de ensino e as demonstrações essencialmente praticas a ellas correspondentes.

(*). Por Dec. N.º 882, de 18 de Março do corrente anno, o governo alterou para Escola Prática "Luiz de Queiroz" a denominação da Escola Agrícola Prática de Piracicaba.



In 1931, it was named "Luiz de Queiroz" College of Agriculture and, in 1934, it became one of the founding units of USP (University of São Paulo). In 1964, it began to offer graduate level programs at Master's Degree level and, in 1970, Doctorate level.

We are a center of excellence for undergraduate and graduate programs, having received the highest scores from Capes (Higher Education Coordination Agency). We have granted degrees to over 13 thousand undergraduate students and were the first higher education institution in Brazil to graduate over 10 thousand agricultural scientists.

We have cooperation agreements with several universities and research institutions in Brazil and abroad. Our faculty is internationally acknowledged for the quality of their publications and participation in technical-scientific events.

Not only faculty members, but also undergraduate and graduate students from all programs are involved in researches.

ESALQ occupies an area of 3,825.4 hectares, which corresponds to 50.44% of USP's total area. We have over 150 laboratories, as well as four experimental stations in Anhembi, Anhumas, Itatinga and in the Areao district in Piracicaba, where the ESALQ-Tec incubator is located.

We have the most complete library in the area of Agricultural Sciences in Latin America. The unit is part of the Integrated Library System of USP, is connected to Agrinet - Agricultural Information Network, and is depository of the Food and Agriculture Organization (FAO).

Roberto Amaral



At the forefront

ESALQ has changed Brazilian eating habits - through the study of more-resistant and higher-quality plant varieties and animals. We have also led researches in biotechnology, production chain and agricultural products process until they reach the final consumer. The institution has played a key role, for example, in the development of more nutritive and aminoacid-rich corn varieties, higher quality meat and adaptation of vegetables to Brazilian climate conditions.

Through researches on soil properties and plant nutrition, we have transformed the Brazilian cerrado from formerly inadequate for farming into a grain production breadbasket.

In the area of biotechnology, we have projects involving the *Xylella fastidiosa* genome, of sugar cane, *Xanthomonas sp.*, of cancer, coffee, eucalyptus, and others.

Roberto Amaral





Through plant diseases diagnosis and control, we have contributed to maintain losses in agriculture at levels of less than 20%. We have developed pioneering studies on the control of pests, such as sugar cane borers, soybean caterpillar, citrus fruit borer, and others.

We are a guiding light to Brazilian agribusiness, keeping track of the prices of the production chain. We are responsible for the calculation of the GDP (Gross Domestic Product) of the Brazilian agribusiness and for the index used by the stock market for livestock.

Our concern with the environment and future of the planet is reflected on studies about the crop management and forest ecosystems, as well as the development of technologies for environmental products and services and nature preservation.

But, unquestionably, the biggest contribution of the institution is personal improvement. Most of the research centers in the area spread around Brazil had ESALQ's professionals since their beginning.

Preserved heritage





ESALQ's architectonic complex, which includes the Central Building, has been protected by the Council for Defense of Historic, Archaeological, Artistic and Tourist Properties of the State of São Paulo (Condephaat) since 2006.



The protection includes the landscape layout projected in 1907 by Arsenio Puttemanns, its 1940 expansion, crop areas, preserved forest areas, road system and a set of buildings.

The construction of the Central Building began in 1904 and the building was inaugurated on May 14, 1907. Projected in neoclassic style by English architect Alfred Brandford Hutching, its original architecture is preserved, making it a landmark in the history of the institution.

Source: ESALQ-USP and Condephaat



1945 - USP/ESALQ Photograph Collection



Roberto Amaral



1964 - USP/ESALQ Photograph Collection

Roberto Amaral



The basis of research

Core sciences, such as statistics and chemistry, are fundamental for applied researches. For a study to be validated or a work to be published, statistical analyses conducted by specialized professionals in the area are essential. Chemical analyses are necessary to know how a molecule behaves in the environment. Thus, both statistics and applied chemistry are strategic analytical tools for the development of studies committed to a sustainable society, preserving the environment and the future of the planet.

Aware of this importance, ESALQ's researchers and faculty develop experiments and prepare professionals who are ready to find appropriate methodologies for the reality they will work with.

As to statistics, experimental statistics outstands, and faculty supervise students and professionals of the area in the planning of experiments, data analysis and results interpretation.

Regarding community services, former students who work in companies seek guidance as to adequate methods to be used in the analysis of collected data. The challenge of supervisors is to understand the problem brought by the professional and lead to a solution for each case.



Gerhard Waller

The group of researchers has already developed methodologies that are referenced by other institutions. Among important contributions by faculty members are the development of a statistics test for the study of genotype x environment interaction, the use of generalized linear models in the analysis of entomological data, the development of new distributions to determine the necessary period for a certain event to take place, and studies to determine the ideal plot sizes.

In applied chemistry, methods are developed to detect contamination or environmentally damaging products, both as to the cause and the effect of chemical elements with agricultural and environmental interest. The tool is used to determine and promote the rational use of the materials that are part of the environment.

Studies conducted at the institution include, soil, consumables, and agro industrial by-products, industrial residues, biofuel, and vegetables. Many of the researches are directed to industrial waste recycling.

Researchers are also concerned with Green Chemistry, the development of analytical

methods to decrease the use of reagents and generate less environmentally hazardous waste.

Many of the analysis methods for fertilizers adopted by the Ministry of Agriculture, which are the base for the current legislation regarding fertilizers in Brazil, were originated by researches conducted in the institution.



Roberto amaral

The challenge of preparing a citizen professional

The educational process must go beyond techniques. At ESALQ, Human Sciences stand out as a transformation tool for the preparation of more complete professionals, offering a view which goes beyond technical training for the market and aims at establishing dialogues with people involved, seeking for a better understanding of their needs.

This feature arises from the need for a new approach to scientific work, understanding it as an element of critical thinking about society. This critical understanding is a result of a decade's work, conducted by faculty and researchers concerned with the enrichment of research, teaching, and community services.

The coming true of this transformational dream, of this recent technology-humanities interface is possible at ESALQ thanks to the centralization of professionals and all the knowledge availability in a research area that unites the best of Sociology, Education, Communication, History, Anthropology, Political Sciences and other fields of this area.

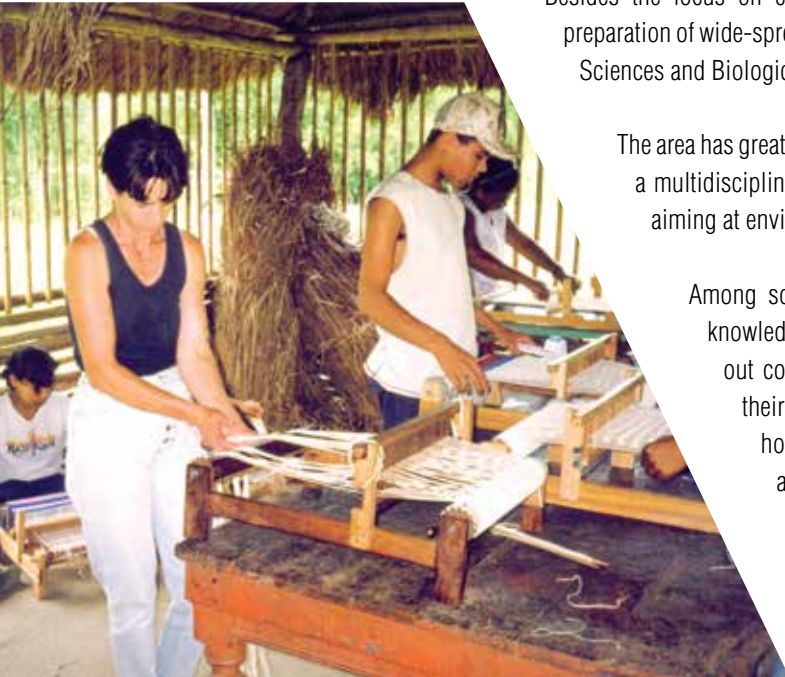
Human beings, who are the fundamental agents in social and environmental interactions, should also be the primary aim of development processes. This new approach shows the importance of respecting differences, knowing traditional, indigenous and minority populations, their experience and the rich exchange the University can promote among people.

Roberto Amaral



As the approach changed, a new concern has also arisen. The issue has gained other fields, as multi-functionality in agriculture, better territorial occupation, agrarian reform, the perspective of the rural as a way of life, understanding how family agriculture works and opening dialogues with the universe of native Brazilians, former slaves descendants settlements, farmers and others.

Alziro Coraza



Besides the focus on community services, our concern is professional education and the preparation of wide-spreaders - teachers - through the Teaching Certificate Programs in Agrarian Sciences and Biological Sciences and the Teaching Certificate Program in Sciences.

The area has great respectability in research with the Graduate Program in Applied Ecology, a multidisciplinary project developed out of a partnership between ESALQ and CENA, aiming at environmental issues.

Among so many activities, there is a constant aspiration for continuing with knowledge production, generating resources to change the reality of down-and-out communities, offering alternatives for small producers to ascend, using their own tools or learning new models provided by the University. This is how we seek to prepare professionals and citizens who can understand and act with responsibility within their social reality.

Biological sciences unveil the mysteries of life

Scientific knowledge relies on core researches and their employment in applied researches. For the area of Biological Sciences, this concept involves a large and ever-evolving universe. A universe where the very origin of life is concentrated, where knowledge offered by Molecular Biochemistry and Biology, Genetics, Biotechnology, Systematic Botany, Vegetal Ecology, Vegetal Physiology, Limnology and Vertebrate Zoology is revealed.

In Botany, the focus is placed on learning Biochemistry, Systematic Botany and Physiology. The idea is making students understand the molecular aspects and the development of plants, as well as their characterization and identification. This institution has the largest herbar in a university in Brazil.

In the study of animals, such as amphibious, reptiles, and mammals, we seek for the knowledge of their characteristics and, more importantly, their preservation in nature.

An overview shows studies on transgenics to increase the concentration of sugar in plants like sugar cane for the production of bioethanol. Another research line is the area of Post-harvest Physiology, in which case our aim is to understand the ripening and senescence of fruits and vegetables - a knowledge that can be used to increase the conservation and preservation of their bioactive compounds.



Roberto Amaral



Biotechnology has given great contributions for the increase in productivity. Plants propagation by cloning has been a strong area. If core and applied researches have had wide respectability, the repercussion of works on Genomics has placed this area in a position of evidence, becoming a reference and giving support to many new technologies aimed at the improvement of agricultural productivity.

Roberto Amaral

As producers have currently used transgenic crops and are also more aware of the need for the correct management of the areas, the institution has researches aiming at environmental interfaces, as well as a concern with preparing professionals to disseminate these concepts.



Among so many research lines, there are also other ones aimed both at terrestrial and aquatic environments that stand out, such as the recovery of degraded areas that again are used in agriculture, the assessment of impacts by anthropogenic actions or the monitoring of water quality in water supply reservoirs. The latter has an extraordinary reach when we think about the impact of waterborne diseases and contaminants.

Engineering interfaces the productive sector

Roberto Amaral

The tools offered by science, mathematics and engineering ensure a solid interface for biology and for achieving organization, planning and best results in agriculture, production systems, natural resources, and related environments.

The work in the area of Biosystems Engineering at ESALQ has the objective of facilitating the application of a wide range of researches, allowing them to reach students, the market, professionals, and the producer more quickly.

Researches concentrate on meeting the operational demands of the agriculture. With that in mind, studies on hydraulics, irrigation, topography, machines and equipment, rural constructions, physics and meteorology, geoprocessing and remote sensing are core areas of ESALQ's Agricultural and Forestry Sciences programs.

The need for constantly seeking knowledge and improvement of these tools and offering them to farmers can be more easily understood when we consider the challenges that need to be overcome to keep the 60 million hectares of farming land throughout Brazil produce efficiently. In addition, there is all the structure and support that increasingly require new agricultural frontiers.





Interesting features are part of each area. Physics and meteorology focus on planning. The study of animal welfare aims at meeting the right demands for the facilities.

Since researches are dynamic, what was formerly known as irrigation has already evolved. It includes the laws on the use of water, granting, charging and management of watersheds, sustainability and the impact on the use of water in the composition of commodities prices.

The adoption of planning and engineering is taught with basis on soil variables, plant, climate, natural resources and infrastructure.

Among the themes studied in the area is environmental sustainability in agriculture, promoting the rational use of natural resources and agricultural consumables, both in large-scale mechanic systems and in family agriculture.

Adapted soils revolutionize agriculture

Soil Science at ESALQ makes strategic contribution to the country. Through researches, it has helped in adaptation of soils considered inadequate from the physical, chemical and biological perspective and, today, it can keep plants and animals and help agribusiness to account for a significant share of the Brazilian GDP (Gross Domestic Product).

As a matter of fact, no research aiming at agricultural improvement and yield, even in the area of animal production, would make any sense without an involvement of the soil. It concentrates the largest biodiversity of the planet, and the need for feeding the 7 billion inhabitants of the planet places the restless search for improvement in management systems, functioning and behavior of the soil in evidence.

The main objective of ESALQ's researches is to study how to produce more food with the least possible impact on the environment.

In order to meet all the demands, the study areas involve recovery processes of physically and chemically damaged soils, increase in biological diversity and optimization of soil-plant-organisms interactions. The range of researches also include adequate nutritional management, increase in agronomical efficiency and impact of the use of fertilizers, waste and effluents, and further knowledge of the dynamics of organic matter and substances that are potentially toxic to the environment.

Gerhard Waller





Paulo Soares



Gerhard Waller



Gerhard Waller

The laboratory of chemical analysis of the soil is accredited by Inmetro and considered a national and international reference in tropical soil researches considering the accumulated knowledge and information.

The wide range of researches have revealed rewarding results. They have changed the path of many stories. Twenty years ago, the Brazilian cerrado was left aside. Its soil was acid and little fertile. The correct management of the soil created conditions for plants to grow. Nowadays, it is the largest soybean producing area in the world. ESALQ's researchers have contributed for the adaptation of organisms that intensify the fixation of nitrogen in the atmosphere through plants cultivated in that area. The research was revolutionary.

Researchers not only identify the best use for the soils, but also advise what is the best form of occupation for other areas, such as the Amazon, which, due to its biodiversity, causes an impact on the entire system, including the hydrologic cycle.

Optimization of vegetable production

Roberto Amaral

The improvement and dissemination of vegetable production technology, from the seed to the final product, guarantee quality improvement, increase in yield, loss and cost reduction, as well as optimization of production. With that in mind, ESALQ's researchers dedicate to Crop Science, the art of cultivation, multiplication and reproduction of plants. They study from theoretical approaches, such as crop models and modeling, to practice, such as production technology, seed analyses and improvement, weeds handling and post-harvest physiology.

They are concerned with the definition of maximum economic productivity, which selects technologies (production systems) for different vegetable species, like fruits, olives, flowers and landscaping, extractive, food, stimulating, fibrous and edible crops, as well as those used in agroforestry systems.

This stage is the practice of the productive chain aiming at the final result. In order to define production technology, a professional needs to know about soils, entomology, phytopathology, nutrition and fertilization, harvest and post-harvest, product quality and conservation.



Vegetable production is considered fundamental, and ESALQ is proud of its excellence in students' education through both its undergraduate and graduate programs (Master's and Doctor's Degrees). They are stimulated to think holistically, integrating, interacting all the concepts, praising the knowledge achieved in every course, seeking for working with different scales - atom, molecule, organelle, cell, tissue, organ, plant and crop.

Faculty members know that academic research benefits society in general through the enrichment of students' education, benefits brought to producers, companies and the final consumer.

Thanks to this work, the institution has developed several citrus cultivars that are more resistant to pathogens, such as greening, and has been involved with the dissemination of the no-till farming in Brazil, among other important actions.



Caio Albuquerque



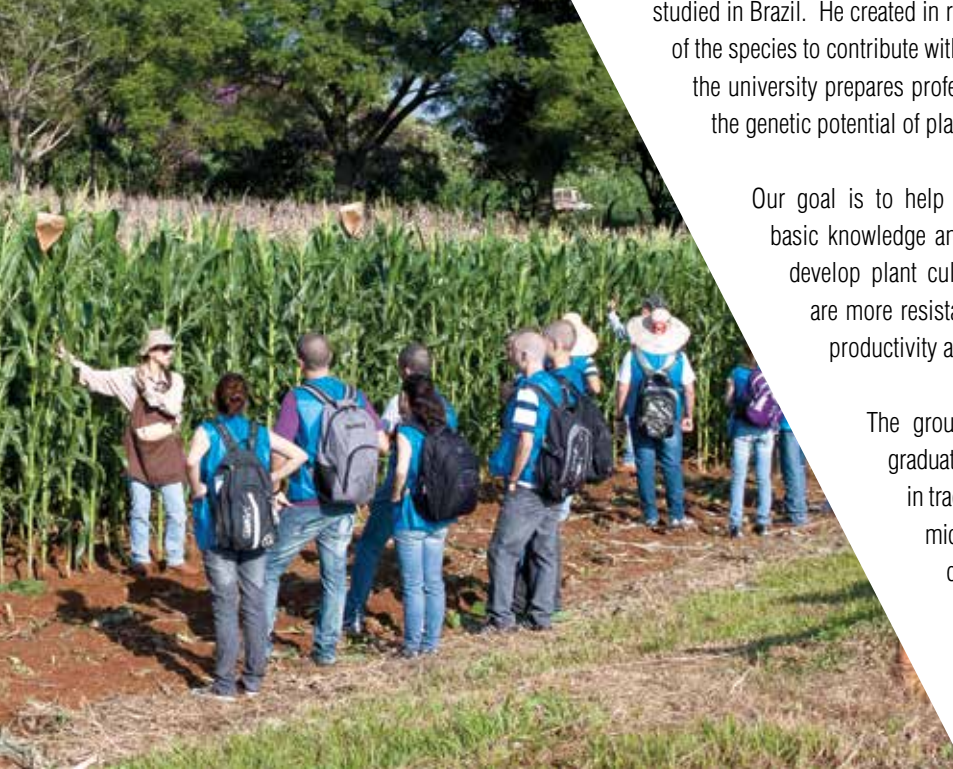
Roberto Amaral



Roberto Amaral

The secret of varieties

Bárbara Burger



When German geneticist Friedrich Gustav Brieger came to Piracicaba in 1936, he did not simply make ESALQ-USP the first university where vegetal genetics was studied in Brazil. He created in researchers the wish for unveiling the secrets of the species to contribute with the development of our planet. Since then, the university prepares professionals dedicated to take full advantage of the genetic potential of plants, animals and microorganisms.

Our goal is to help in the production of varieties, developing basic knowledge and methodologies to help other researchers develop plant cultivars, animal breeds or fungi strains that are more resistant to pests and diseases, achieving greater productivity and higher quality for the consumer.

The group, formed by faculty, undergraduates and graduates, study Brazilian plants, species cultivated in traditional crops, germplasm banks, eucalyptus, microorganisms, green vegetables, sugarcane, corn, soy, poultry, and others.



The researches conducted by them have changed Brazilians' eating habits. Many types of vegetables, due to their European origin, had good yield in the winter, but were scarce in the summer. Brazilians have eaten salad all year round thanks to ESALQ's genetic improvement studies on lettuce, cabbage, broccoli, cauliflower, onion, and eggplant.

The institution also had a key role on the development of corn, rice and soy varieties that were spread throughout the country. Chicken Genome was also developed in association with other institutions, identifying several genes related to the muscular development of chicken, aiming at improving its meat.

Being updated with the latest world researches, bioinformatics is used to analyze DNA sequences and protein of sugar cane produced all over the world, which results are published on the internet by researchers with the objective of making genetic maps.



And continuing Brieger's legacy, the orchid garden initiated by the geneticist is preserved. The collection, regarded as a germplasm bank, has approximately 800 species, mostly brought from the Atlantic Forest. Many of them were collected long ago in places where the originals no longer exist. This is an example of our commitment to environment preservation.

Forests have strategic importance

Those who think forests are distant entities located only in the heart of the Amazon are mistaken.

Forests are near us, sometimes even in the middle of a sugar cane plantation. The truth is that forests interfere with the quality of the water, the climate, biodiversity, as well as supply us with plenty of raw material for our existence.

Roberto Amaral

Because of their strategic role, ESALQ's researches focus on the handling of plantations and forest ecosystems, as well as the development of technologies for obtaining environmental products and services and nature preservation.

This institution has, in fact, made great and strategic contributions with forest development and expansion in Brazil through researches, technologies and even subsidies which have helped in the definition of public policies for the area for years.

The studies have had impact on the entire productive chain and aim both at natural and planted forests, which are formed to meet some specific needs, such as products supply or simply preservation.



In the case of planted forests, we seek the best planning for the extraction of by-products, such as paper, resins, essential oils, wood for construction of furniture manufacturing. In these forests, the structure of wood trees, as well as their physiology, nutrition and resistance to draught, plagues and diseases are analyzed.

In this field, researches initiated in the 1960s aimed at genetic improvement for eucalyptus and pine have greatly promoted timber production with these species, which are largely commercially used in Brazil nowadays.

Adilson Correa da Silva



The environmental services offered by forests - which are home to animals, protect the soil from erosion and have impact on the volume of water - are also research themes at ESALQ.

These studies also have the objective of finding answers for a question currently asked with growing interest: how can we estimate how much should be paid to those who keep the forests, guaranteeing the protection of these natural ecosystems?

Thus, concerns about endangered species preservation, management of conservation units - such as parks, forest reserves, and others - have increased.

As to natural forests, we study how to explore native areas, as in Amazon, for instance, with sustainable handling, biodiversity preservation and minimal impact.

Another challenge faced by researchers is how to conduct reforestation, since the recreating natural systems is not possible.

In this vast universe, we reach also urban forests and the best tree-planting solutions in cities in order to guarantee a better quality of life for the population.

Animal production and food safety

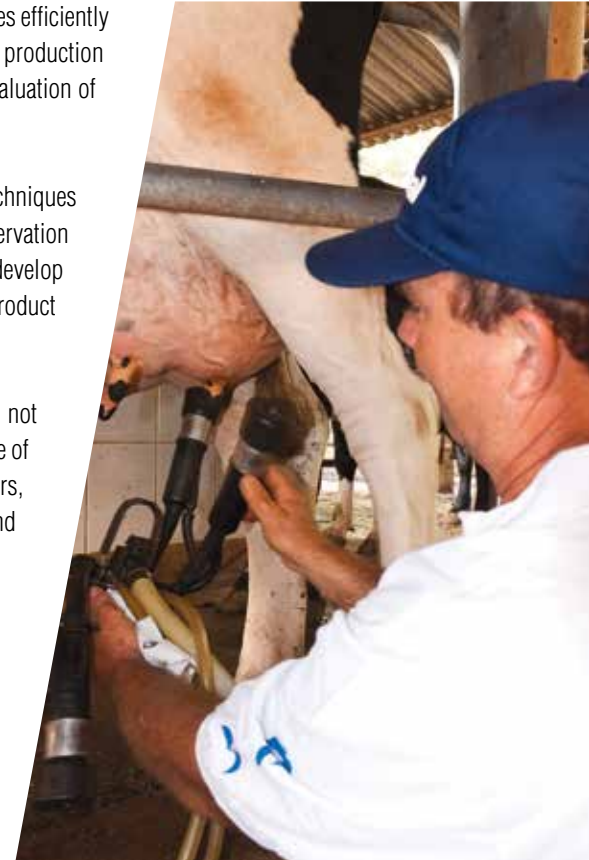
How to meet the increasing demand for animal-source proteins in the world, by using consumables efficiently and guaranteeing food safety? These are the challenges faced by researchers working with animal production and food safety at ESALQ. For this reason, they are focused on genetic improvement, genetic evaluation of higher animals, animal nutrition, and nutritional and microbiological quality of the product.

They know that feed is the most important aspect of animal production and aim at developing techniques to minimize damages to natural resources. They study pasture composition and efficiency, conservation of forage used as fodder (silage), meals processing, use of industry by-products in feed, and develop several supplements to improve production efficiency as well as interfere in the quality of the product - meat, milk and eggs - avoiding sanitary problems.

There are studies on probiotic supplements - live bacteria - and prebiotic - molecules that are not digested by the animal, but stimulate the activity of microorganisms and can reduce bacteria -, use of vegetal extracts from several sources, industry by-products, organic acids and metabolic modifiers, which can change the composition of milk or meat and are normally used to increase muscles and decrease fat.

The group tests new products that can be part of the food chain, such as the use of glycerin - discharged by the biodiesel industry - in the composition of animal feed. The analysis was conducted under request of the Ministry of Agriculture, so that its use could be registered. Such requests are frequently received by the institution, which validates new practices and novelties in animal feed.

Roberto Amaral



We are also home to the Milk Quality Laboratory, receiving samples from all over Brazil, aiming at the improvement of the nutritional quality, in accordance with the type of feed eaten by the animal and its microbiological quality.

Besides cattle, sheep, swine and poultry, the institution has also great tradition in the study of fish. The challenge is to develop omnivores and carnivores, increasing sanitary quality and the immunologic system of animals through immunostimulants.

Roberto Amaral



Without control, pests would destroy food production

The world would not be able to maintain any agricultural crop and produce the amount of food necessary without pest control. ESALQ has made restless efforts in the search for techniques involving this great puzzle.

Roberto Amaral

With its pioneering researches, it played a fundamental role in the control of sugar cane, soy, citrus fruit, and corn pests, and others, guaranteeing the highest score in Capes (Higher Education Coordination Office) evaluation.

Researches on insects and mites that damage agriculture all around Brazil are based on principles such as taxonomy (species, family, order), bioecology (interrelations between plants and other organisms) and handling and control strategies.

Effective pest termination actions make use of several techniques adopted worldwide. The difference lies on research lines and on results.

Biological control is a scientific response to the excessive use of agrochemicals, i.e., an alternative for keeping the agricultural system sustainable.

The use of *Trichogramma*, a minute wasp that naturally controls crop-destroying pests, such as the sugar cane borer, the corn caterpillar and the tomato borer, was pioneered by ESALQ's researchers.



Likewise, *Ageniaspis* and *Tamarixia* were used in citrus crops to control the citrus leafminer and psyllid *Diaphorina citri*, one of the vectors of greening disease.

Another strategy for biological control by entomopathogens, using fungi or beneficial viruses, have showed excellent results on the field, since pests are controlled without hazard to human beings or the environment. Not to mention the introduction of the integrated pest management by the safe and rational use of agrochemicals, with sampling criteria, control levels and rotating active ingredients.

The use of pheromones to control insect behavior was also extraordinary for the Brazilian agricultural sector.

One of the greatest discoveries of this research was the sexual pheromone of the citrus fruit borer, a Brazilian pest that has caused the annual loss of over 50 million dollars, with great repercussion on the citrus market around the world.

Thanks to the simple management practices found at Esalq, with the use of one trap for each 10 hectares, the loss decreased from 1.5 box per plant out of four boxes produced to one single fruit per plant on average. Since 2005, this technique was made available for the citrus fruit market.

The continuous work of community services is also noteworthy, with results made quickly available to producers, and the permanent challenge of achieving levels of excellence. Despite so many advances, the annual loss caused by pests in agriculture has an impact on the world food production, evidencing there is still a lot to be done.



Reducing losses in agriculture

Losses caused by plant diseases affect about 20% of the world's agricultural production. Not to mention post-harvest problems. Preparing a professional who will work on the early detection of diseases on site and will efficiently interfere in the reduction of this percentage is the challenge of institutions that have a commitment to society, such as ESALQ-USP.

Researches conducted in the area and the work of professionals contribute to prevent losses from increasing, as planted areas have gradually become wider, affecting yield, mainly of food.

The range of studied plants includes edible, horticultural, ornamental and forest plants. Professionals pay special attention to citrus and sugar cane, which are cultivated in the area where ESALQ is situated. We have Study Abroad program agreements with universities worldwide, aiming at the exchange of knowledge and information.

Roberto Amaral





Initially, fungi, bacteria, viruses, nematodes and phytoplasma affecting the culture, as well as fungi and bacteria causing post-harvest loss, are identified. Training is offered on disease-reducing measures, such as biological, culture, physical or chemical control. As to post-harvest of vegetables, ideal way of handling and storage are shown.

Our Phytopathology Lab serves the community. The samples delivered personally or by mail are analysed. ESALQ gives the producer or technician the results and instructions on the control of the disease. The service is also used by respected specialized publications as a source of data.

The result of all this work is higher crop yield and profitability, helping the producer and the country's domestic and exports production.

Transforming raw materials and the world

The desire for safe food and with growing demands for quality, there is an urge for professionals who are ready to optimize and transform raw material into added-value products, making them competitive in the global agribusiness and attracting more foreign currency to Brazil, a strongly agriculture-oriented country.

Researches in the area of agro industry, food and nutrition developed at ESALQ are aimed at this objective. They are present in all segments of the productive chain, beginning at the primary production on the field, and extending to post-harvest, post-milking, post-slaughtering, processing, distribution, and storage, with products made available to consumers, in compliance with domestic and international markets.

The search for perfection has a long path. Science unveils the physical and chemical structure of raw materials and directs them towards technological applications, involving the choice of processes that guarantee the best physical-chemical, microbiological and sensory results.

Roberto Amaral



In the analysis of agro industrial production of food and energy, we seek for the optimization of yield, economic viability, sensory and nutritional characteristics, safety, good product acceptance and sustainability. Undergraduate and graduate students participate in the whole process. The academic research is led to the productive sector as technology transfer.

The guiding light of research and teaching in this area is the holistic view of the productive chain, i.e., familiarity with the raw material, the influence of the place of production on the final features of the product, the processing conditions and the challenge of producing more nutritive food, with biodegradable packaging, available even in more remote parts of the country, and the provision of biorenewable energy.

The demand for researches come from the productive sector, which come to ESALQ to seeking answers to questions about nutritional composition, toxicological, and microbiological analyses, certification, reuse and recycling of waste, prospection of bioactives and biofuel, clean energy generation, installation of processing units, products and processes development, technological innovation.

There is an ever-growing link between the university and society, making this a healthier world with quality of life for the population.



A guiding light to Agribusiness

To manage the whole productive chain - from the stage prior to crop production throughout the availability of the product to consumers - and serve as a guiding light to agribusiness, which represents a significant share of the GDP in Brazil, is the greatest challenge faced by business and economics professionals working at ESALQ-USP. The group has a macro view of Brazilian economy and reach the productive area all over the country, from small farmers or fishermen to multinationals, seeking for positive results in business and fostering opportunities for people to prosper in life.

They monitor animal agriculture, agro industrial activities - from the simplest to the most complex ones, as well as distribution (logistics, transportation, and trade) until the product reaches the final consumer in supermarkets or ports, in the case of exports, taking the human capital and the environment in consideration at all stages of the process.



The process involves undergraduate and graduate students, who are supervised by researchers of the institution, all of them PhD's, guaranteeing quality in research and community services. The team constantly takes study trips abroad, mainly to the USA or Europe. But the focus of the studies is the Brazilian agribusiness.

Among the activities developed by the group is the calculation of the GDP (Gross Domestic Product) of the Brazilian agribusiness and the index used by the stock market for live cattle futures. Systematic work has also been conducted on monitoring price of grains (soy, corn, beans, rice, wheat, and others), vegetables, beef, pork and poultry products, as well as the sugar and alcohol, and forest sectors. As to ethanol, the index is used by Orplana for the calculation of ATR (Total Recoverable Sugar) for the payment of producers.



Gerhard Waller

Freight prices and transportation routes are also important, as well as other logistics components.

All these prices are available to rural producers through the media (Estado, Bloomberg and Reuters), as well as printed materials mailed to small farms.

Besides prices, there are researches on production costs for the main animal agriculture activities in Brazil.



Fernando Lupinacci/ESALQ-LOG

Credits

“Luiz de Queiroz” College of Agriculture

University of São Paulo

www.esalq.usp.br

Address: Av. Pádua Dias, 11 | P.O. Box 09 | ZIP: 13418-900

Piracicaba – SP - Brazil

Phone: Dean's Office 55 (19) 3429-4110

e-mail: diretor.esalq@usp.br



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