

YEARBOOK 2009

NATIONAL CENTER FOR ANIMAL AND PLANT HEALTH



PRESENTATION
MAIN SCIENTIFIC RESULTS IN THE YEAR:

TECHNOLOGICAL INNOVATION AND HUMAN RESOURCES

MICROBIOLOGY

ANIMAL HEALTH AND PRODUCTION

PLANT PROTECTION

BIOPHARMACEUTICAL PRODUCTIONS



YEARBOOK 2009

Table of contents

PRESENTATION **1**

**Technological Innovation
and Human Resources** **2**

Microbiology **3**

Plant Protection **4**

**Animal Health and
Production** **5**

**Biopharmaceutical
productions** **6**



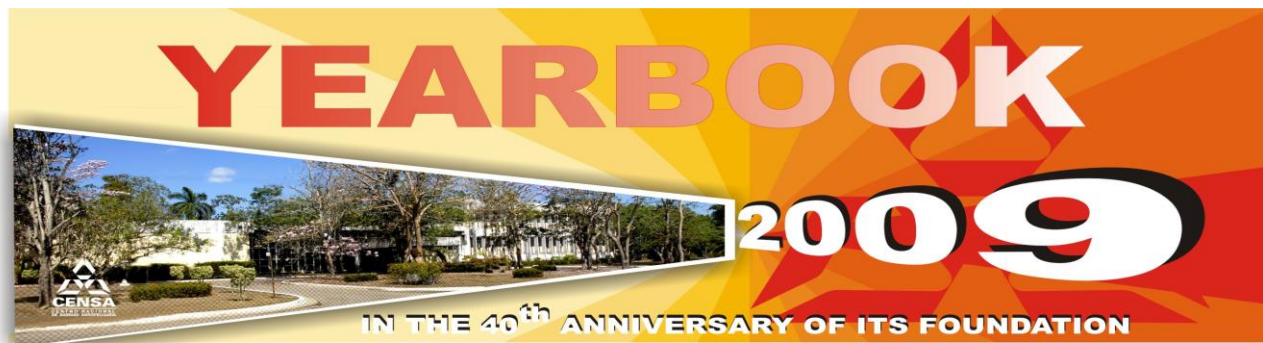
In 2009, the National Center for Animal and Plant Health (CENSA) celebrated the 40th anniversary of its foundation with a broad and varied program of activities, culminating in the main event held on June 12. It could be confirmed that the work of all these years fitted well with the conception and design of the Commander in Chief Fidel Castro, when he created the national science system integrated by all the scientific institutions, and those of production and services, in the country which could contribute to the achievement of an outcome; as well as the talent and permanent will of its workers, who advance facing all the difficulties with loyalty and total dedication to their work. As stated by the Commander:

"The future of our country has to be, necessarily, a future of men of Science."

Fidel Castro.



In the year, the National Center for Animal and Plant Health carried out a total of 35 national projects of Science and Technological Innovation, of which 11 culminated, and the results were presented in their respective groups of experts. Sixteen new projects were submitted to and approved by the various national and branch programs; other 9 projects were considered of interest to the institution. Other important results for our institution were the approval of 10 international projects corresponding to the lines of scientific strategies, and the presentation of other new projects to international organizations. Of these, one was presented to the International Organization of Epizootiology (OIE): Censa-HannoverTwinning Project on CSF; seven to the Spanish Agency of Ibero-American Development Cooperation (AECID), one to the Ibero-American Program on Science and Technology for Development (CYTED), and two to the Food and Agriculture Organization (FAO) of the United Nations Organization (UNO). The Conference of the Research and Development Centre for Health Technology London MET of London Metropolitan University, UK (IHRP)-CENSA, was developed successfully. Moreover, the actions planned in the twinning projects of the International Organization of Epizootiology were completed, and results of a high diagnostic value for CENSA and the country are being achieved. From these actions, new collaborative options are derived.



Because of its great significance and importance, it must be highlighted that the State Council of the Republic of Cuba awarded CENSA with the

Carlos J. Finlay Order,

the highest honor given by the country to individual workers, or groups of workers in the scientific field, for their sustained outstanding achievements.

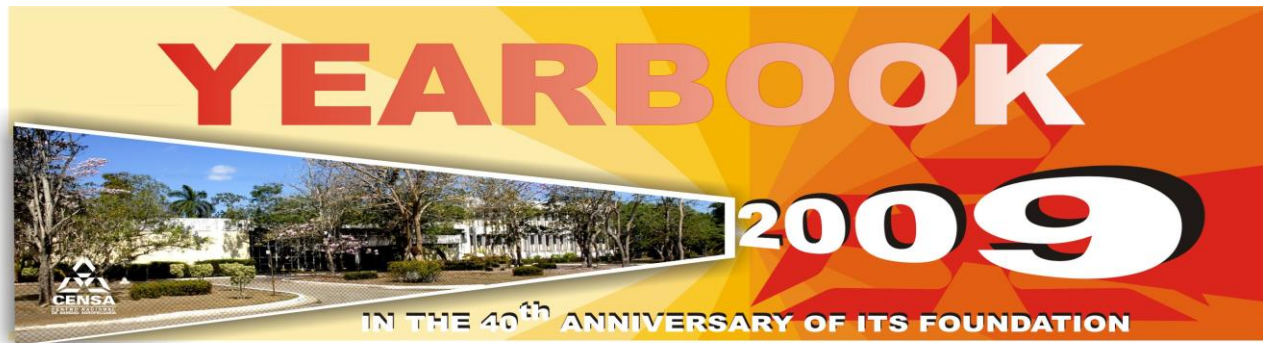
CENSA was also the recipient of two awards of the Academy of Science of Cuba and the Award from the Ministry of Public Health 2009. Two products were awarded in EXPOCUBA: SURFACEN, as the most significant exposed sample, and KLAMIC with the QUALITY AWARD.

Intellectual Property

A patent was granted to CENSA for the "Formulation to increase resistance to mastitis in the mammary gland."

The following brands were presented:

- **RHIZONAT:** formulated as tablets to identify natural products from red mangroves for the treatment of gastroduodenal ulcers caused by *Helicobacter pylori*.
- **CENMAST:** identifies a chemical reagent used in the rapid diagnosis of bovine mastitis.
- **GLUTAVE:** identifies a nonspecific immunostimulant suspension for the treatment of birds.



There were new brand applications, SURFACEN AND STABILAK, in Nicaragua. They both were renewed in Mexico, and STABILAK also in Colombia. Registration was granted by the National Center of Copyright (CENDA) to: "Biology, quality control, and mass reproduction of *Tamarixia W radiata* (Hymenoptera: Eulophidae)."

Postgraduate Education

The scientific degree of Doctor of Science (second level of Doctor of a Specific Science) was successfully defended by Ondina León Martínez and Yamila Diaz Zubiaur, with the respective theses: "Contributions to the pathophysiological knowledge in plant-pathogen interactions of interest for agriculture" and "Studies for identification, diagnosis and control of Begomoviruses in Cuba.

Four theses for the scientific degree of Doctor of a Specific Science were defended: one of Pharmaceutical Sciences and three of Agricultural Sciences. Four theses were defended for the degree of Master of Science in the fields of; Pharmacy, Microbiology, Agricultural Sciences, and Technical Sciences.

Doctoral programs in progress were:

- Collaborative Curricular Program on Animal Health
- Collaborative Curricular Program on Plant Protection.

Sixteen postgraduate courses and one postgraduate training course were completed with an attendance of 279 participants, of which 267 were national and 12 from abroad. Similarly, the fourth edition of the Master of Veterinary Microbiology continued in progress.

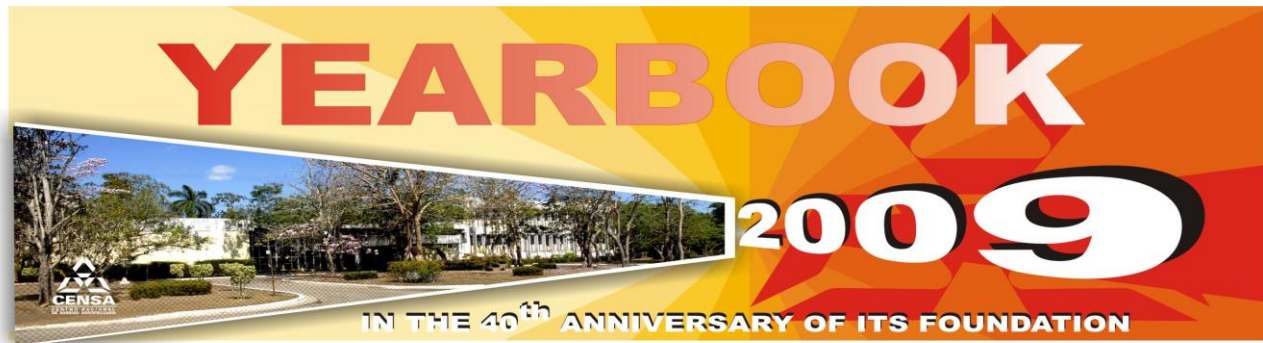
The doctoral program on Animal Biotechnology was satisfactorily developed jointly with



the National Institute of Agricultural Research (INIA). The theses planned for the edition in progress were defended, and the second edition was initiated with the new candidates.

Courses implemented for laboratory technicians:

- Management and Calibration of Milken and LactoStar
- Course-International Workshop on Dairy Laboratories and Improvement of Milk Quality



Editorial Activity

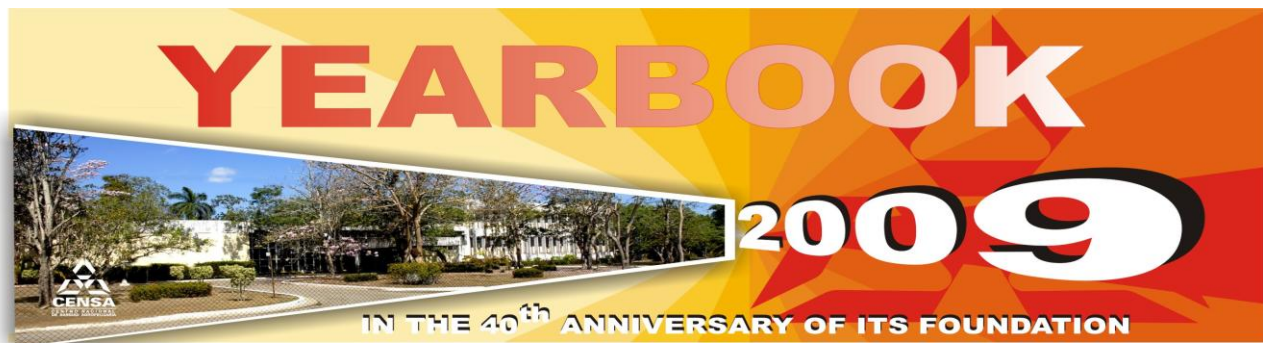
The two scientific journals published by CENSA on a basis of three numbers in the year were edited, continuing their consolidation as organs for dissemination of research results in the fields of plant and animal health in the country. The editorial work has been strengthened and their insertion into the International Data Base Scielo has led to an increasing international visibility:



Journal of Animal Health

This year, 34 papers were published, 50% of them related to Microbiology, one of the topics of greatest interest at present; the rest was distributed among Biomodels, Drug, and Toxicology. Seven papers were written by foreign experts, mainly from Mexico, Colombia and United Kingdom.

This journal is indexed by LATINDEX, CAB Abstract, AGRIS, SciELO, CubaCienca, Periodic, EBSCO, Index Veterinarius.



Journal of Plant Protection

This year, 42 papers were published with a suitable proportion in terms of the different types of articles; 47% of its space was devoted to review articles and original contributions. Only 50% of the papers published were written by researchers from CENSA, the other 50% were by professors and researchers from Argentina, meaning an increase over previous periods.

The thematic scope of the articles published reflected the current trends in this field, which was focused on biological control, pest diagnosis, and the studies on plant-pathogen interactions.

This journal is indexed by CubaCiencias, LATINDEX, Review of Plant Pathology, CABI, EBSCO, and SciELO.

Main results achieved by research directions:



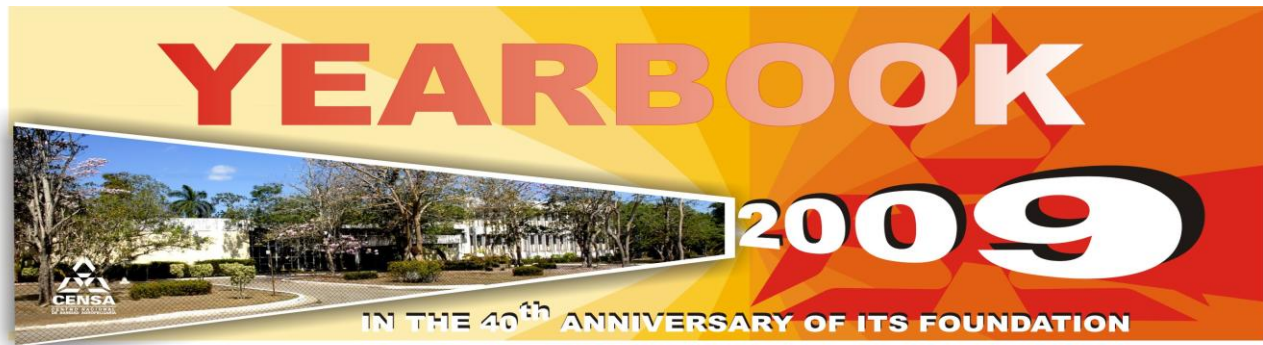
DIRECTION OF MICROBIOLOGY

Main Impacts:

1. DEVELOPMENT OF DIAGNOSTIC TECHNOLOGIES FOR DISEASES AFFECTING ANIMAL SPECIES.



- **Real time PCR assays were developed for the detection and quantification of type A, subtype H5 influenza and the classical swine fever (CSF).** The test designed to detect influenza strains of Eurasian and American lineages proved able to detect subtype H5 strains of the American lineage, including the H5N2 strain, which affects the Dominican Republic and has the highest potential for being introduced into Cuba. . The tests for type A and subtype H5 work in a multiplex format, so that the simultaneous detection is allowed in the same test, shortening the time of the diagnostic response. . These controls also allow the quantification of the number of copies of the target gene, what is the basis for vaccine evaluation against these viral infections.



- Multiple PCR assays were developed for the simultaneous and differential detection of viruses affecting the pig. The analysis of more than 100 samples as a part of two inter-laboratory comparison tests conducted by the International Reference Laboratory of the Epizootiology Organization (OIE), FAO, and the European Union (EU) for the diagnosis of Classical Swine Fever in Hanover, Germany, showed that the test was fast, highly sensitive, specific, and cost-effective for the diagnosis of the classical swine fever and other pestivirus infections in pigs. . This is the basis for taking appropriate and effective measures to control these infections leading to loss reductions by controlling their spread.

2. CREDITED SERVICE. MYCOLAB.

Services of mycoplasma detection in cell cultures, sera and biopharmaceuticals for biomedical purposes are offered to the different scientific institutions in the country. The methods used in this type of diagnosis are validated and recognized by the various pharmacopoeias. At present, MYCOLAB is being processed by the National Accreditation Board of the Republic of Cuba (ONARC) for the accreditation of its testing procedures. To have credited techniques allows to increase the reliability of the results, to meet both the clients' requirements and the demands of the international regulatory organisms for this type of service; in addition to provide an added value to this scientific-technical service, and an international recognition.

Major Achievements:

- Preparation for confronting the Avian and Swine Influenzas was consolidated.
- Alliance between national institutes with positive results in the collection and evaluation of CSF and avian influenza candidate vaccines and the Group of Bioinformatics of the Central University of Las Villa.



- Excellent collaborative work through projects and scholarships in recognized international institutions
- Standardization of advanced diagnostic systems for various diseases in animals and for detecting mammalian remains in food, contributing to safeguard the national security. Diagnostic services of high interest for the country are provided, including those for detecting mycoplasma in several products of the Cuban biotechnology, with a sustained work to get the accreditation of the laboratory.
- Carrying out of international twinning projects with OIE laboratories of reference, with the goal that our centers become centers of reference for the diagnosis of major entities such as avian influenza, Newcastle C disease, contagious bovine pleuropneumonia and classical swine fever.

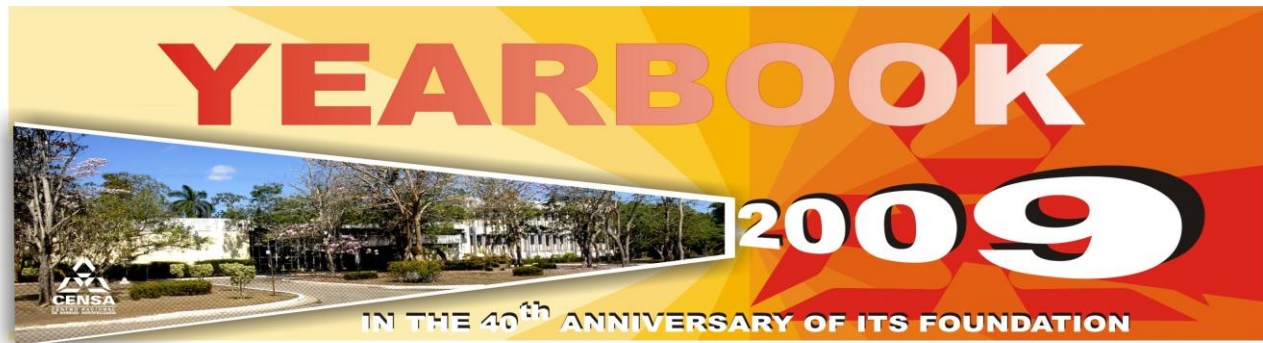
Awards:

Award of the Academy of Sciences of Cuba:

- **System based on technologies of nucleic acid test for the diagnosis of viral diseases of economic importance.**

Provincial Award of the Ministry of Science, Technology and Environment in Havana:

- **System based on technologies of nucleic acid test for the diagnosis of viral diseases of economic importance.**
- **Contribution to the knowledge of swine enzootic pneumonia. Basis for the molecular epidemiology of porcine mycoplasmas.**
- **Expression, solubilisation and purification of the recombinant protein MSP5 of Anaplasma marginale Havana isolate.**



Award of the Ministry of Agriculture:

- System based on technologies of nucleic acid test for the diagnosis of viral diseases of economic importance.
- Contributions to the knowledge of swine enzootic pneumonia. Basis for the molecular epidemiology of porcine mycoplasmas.

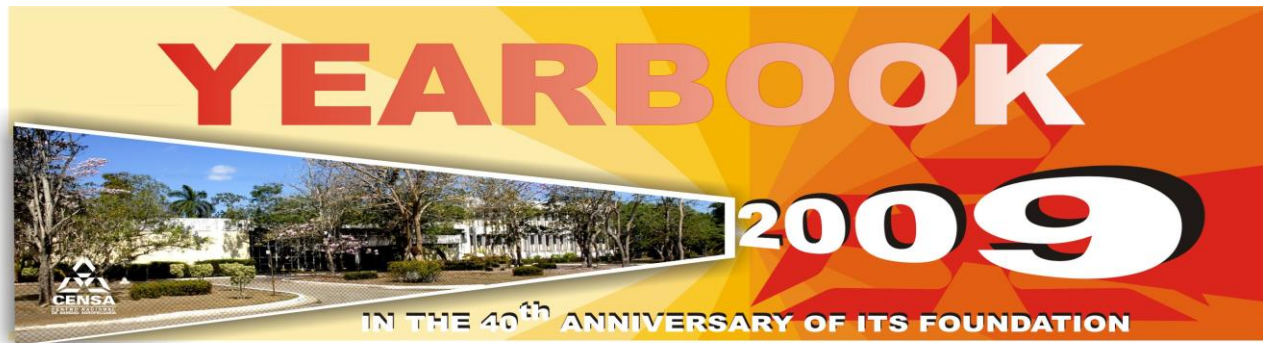
Award of the Ministry of Higher Education of Cuba to the Result Reflecting the Technical Scientific Progress of Higher Significance and Originality:

- System based on technologies of nucleic acid test for the diagnosis of viral diseases of economic importance.

Publications:

REVISTAS DE LA WEB OF SCIENCE.

- *Development and evaluation of a polymerase chain reaction for Bovine herpesvirus 1 detection. Majela Rodríguez, Mislav Avila, Heidy Díaz de Arce, Maritza Barrera. **Spanish Journal of Agricultural Research Vol.7 No.1 Pág. 59-66, 2009.***
- *Thermal stress treatment does not affect the stability and protective capacity of goat milk derived E2-marker vaccine formulation against CSFV. Maritza Barrera, Oliberto Sanchez, Yanet Prieto, Sara Castell, Paula Naranjo, María P. Rodríguez, Omar Farnós, Ana Aguilera, María Frías, Osvaldo Fonseca, José M. Figueredo,*

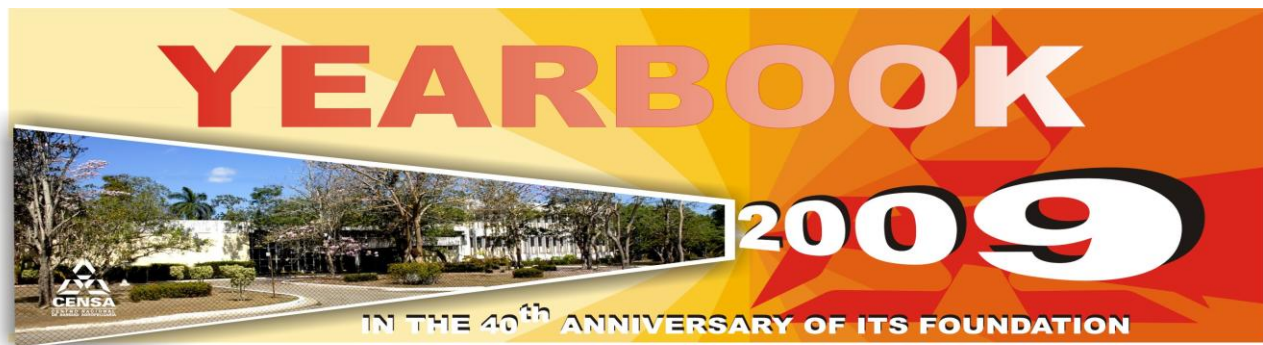


*Felix Agüero, Raquel montesino, Jorge R. Toledo. **Veterinary Immunology and Immunopathology Vol.127 No.3-4 Pág.325-331, 2009. ELSEVIER, Holanda.***

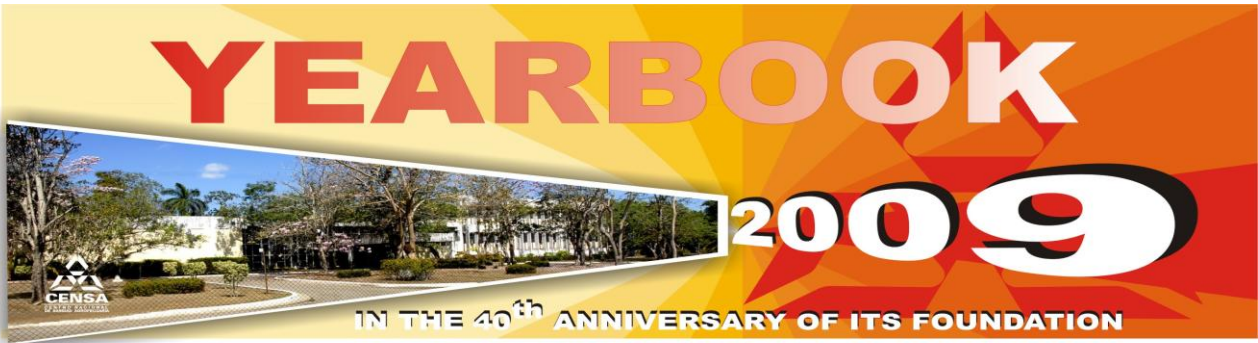
- *A RT-PCR assay for the detection of Encephalomyocarditis virus infections in pigs. Lester J. Pérez, Heidy Díaz de Arce. **Brazilian Journal of Microbiology Vol. 40, Pág. 988-993, 2009. Brasil.***
- *Cloning and expression of msp5 gene of Anaplasma marginale Havana isolates. Belkis Corona, Hector Machado, Majela Rodríguez, Siomara Martínez. **Braslian Journal of Microbiology Vol.40, No.4, Pág.972-979, 2009. Brasil.***

REVISTAS EN BDI SELECCIONADAS

1. *Enteropatogenicidad de una cepa de coronavirus bovino. A. Betancourt, Edisleidy Rodríguez, R. Joa, J.A. Ancizar, A. López, Damais Relova y Maritza Barrera. **Revista Salud Animal (RSA) Vol.31, No.1, Pág.18, 2009. Cuba.***
2. *Evaluación de diferentes métodos de extracción de ADN de micoplasmas para su empleo en el diagnóstico por PCR. Yenney Hernández, Evelyn Lobo, Siomara Martínez y Loidy Zamora. **Revista Salud Animal (RSA) Vol.31, No.2, Pág.108, 2009. Cuba.***
3. *Desarrollo de controles positivos para métodos moleculares de detección de virus de influenza aviar. Ana María Acevedo, Elaine Santana, Heidy Díaz de Arce, L.J. Pérez , A. Caballero, L. Suárez y O. Sánchez. **Revista Salud Animal (RSA) Vol.31 No.1 Pág.50, 2009. Cuba.***
4. *Differences and similarities between Anaplasma marginale and Anaplasma phagocytophylum. Belkis Corona and Siomara Martínez. **Revista Salud Animal (RSA) Vol.31, No.1, Pág.1, 2009. Cuba.***



5. *Polymerase chain reaction detection of avian leukosis virus DNA in vaccines used in poultry.* Ana María Acevedo, Edisleidy Rodríguez, Odalys Uffo, Damarys Relova, Julia Noda y Heidy Díaz de Arce. **Revista Salud Animal (RSA) Vol.31, No.1, Pág.55, 2009. Cuba.**
6. *Presencia de anticuerpos al virus de la leucosis bovina en rebaños de Cuba.* Irma Delgado, A. Alfonso, Nadia Martínez, María Antonia Abeledo, Majela Rodríguez y Maritza Barrera. **Revista Salud Animal (RSA) Vol.31, No.1, Pág.24, 2009. Cuba.**
7. *Dinámica de peso en pollos de ceba tratados con una formulación de β 1-3 glucano particulado lineal.* J. Lavielle, Miriam Pedroso y D.M. Soler. **Revista Salud Animal (RSA) Vol.31, No.2, Pág.129, 2009. Cuba.**
8. *Diagnóstico de la gastroenteritis transmisible del cerdo en Cuba.* Edisleidy Rodríguez Batista. **Revista Salud Animal (RSA) Vol.31, No.1, Pág.67, 2009. Cuba.**
9. *Formación de recursos humanos en biotecnología para los países del ALBA: doctorado curricular en biotecnología animal.* Siomara Martínez, Belkis Corona, Lydia Tablada, María Teresa Frías, Luis Dickson, Alejandra Villoch, Bertha Chongo, M. Suárez y N. Obispo. **Revista Salud Animal (RSA) Vol.31, No.2, Pág.113, 2009. Cuba.**
10. *Análisis in silico de la catepsina B de Fasciola hepatica como diana terapéutica. (In silico analysis of cathepsin B Fasciola hepatica as a therapeutic target).* Artículo revisión. Naranjo Feliciano, Dany. **Revista Electrónica de Veterinaria (REDVET) Vol. 10, No 2, 2009.**



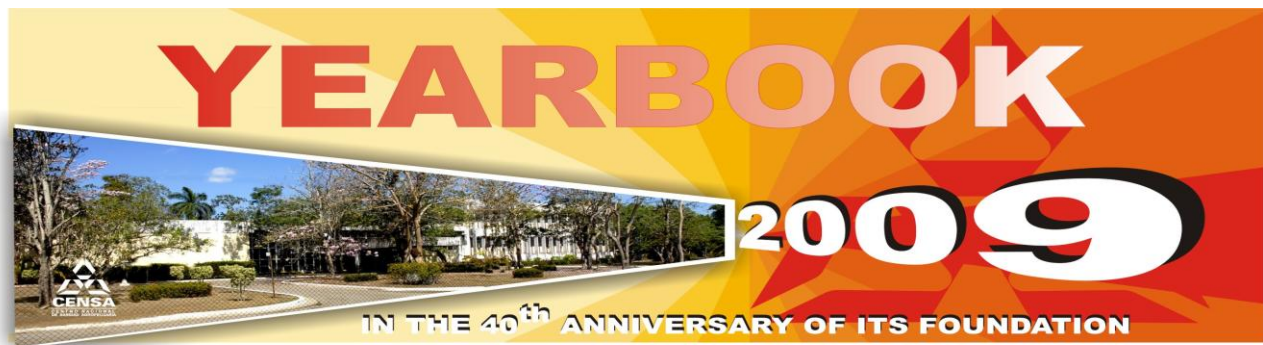
DIRECTION OF PLANT PROTECTION

Main Impacts:

- **Molecular markers associated with resistance to begomoviruses** that allow using molecular techniques to assist breeding programs and the achievement of better results in the resistance to two major viral diseases of tomato. The Ty3 and SW5 loci were sequenced and compared with similar sites, reported in the international databases; these loci were incorporated into promising materials of the genetic program of this crop. The Ministry of Science Technology and Environment considered this result as relevant.



- **The effectiveness of Amblyseius largoensis as a biological control agent of the broad mite in protected systems was demonstrated.** The main results that could be highlighted were the fact of having a methodology for the mass reproduction of the predator, the determination of its compatibility with chemicals



and other biological products, and, especially, the demonstration, for the first time in the country, of the effectiveness of a phytoseid as a biological control of the broad mite. The introduction of these results into the agricultural practice will reduce the damages caused by this mite with an important economic and ecological impact, resulting in environmental benefits and the achievement of healthier food for consumption.

Major Achievements:

- A methodology for the mass rearing of *Tamarixia radiata*, biological control of the vector of Citrus Greening Ex., was introduced.
- The biological and molecular characterization of different strains of *Trichoderma* sp was carried out. New studies on the mode of action.
- A system for the molecular detection of PVYN was developed to be used in the national quarantine.
- Bacterial diseases in rice were diagnosed by their identification using morphological, cultural, serological, and biochemical methods.
- A potential botanical pesticide for varroosis.



Awards:

Award of the Academy of Science of Cuba:

- **Distribution and molecular variability of begomoviruses affecting economically important crops in Cuba: epiphytological elements.**



Provincial Award of the Ministry of Science, Technology and Environment in Havana.

- **Distribution and molecular variability of begomoviruses affecting economically important crops in Cuba: epiphytological elements.**
- **Potential of *Amblyseius largoensis* as a biological control agent of the broad mite.**
- **Expression, solubilisation and purification of the recombinant protein MSP5 of *Anaplasma marginale* Havana isolate.**
- **Improvements in the process to obtain a natural product.**

Award of the Ministry of Agriculture:

- **Distribution and molecular variability of begomoviruses affecting economically important crops in Cuba: epiphytological elements.**

The Most Distinguished Collective of Workers in Research and in Promotion of Innovative Processes:

- **Direction of Plant Protection.**

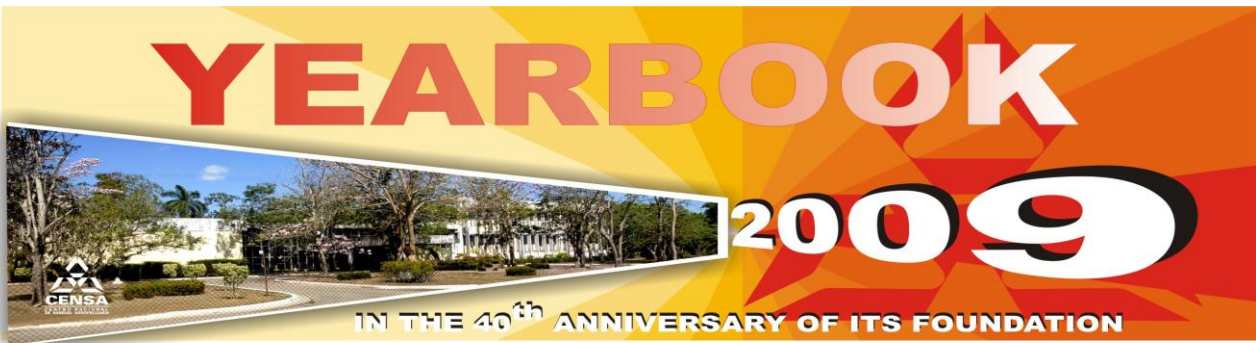
Publications:

REVISTAS DE LA WEB OF SCIENCE.

1. *Production of extracellular enzymes by different isolates of *Pochonia chlamydosporia*. Ivania Esteves, Belkis Peteira, Simon D. Atkins, Narash Magan, Brian Kerry. **Mycological Research, 2009, V 113(8):867-876.***



2. Use of real-time quantitative PCR to investigate root and gall colonisation by co-inoculated isolates of the nematophagous fungus *Pochonia chlamydosporia*. S. D. Atkins, Belkis Peteira, IM. Clark, B. Kerry, PR Hirsch. **Annals of Applied Biology**, 155 (2009). 143-152.
3. Effects of osmotic and matric potential on radial growth and accumulation of endogenous reserves in three isolates of *Pochonia chlamydosporia*. Ivania Esteves, Belkis Peteira, S. Powers, N. Magan, Brian Kerry. **Biocontrol Science and Technology**. 19(2)185-199, 2009.
4. First report on detection of 'Candidatus *Phytoplasma aurantifolia*' (group 6SrII) affecting sapodilla in eastern Cuba. Karel Acosta and Y. Arocha. Karel Acosta and Y. Arocha. **Plant Pathology Volume: 58, Issue: 4**, (p 793), año 2009.
5. Tobacco yellow crinkle virus, a new bipartite begomovirus infecting tobacco and pepper in Cuba. Yamila Martínez. **Plant Pathology (2009), 58, 785. Journal Compilation.**
6. Tomato yellow leaf distortion virus, a new bipartite begomovirus infecting tomato in Cuba. Yamila Martínez, E. Fiallo-Olivé and R. F. Rivera-Bustamante **Plant Pathology (2009), 58, 785. Journal Compilation.**
7. Cultural and morphological characterization of *Pochonia chlamydosporia* and *Lecanicillium psalliotae* isolated from *Meloidogyne mayaguensis* eggs in Brazil. Jersys Arevalo, Leopoldo Hidalgo, Irene Martins, J. F. Souza, José Mauro C. Castro, Regina Maria D.G. Carneiro and Myrian S. Tigano. **Tropical Plant Pathology, vol. 34, 3, 158-163 (2009).**
8. Caracterización del hongo nematofago cepa IMI SD 187 de *Pochonia chlamydosporia* var. *catenulata* (Kamyscho ex Barron y Onions) Zare y Gams.

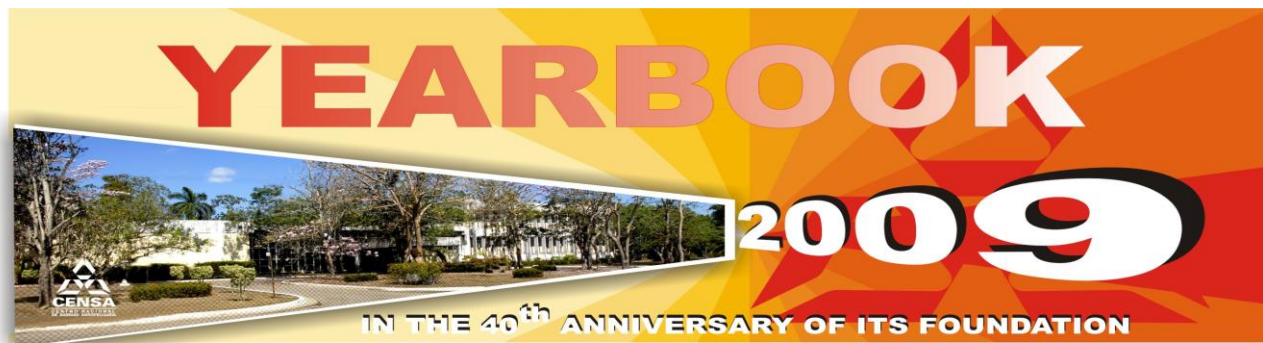


Belkis Peteira , Leopoldo Hidalgo. *Phytopathology* Vol. 99, No. 6 (Supplement), 2009 S189.

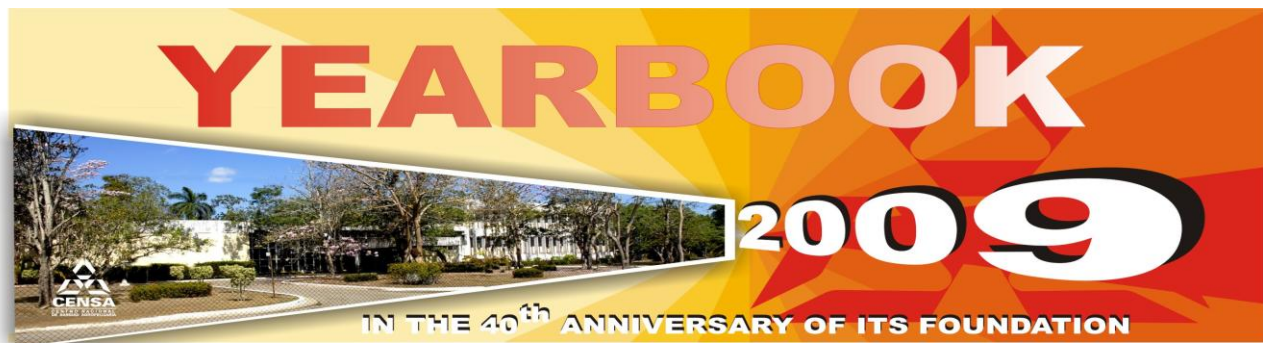
9. Emergencia de virus transmitidos por mosca blanca en Cuba. Yamila Martínez. *Phytopathology*. Vol. 99, No. 6 (Supplement), 2009 S189.
10. Molecular variability of begomovirus isolates affecting pepper crops in Cuba. M. Quiñones, Y. Martínez , E. Fiallo , A. Díaz , P. A. Zerbini y F. M. Zerbini. *Phytopathology* Vol. 99, No. 6 (Supplement), 2009 S189.
11. Detection of phytoplasma and potyvirus pathogens in papaya (*Carica papaya*) affected with 'Bunchy Top Symptom' (BTS) in eastern Cuba. Arocha Y, Piñol B, Acosta K, Almeida R, Devonshire J, Van de Meene A, Boa E, Lucas J. *Journal Crop Protection* (2009), [Volume: 28, Issue: 8](#), Pages 640-64.
12. First Report of 'Candidatus Phytoplasma asteris' (Group 16Srl) Infecting Fruits and Vegetables in Islamabad, Pakistan. Fahmeed F, Arocha Y, ACOSTA K, BOA E. and LUCAS J. *Journal of Phytopathology* (2009). Volume 157 Issue 10, Pages 639-641.

REVISTAS EN BDI SELECCIONADAS

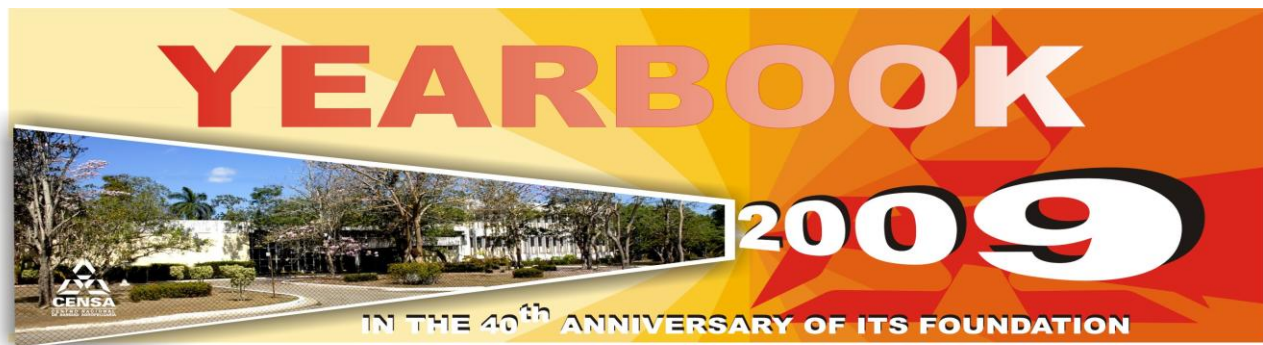
1. Muestreo secuencial para la toma de deisiones de control de Trips palmi en papa en Cuba. Alcides Cabrera, Moraima Surís. *Rev, Manejo Integrado de Plagas*, 4, 79, 2009.
2. Aspectos generales de la interacción tomate (*Solanum lycopersicon* L.) – *Melodogyne incognita*. Yaylen Arias, Ivonne González, Mayra Rodríguez, Carolina Rosales, Zoraida Suárez y Belkis Peteira. *Rev. Prot. Vegetal* 24 (1):1-14, 2009.



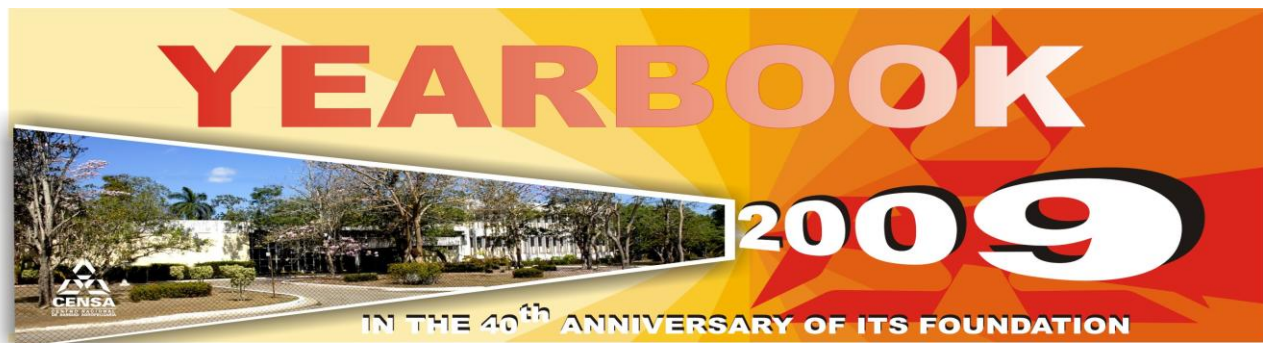
3. *Mecanismo de acción de Trichoderma frente a hongos fitopatógenos.* Danay Infante, Benedicto Martínez, Noyma Gonzalez y Yusimí Reyes. **Rev. Prot. Vegetal 24 (1):15-21, 2009.**
4. *Puccinia kuehnii (Krüger) Butler Y Puccinia melanocephala H. Sydow y P. Sydow. en el cultivo de la Caña de Azúcar.* Danay Infante, B. Martínez, E. González y Noyma González. **Rev. Prot. Vegetal 24 (1):22-25, 2009.**
5. *Estudio químico y microbiológico del aceite esencial de Piper auritum Kunth (caisimón de anís).* Yaíma Sánchez, Oriela Pino, Teresa M. Correa, Eber Naranjo y Aleika Iglesia. **Rev. Prot. Vegetal 24 (1): 26-31, 2009.**
6. *Estudios de factores que influyen en la epifitología del complejo mosca blanca-geminivirus en la región oriental de Cuba.* Yamila Martínez, Maria de los A. Martínez, Madelaine Quiñones, Ileana Miranda, J. Holt y Tim Chancellor. **Rev. Prot. Vegetal 24 (1): 37-39, 2009.**
7. *Estudio químico y microbiológico del aceite esencial de Piper auricum Kunth,(Caisimóm de anis).* Yaíma Sánchez, Oriela Pino, Teresa M. Correa, Eber Naranjo y Aleika Iglesias. **Rev. Prot. Vegetal 24 (1): 39-41,2009.**
8. *Ceratohripoides claratris Shumsher (Thysanoptera: Thripidae).* Nueva especie para Cuba. Moraima Suris y A. Rodríguez-Romero. **Rev. Prot. Vegetal 24 (1): 42-47, 2009.**
9. *Comportamiento de genotipos de tomate (Solanum lycopersicum L.) frente a Melodogyne incognita (Kofoid y White) Chitwood.* L. Navarro-Bartelemy, Lucila Gómez, R. Enrique, Farah M. González y Mayra Rodríguez. **Rev. Prot. Vegetal 24 (1): 48-53, 2009.**



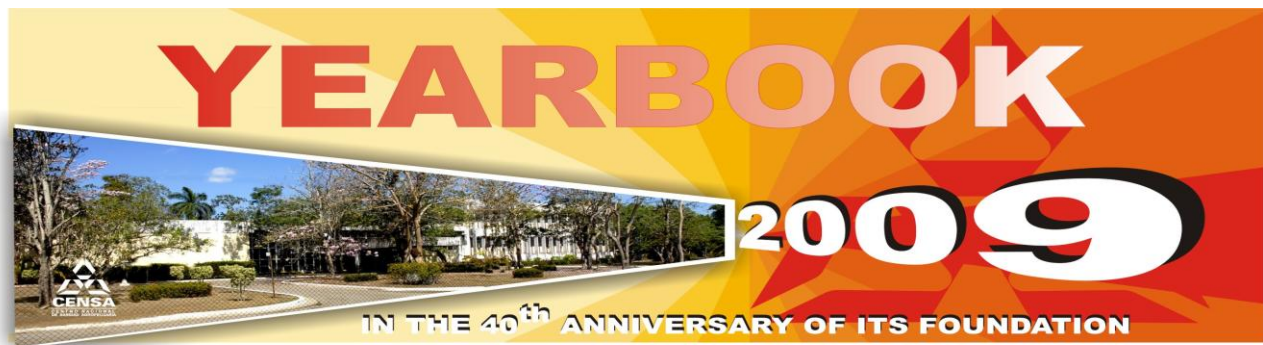
10. Identificación de nuevos begomovirus en Cuba mediante el empleo de la amplificación por círculo rodante. Elvira Fiallo, Yamila Martínez, C. Hernández, Gimena Castillo. **Rev. Prot. Vegetal 24 (2): 81-86, 2009.**
11. Factores que influyen en la situación epidemiológica en el complejo mosca blanca-geminivirus en la región oriental del país. Yamila Martínez, María A Martínez, Madelaine Quiñones, Ileana Miranda. **Rev. Prot. Vegetal RPV 24 (2):47-50, 2009.**
12. Factores limitantes de los rendimientos y calidad de las cosechas en la producción protegida de hortalizas en Cuba. Lucila Gómez, Mayra G. Rodríguez, R. Enríquez, Ileana Miranda y E. Gonzales. **Rev. Prot. Vegetal 24(2):117-125,2009.**
13. Interacción planta-bacterias fitopatógenas: caso de estudio *Ralstonia solanacearum* plantas hospedantes. Ivonne Gonzales, Yailén Arias y Belkis Peteira. **Rev. Prot. Vegetal Vol 24(2):69-80,2009.**
14. Inducción de enzimas extracelulares con huevos de *Meloidogyne incognita* y de *Globodera pallida* Belkis Peteira, Ivania Estévez, S. ATKINS, L. HIDALGO-DÍAZ y B. KERRY. **Rev. Prot. Vegetal Vol 24(2):94-101,2009.**
15. Fauna de chinches harinosas (Hemiptera: Coccoidea) asociada a plantas de interés: V Flores de corte y de jardín. María A. Martínez, Moraima Surís y E. Blanco. **Rev. Prot. Vegetal Vol 24(2):123-125,2009.**
16. Evaluación del efecto de bioestimulantes sobre la brotación de *Muralla paniculata* L. antes y después de la poda. Heiker Baños, Juan A. Alemán, J. Ravelo y María A. Martínez. **Revista Cultivos Tropicales Vol 30, no 3,2009.**
17. Uso de las técnicas moleculares en el uso de nematodos entomopathogenos, y sus bacterias simbiotes. Peteira, Belkis; Rodríguez, Mayra G., Rosales, Carolina.



- y Salazar, E. **Rev. INIA Hoy**. No 3 (Septiembre- diciembre 2009). En www.inia.gov.ve/index.php?option.
18. Investigaciones en nematodos entomopathogenos desarrollados en INIA, Venezuela. Carolina Rosales, Mayra G. Rodríguez, E. Salazar, L. Bautista, Belkis Peteira. **Rev. INIA Hoy** Septiembre –Diciembre, 2009. Pag 1-4 www.inia.gov.ve/index.php.crosales.
19. Perspectiva social de la Nematología Agrícola en Venezuela. Rosales, L.C., Velázquez, L., Rodríguez, Mayra G., Suárez. **Rev. INIA Hoy**. No 3 (Septiembre- diciembre 2009). En www.inia.gov.ve/index.php?option.
20. Identificación de los genes Ty2 y Ty3 de resistencia a begomovirus y su grado de homocigosis en nuevas accesiones de tomate. Dueñas, Yamila Martínez, Belkis Peteira y Yailén Arias. **Revista Cultivos Tropicales**, 30(1): 61-64. 2009.
21. Comportamiento de genotipos de tomate (*Solanum lycopersicum* L.) frente a *Meloidogyne incognita*. L. Navarro-Bartelmy, Lucila Gómez, R. Enrique, Farah M. González y Mayra Rodríguez. **Rev. Fitosanidad** 12 (4), p. 283. 2009.
22. La agroecología en el manejo de plagas: ¿Filosofía, ciencia o herramienta?. Moraima Surís, Esteban González, Mayra Rodríguez, María de los Ángeles Martínez, Leopoldo Hidalgo, Lucila Gómez, Benedicto Martínez, Miguel A. Hernández e Ileana Miranda. **Fitosanidad vol. 12, no. 4, p. 247. 2009.**
23. Avances en la implementación de tecnologías agroecológicas en unidades productivas agrícolas de San José de las Lajas. Esteban González, M. G. Rodríguez, M.I A. Hernández, L. Hidalgo, M. Surís, J. Alemán, B. Martínez, M. A. Martínez, Y. Martínez, M. Quiñónez, R. Montano, J. Orijuela, F. Alfaro, R. Muñoz, R. Enrique, L. González, M. Bertolí, A. Iglesias, R. C. Díaz, J. Enrique, E. González e I. Miranda **Fitosanidad vol. 12, no. 4, p. 249. 2009.**



24. *Especies de Meloidogyne asociadas a la producción protegida de hortalizas y potencialidades prácticas agronómicas para su manejo.* Lucila Gómez, R. Enrique, L. Díaz-Viruliche, R. Cuadra, A. Casanova, F. M. González, L. Hidalgo, M. A. Hernández, O. Gómez, B. de la Noval, E. González, M. G. Rodríguez **Fitosanidad vol. 12, no. 4, p 250-251. 2009.**
25. *Indicadores poblacionales de áfidos y parasitoides asociados presentes en agroecosistemas hortícolas.* María A. Martínez, Juan Alemán, Margarita Ceballos, Moraima Surís, Ileana Miranda, Heyker Lellanis y Adayakni Sánchez. **Fitosanidad vol. 12, no. 4, p 253-254. 2009.**
26. *Desarrollo y uso racional de nemátodos entomopatógenos en el manejo de plagas.* Mayra G. Rodríguez, R. Enrique, E. González, Lucila Gómez, M. Bertolí, R. Montano, M. A. Hernández, Oriela Pino, L. González, Margarita Vidal, R. Rodríguez y O. Reyes. **Fitosanidad vol. 12, no. 4, p 254-255. 2009.**
27. *Especies de Trips asociadas a plantas ornamentales y frutales de interés en las Provincias Habaneras.* Moraima Surís y C. González. **Fitosanidad vol. 12, no. 4, p 258. 2009.**
28. *Asociación de áfidos y parasitoides en cultivos hortícolas en sistemas urbanos y periurbanos.* Margarita Ceballos Vázquez y María de los Ángeles Martínez Rivero. **Fitosanidad vol. 12, no. 4, p 263-264. 2009.**
29. *Comportamiento de genotipos de la familia Solanaceae frente a Meloidogyne incognita (Kofoid y White) Chitwood.* Mayra G. Rodríguez, Lucila Gómez, Farah M. González, Yudines Carrillo, Maite Piñón, Olimpia Gómez, A.S. Casanova, Martha Álvarez, Belkis Peteira. **Rev. Protección Vegetal 2009 24 3 137-145.**
30. *Densidad límite para el control de Polyphagotarsonemus latus (Banks) (Acari: Tarsonemidae) sobre pimiento (Capsicum annum L.) en cultivo protegido.* Ileana



Miranda, A. Montoya, Yaritza Rodríguez, T. Depestre, Mayra Ramos, H. Rodríguez.
Rev. Protección Vegetal 2009 24 3 146-151.

31. Introducción del software Fitovigía 3.0 en el Sistema Nacional de Vigilancia Fitosanitaria O.E. Sánchez, Jennifer Ravelo, J. Alemán, Ileana Miranda, A. Navarro, Alina Pérez, Y. Pérez, Félix Pérez, Frank Pérez, M. García, Yarila Rodríguez, Y. Borrero, Y. Machado. **Rev. Protección Vegetal 2009 24 3 152-155.**

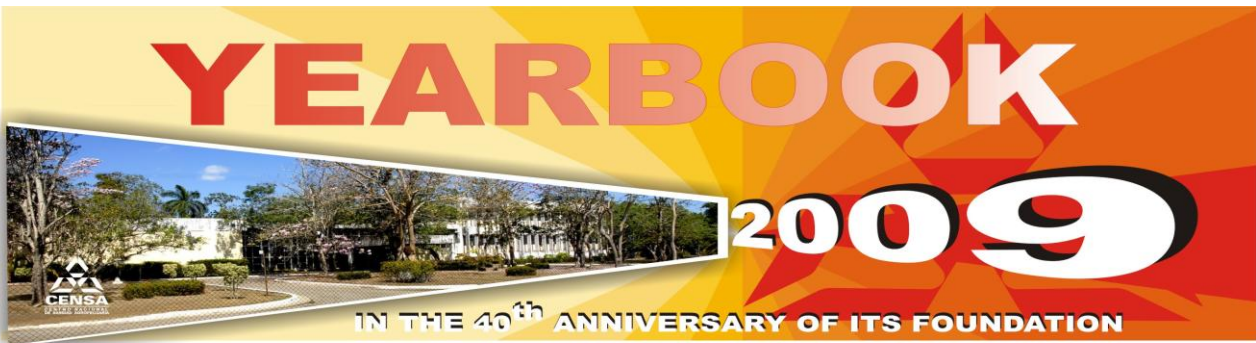
32. VCP1 protease detection in *Pochonia chlamydosporia* var. *catenulata* strain IMI SD 187. B. Peteira-Delgado, L. Hidalgo-Díaz. **Rev. Protección Vegetal 2009 24 3 166-172.**

33. Efectividad de *Lactuca sativa* usada como planta trampa de *Meloidogyne* spp. en la producción protegida de hortalizas. Lucila Gómez, Mayra G. Rodríguez, R. Enrique. **Rev. Protección Vegetal 2009 24 3 173-176.**

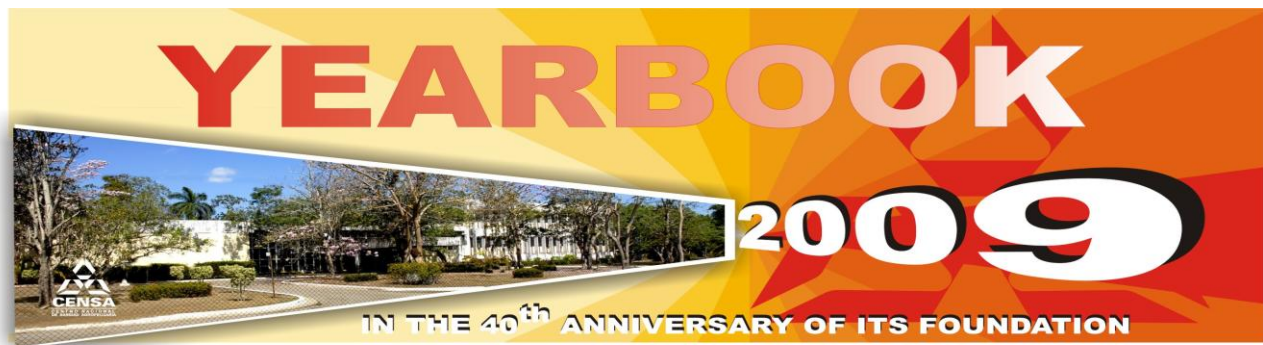
34. Genotipos de la familia Solanaceae frente a *Meloidogyne incognita* (Kofoid y White) Chitwood. Mayra G. Rodríguez, Lucila Gómez, Farah M. González, Yudines Carrillo, Maite Piñón, Olimpia Gómez, A.S. Casanova, Martha Álvarez, Belkis Peteira. **Rev. Protección Vegetal 2009 24 3 137-145.**

OTRAS REVISTAS

1. La Biotecnología aplicada al desarrollo de agentes de control biológico: caso de estudio KlamiC. Belkis Peteira, Ivania Esteves, Nivian Montes De Oca, Ileana Miranda, Leopoldo Hidalgo, Penny Hirsch, Brian Kerry y Simon Atkins. **Seminario Científico sobre Agricultura Tropical AGROTROP, 2009.** Universidad Agraria de La Habana, San José de las Lajas, 8-10 de julio de 2009. ISBN: 978-959-16-1054-6



2. Cría de *diaphorina citri* Kuwayama (Hemiptera: Psyllidae) para la obtención de *Tamarixia radiata* W. (Hymenoptera: Eulophidae). Heyker Baños, Juan Alemán, María de los Á. Martínez, Héctor Rodríguez Morell, Moraima Suris Campo, Ileana Miranda Cabrera, Jennifer Ravelo Rodríguez, Adayakni Sánchez Castro, Reinaldo Chico Morejón, Margarita Ceballos. **Seminario Científico sobre Agricultura Tropical AGROTROP**, 2009. Universidad Agraria de La Habana, San José de las Lajas, 8-10 de julio de 2009. ISBN: 978-959-16-1054-6.
3. Inventario acarológico en especies de plantas seleccionadas del municipio San José de las Lajas. Héctor Rodríguez, Antonina Benegas Avalos y Reynaldo Chico. **Seminario Científico sobre Agricultura Tropical AGROTROP**, 2009. Universidad Agraria de La Habana, San José de las Lajas, 8-10 de julio de 2009. ISBN: 978-959-16-1054-6.
4. Fungus patógenos de ovos de nematoides fitoparásitos: aspectos básicos e aplicação. Myrian Silvina Tigano y Leopoldo Hidalgo-Díaz. Congreso de Micología Brasileño^{5^{to}} Congreso de Micología Brasileño. **Resumos Micologia: Avancos no conhecimento**. Recife-PE, 12-16 de novembro, Ed. Universitaria da UFPE, 2009. Pág. 168-169. ISBN 978-85-7315-444-3
5. Qualitative and quantitative description of predatory mite biodiversity in different agroecosystems in Cuba. Mayra Ramos, Héctor Rodríguez and Lérica Almaguel. **Acarology XI: Proceedings of the International Congress**. México, 2009. ISBN 978-970-32-4451-5
6. Preparación de capital humano en el manejo de plagas: contribución al desarrollo agrícola sostenible en América Latina. Mayra G. Rodríguez, E. González; Madelaine Quiñonez; M. A. Hernández; Moraima Surís; María A. Martínez; H. Rodríguez; J. Alemán; Oriela Pino; F. Alfaro; J. M. Rodríguez; J. J. León; R.



Montano; Yudith Roque, Luisa Díaz- Viruliche; Lucila Gómez; R. Enrique; A. Iglesia; R. Ronda. Congreso Provincial de de Educación Superior. ISBN: 978-959-16-1073-7.



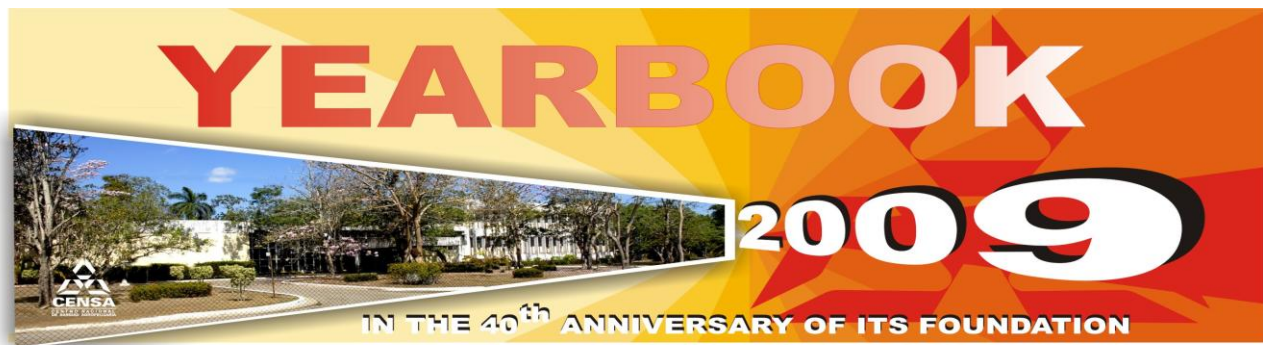
DIRECTION OF ANIMAL HEALTH AND PRODUCTION

Main Impacts:

- **A subunit vaccine against Classical Swine Fever (CSF), more effective and stable than that prevailing in the domestic market, was evaluated.** Clinical trials were carried out in a swine farm closed in 2007 because of the disease. It is now considered the best Swine Farming Unit having controlled CSF. A program proposal to have CSF controlled and eradicated in the province of Pinar del Rio in 2012 by using this vaccine was prepared and submitted to the National Institute of Veterinary Medicine.. This result was considered as Relevant in this year by CITMA.
- **Food production.** A systematic work was displayed to introduce research results into the agricultural practice through agreements with some ministries, the Development Program of the Municipality of San José de las Lajas and the Livestock Direction of the Ministry of Agriculture.

Major Achievements:

- A multimedia of the National Net of Dairy Laboratories (REDULAC), containing practical solutions for the Cuban dairy industry, was multiplied and distributed along the country.
- A CD with 140 documents on standards, procedures and laboratory regulations and good practices was edited and sent to all the laboratories in the country.



Awards:

Award of the Ministry of Public Health:

- Pharmacotoxicological basis sustaining the development of new pharmaceutical products from *Rhizophora mangle* L, in the treatment of gastroduodenal ulcers.

Provincial Award of the Ministry of Science, Technology and Environment in Havana:

- Molecular epidemiology of swine enzootic pneumonia in Cuba.

Award of the Ministry of Agriculture:

- Contribution of CEDESAP and REDesastres to the human capital education for the reduction of health disasters in the animal husbandry sector by integrating the scientific, academic and productive sectors.
- Molecular epidemiology of swine enzootic pneumonia in Cuba.

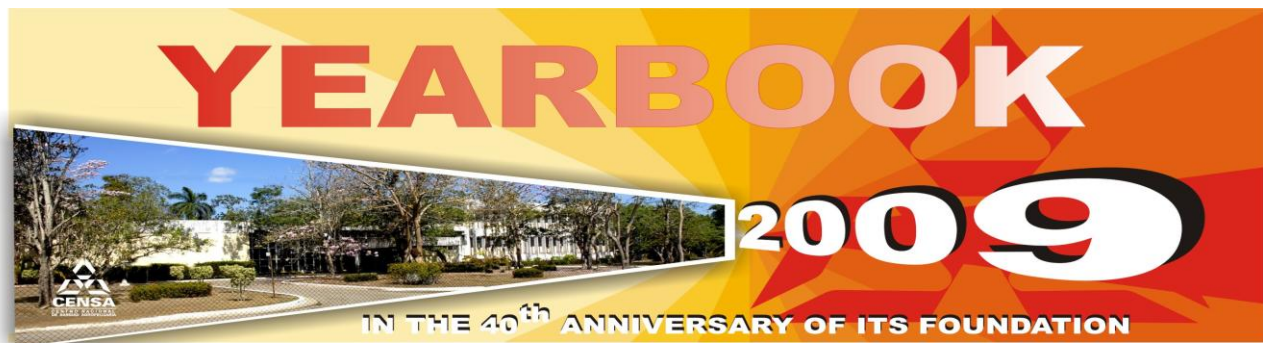
GASPAR JORGE GARCÍA GALLO Award:

- Training Center for the Reduction of Animal and Plant Health Disasters.

Publications:

REVISTAS DE LA WEB OF SCIENCE.

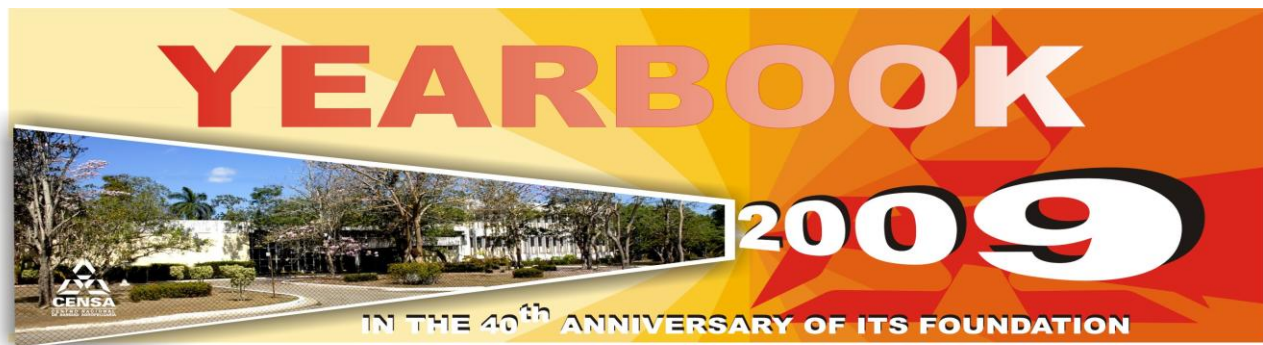
1. *Molecular diagnosis and control strategies for the main genetic diseases of cattle.* Odalys Uffo, Atzel Acosta. ***Biotecnología Aplicada***. vol. 26, no. 3, 2009.



2. *New tools for harmonization and reinforcement of animal disease surveillance.* Victor Gongora, Mark Trotman, Reginald Thomas, Millien Max, Pastor Alfonso Zamora, Maria Teresa Frias_Lepoureau, Simeon Phanord, Jocelyn Quirico, Kirk Douglas, Rupert Pegram, Dominique Martinez, Martial Petitclerc, Emilie Chouin, C'eline Marchal, David Chavernac, David Doyen, Nathalie Vachi'ery, Sophie Molia, Pascal Hendrixx, and Thierry Lefranc. **Annals of New York Academy of Sciences Vol. 1149 Pág 12-15, 2008, USA. Web of Sciences**

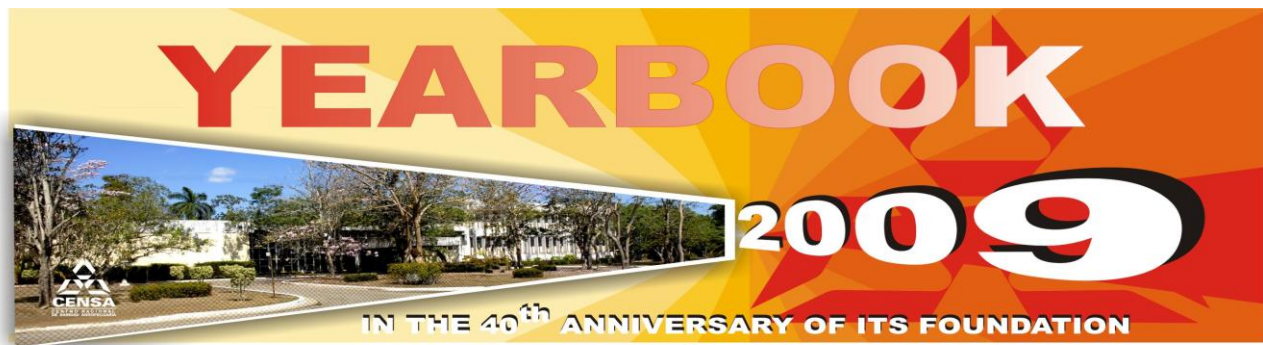
REVISTAS EN BDI SELECCIONADAS

1. *Efecto de Rhizophora mangle L. sobre colitis ulcerativa experimental en ratas.* Sánchez Perera, Luz María; Batista, Niurka Yasmin; Gálvez, Julio; Durán, Reina; Bulnes, Carlos. **Revista Cubana de Plantas Medicinales (volumen 14, No. 1), 2009.**
2. *Antioxidant and Wound Healing Effect of Rhizophora mangle (L.) in an Aseptic Wounds Model in Rats.* Janet Sánchez, Roberto Faure, Gregorio Martínez, Octavio Fernández, Ernesto Vega and Evangelina Marrero. **Revista Cubana de Farmacia (volumen 43, No. 1), 2009.**
3. *Propiedades antioxidantes del extracto acuoso de Rhizophora mangle L. y de su fracción polifenólica mayoritaria evaluadas en sistemas in vitro e in vivo.* Janet Sánchez. **Revista de Salud Animal. Cuba (Volumen 31 No. 1: 68), 2009.**
4. *New approach of Rizophora mangle L. efficacy in experimental peptic ulcers.* Luz María Sánchez Perera. **Revista Cubana de Plantas Medicinales (volumen 14, suplemento especial versión electrónica), 2009..**
5. *Polyphenols compounds and pharmacological mechanisms involved in wound healing. Rizophora mangle case study.* Janet Sánchez, Roberto Faure, Gregorio Martínez, Octavio Fernández, Ernesto Vega and Evangelina Marrero. **Revista**



Cubana de Plantas Medicinales, Cuba (volumen 14, suplemento especial versión electrónica), 2009.

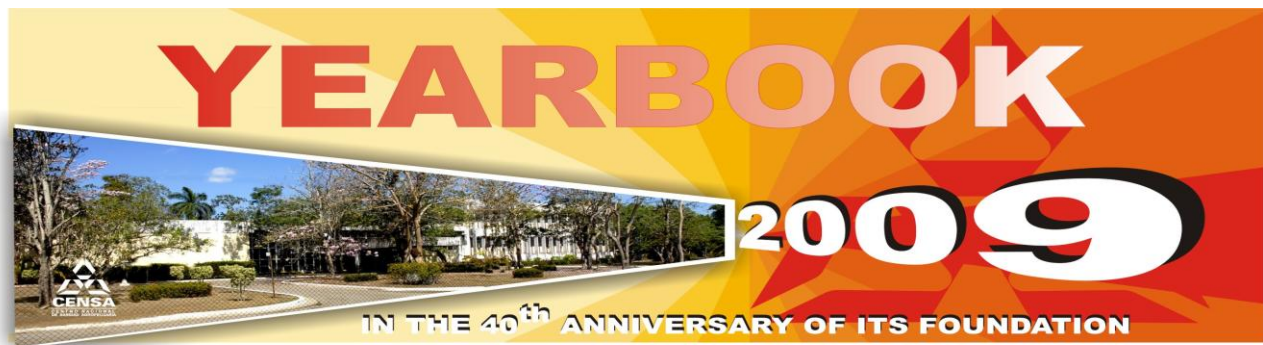
6. Update of experimental biophysical and rheological properties of natural lung surfactants. Odalys Blanco, Cruz A, Morales I, Faure R y Pérez-Gil J. ***Revista Cubana de Plantas Medicinales, Cuba (volumen 14, suplemento especial versión electrónica), 2009..***
7. Natural products: challenges to access de chemical diversity and new therapeutic targets. Evangelina Marrero Faz. ***Revista Cubana de Plantas Medicinales, Cuba (volumen 14, suplemento especial versión electrónica), 2009.***
8. Niveles de aflatoxina M1 en quesos frescos producidos en diferentes zonas de México. G. Urbán, J. Pérez, F. Martínez, J. Salas, G. Díaz, M.L. Ramírez, G. Castro¹, S. Vega, R. Gutiérrez y A. Escobar. ***Revista de Salud Animal Cuba (volumen31, No. 2 p 115), 2009.***
9. Composición láctea y sus interrelaciones: Expresión genética, nutricional, fisiológica y metabólica de la lactancia en las condiciones del trópico. Pastor Ponce Ceballo. ***Revista de Salud Animal (volumen 31, No. 2 p 69), 2009.***
10. Un enfoque crítico de la lechería internacional y cubana. Pastor Ponce Ceballo. ***Revista de Salud Animal (volumen 31, No. 2 p 77), 2009.***
11. Impact on Cuba neonatal mortality of use of a natural surfactant "SURFACEN". Future new indications. Octavio Fernández. ***Revista Cubana de Plantas Medicinales (volumen 14, suplemento especial versión electrónica), 2009.***
12. Oestrus ovis (DIPTERA: OESTRIDAE) EN OVINOS EN CUBA. Vilmaris Matos Moya, Roy Torres, Dasniellis Betancourt Rodríguez, Luis Frómeta, Magdiela Díaz



Matos, Zoe Dubrooks Chivas, Alina Elías Peña, J.G. Rodríguez Diego, P. Alfonso y C. Bulnes. **Revista de Salud Animal, Cuba (volumen 3, No. 3 p 189-191), 2009.**

OTRAS REVISTAS

1. Método para extracción de ADN bovino. Odalys Uffo. **Revista: Producción y Negocio (Venezuela), Año 5, No. 29, 48-50, 2009.**
2. La reacción en cadena de la polimerasa (PCR) como método diagnóstico: Generalidades y su aplicabilidad en ciencias médicas y veterinarias. Odalys Uffo. **Revista: Producción y Negocio (Venezuela), Año 6, No. 30, 30-32, 2009.**
3. Biodiversidad como garantía del futuro. Parte II. Odalys Uffo. **Revista: Producción y Negocio (Venezuela), Año 6, No. 30, 36-40, 2009.**
4. Determinación de la estructura genética de tres poblaciones de ganado bovino autóctono cubano a través de la tipificación de RAPD. Atzel Acosta, Odalys Uffo. **Libro Resúmenes Congreso Internacional de Ciencias Agropecuarias. Agrociencias 2009. Universidad Agraria de La Habana ISBN 978-959-16-1054-6, 2009.**
5. Protección clínica frente al desafío contra la cepa virulenta del virus de Peste Porcina Clásica (PPC) en crías con anticuerpos maternos (E2). Ernesto Vega **Libro Resúmenes Congreso Internacional de Ciencias Agropecuarias. Agrociencias 2009. Universidad Agraria de La Habana ISBN 978-959-16-1054-6.**
6. Enfermedades virales emergentes en la interfase hombre-animal. Pastor Alfonso. **Libro Resúmenes Congreso Internacional de Ciencias Agropecuarias. Agrociencias 2009. Universidad Agraria de La Habana. ISBN 978-959-16-1054-6.**
7. Efecto del genotipo materno Yorkland y Camboroug en la presentación de procesos neumónicos en sus descendencias. Maikel Díaz Gutierrez y Yunier Hernández Cruz.

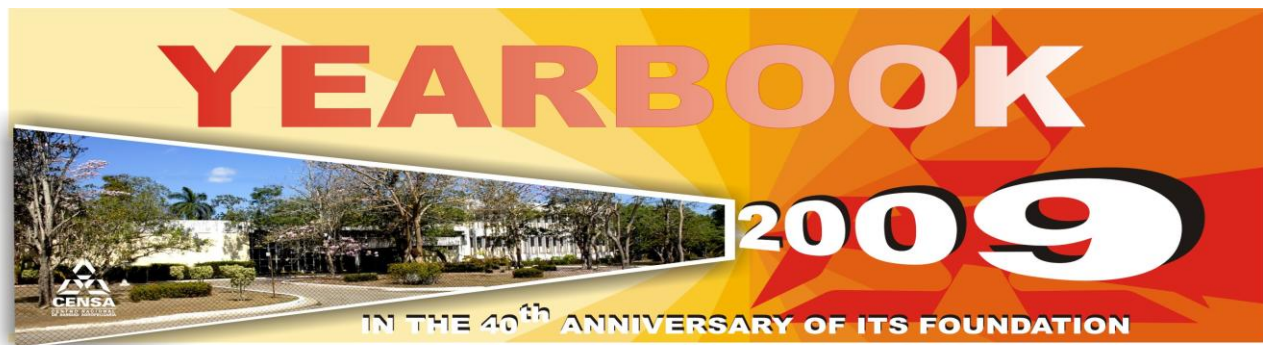


Libro Resúmenes Congreso Internacional de Ciencias Agropecuarias. Agrociencias 2009. Universidad Agraria de La Habana Fructuoso Rodríguez Pérez. ISBN 978-959-16-1054-6.

8. *REDesastres. Una contribución a la gestión de desastres en el sector Agropecuario. Maria Irian Percedo. Libro Resúmenes Congreso Internacional de Ciencias Agropecuarias. Agrociencias 2009. Universidad Agraria de La Habana ISBN 978-959-16-1054-6.*
9. *CEDESAP-REDesastres: Integración universitaria al entorno científico-productivo en la reducción de riesgo de desastres. Proyección internacional del trabajo en red. Maria Irian Percedo. Libro Resúmenes Universidad 2010 ISBN: 978-956-16-1054-6.*

LIBRO

Manual Practico Ilustrado Para Productores Leheros. Brocal. Pastor Poce Ceballos. Editorial MINAG (94 pgs.), 2009. Registro CENDA.



DIRECTION OF BIOPHARMACEUTICAL PRODUCTION

Main Impacts:



- **SURFACEN:** the entire national demand for treating the respiratory distress syndrome in the newborn (ARDS) was covered.). The pharmaco-surveillance study carried out in several neonatal intensive care units of the country finished, and the therapeutic benefits of this product were ratified. The effect and safety of SURFACEN for the treatment of the respiratory distress in adults was also evaluated in adult intensive care units (ICU) of the country.. SURFACEN applications was approved by the State Center for Drug Control, and considered by CITMA one of the outstanding results of 2009.



- **STABILAK.** Over 26 300 cases were produced and sold, which covered 65.88 million liters of milk. By an agreement of the 32nd General Assembly of the Codex Alimentarius, the restriction for using the Lactoperoxidase System (LPS) in the international dairy market was lifted. The new Cuban Standard for LPS use was approved, and work is being done jointly with livestock enterprises to elaborate the regulations for its use. The facilities for Stabilak production were remodeled and put into operation with a double capacity and the compliance of the quality standards.



Major Achievements:

- **Production of membranes for burns based on hydrogels using ionizing radiation.**

Publications

1. *Obtención de extractos a partir de plantas medicinales. Tania Pérez Bueno. <http://www.monografias.com>, 2009.*
2. *Optimización de un medio de cultivo para el crecimiento de Gardnerella vaginalis. Lilian Sánchez Miranda. Revista Cubana de Investigaciones Biomédicas, vol 28 n2, 2009.*
3. *Efecto del residual de Rhizophora mangle L. para el control de fitonematodos. Yanet Rodríguez Perdomo. Rev. Prot. Vegetal. 24 (1), 2009.*



Final evaluation of the work done in 2009.

The balance of the work done in this year reflects a continuation in the meritorious path of contributions and highly significant results in research, diagnostics and production within the field of animal and human health, and plant health as well. These results are specifically related to:

- + Introduction and development of advanced technologies for the diagnosis of serious diseases in agriculture. Introduction of results of impact on food production through the consolidation of important domestic and foreign partnerships..
- + Significant activity of internationalization: international projects and market research.
- + Increase of the organization relevance and visibility through Web of Science Publications and Scielo, Events, Awards and National Distinctions.
- + Implementation of a comprehensive staff education and training.



NATIONAL CENTER FOR ANIMAL AND PLANT HEALTH