



Center for Science Diplomacy



Academia de Ciencias de Cuba

WORKSHOP USA-CUBA SCIENTIFIC COOPERATION

Connection between environment, climate change,
and public health; challenges and opportunities

Climate Change and its Impact on Food Security

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Center of Animal and Plant Health (CENSA)

Climate, diseases and pest, health, production AGRICULTURE

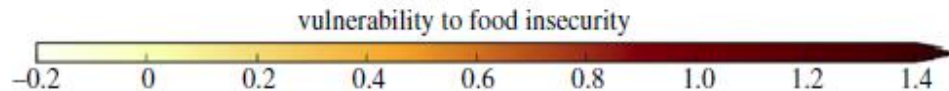
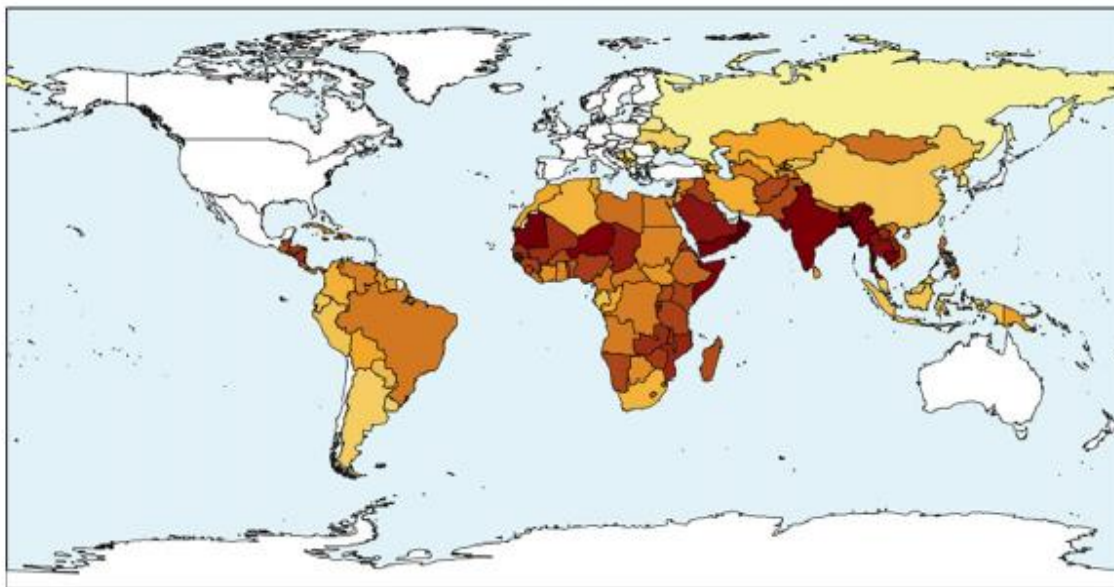
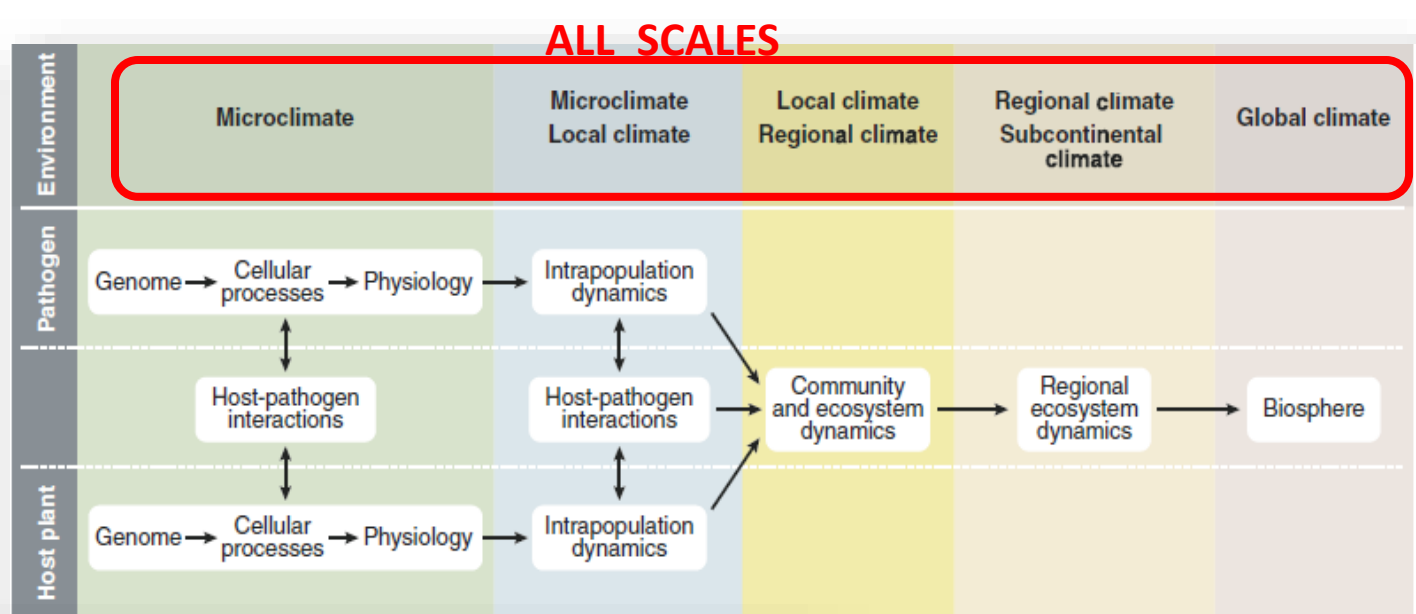


Figure 18. Hunger and Climate Vulnerability Index at 1.5°C global warming (ensemble mean).

Changes in climate extremes, fresh water availability and vulnerability to food insecurity projected at 1.5°C and 2°C global warming with a higher-resolution global climate model. *Phil. Trans. R. Soc. A.* 2018, **376**: 20160452. <http://dx.doi.org/10.1098/rsta.2016.0452>





Thrips-tospovirus



TLCYV

Tomato chlorosis spot virus
Beans, tomato -*T. palmi*, *F. insularis*,
F. tritici, *F. schultzei* y *Frankliniella c*
ephalica,
Potato-*T. palmi*
Onion:*T. palmi* y *T. tabaci*.



Map 1. Avian influenza outbreaks and main migratory routes of wild birds. Region of the Americas, as of EW 48 of 2022.



Epidemiological Update
Outbreaks of avian influenza and public health implications in the Region of the Americas

3 December 2022

Canada, Colombia, Ecuador, Mexico, Peru, the United States of America, and Venezuela have detected outbreaks of HPAI H5 viruses in domestic birds, farm poultry, and wild birds (Map 1)



World Organization for Animal Health (WOAH)

- At global level, there have been multiple waves of intercontinental transmission .
- Over 4.6 million birds died or were culled during the 4 weeks period (Oct 12- Nov 10-/2022). (*)

African Swine Fever (ASF)



World Organization for Animal Health (WOAH)
AMÉRICAS (Dominican Rep. and Haiti) (*)

Outbreaks		Cases		Losses*
Domestic pigs	Wild boar	Domestic pigs	Wild boar	Domestic pigs
278	0	9,977	0	18,973

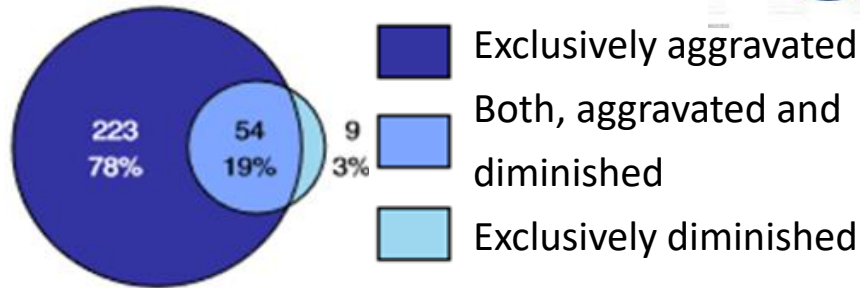
(*) Losses (deaths + animals killed and disposed of): this figure refers to losses in the establishments affected by the outbreaks and it does not include the animals culled in areas around the outbreak for controlling the disease

Multiple and complex drive forces are behind the increasing interaction between the human, animal, plant and ecosystem health

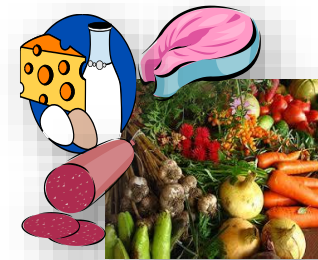
Global public health emergencies are becoming increasingly frequent and complex



HUMAN DISEASES



NATURE CLIMATE CHANGE | VOL 12 | SEPTEMBER 2022 | 869-875



ANIMAL AND PLANT HEALTH

Food safety and security are also crucial aspects of **One Health** and is a pillar of the UN-SDG

Also, the diseases and pest in animals and plants can to develop and aggravate

✓ TO ENSURE THE NECESSARY COMBINATION OF COMPETENCIES, KNOWLEDGE AND SKILLS, IS ESSENTIAL FOR RISK PREVENTION, EARLY WARNING AND RAPID RESPONSE

✓ June 2021: *One Health approach in national sanitary strategy for sustainable development.*



OH Strategy

Priority areas in One Health Cuban Strategy

- ✓ *Diagnosis and surveillance*
- ✓ *Antimicrobial Resistance (AMR)*
- ✓ *Zoonoses*
- ✓ *Food safety and security*



African and Classical Swine Fever



Avian Influenza



Race 4 *Fusarium*

- Diagnosis, surveillance and management of diseases and pest risk for regional agriculture. AI, Nematology

Auburn University, University of Florida, APHIS.

- Training exchanges through inter-institution agreements in the agricultural sector at the **University of Connecticut.**

- Provision of *E-Learning* Modules on Emergency and Disaster Management. WOAHC Collaborating Centre Consortium. **CENSA and University of Texas.**

Plants provide over 80% of the food consumed by humans and are the primary source of nutrition for livestock

Plant diseases and pests often threaten the availability and safety of plants for human and animal consumption



- ✓ Plan of action for the surveillance of races Foc 4 in bananas and plantains: Cuba works with FAO and OIRSA, regional organizations on this issue.
- ✓ Surveillance of insect vectors of diseases with an impact on crop production that contribute to food sovereignty, for example, thrips and their dispersal in the region, for example *Megaluro trips*, psyllids such as *Bactericera cockerelli*.
- ✓ Different invasive species of white fly transmitting a large number of viral genera.



Pest management is a core practice in any agricultural production system
Prevention, Avoidance, Monitoring and Suppression (PAMS)

- ✓ Exchange experiences in management practices by agroecological and conservation strategies for pests of common interest. Examples: Biochar, Essential oils (Auburn University), etc.

- ✓ Promotion of the exchange of germoplasm to mitigate the impact of adverse events such as high temperatures, droughts and also plagues and collaboration based on the results of Cuba in the improvement programs of crops such as rice, beans, potatoes, tomatoes, peppers, cassava, yams, bananas and plantains, among others.
- ✓ Contribution to genetic improving of tomato for the *Tomato yellow leaf curl virus TYLCV-IL(CU)*

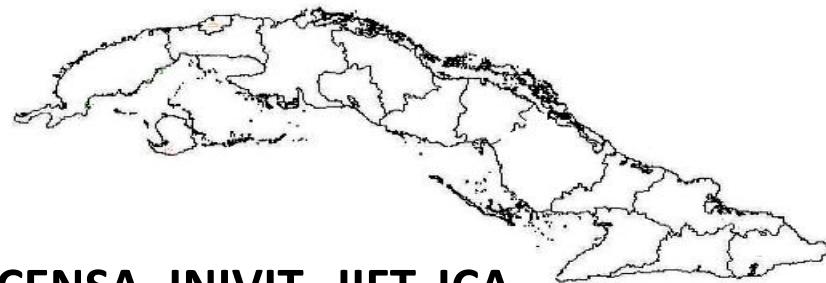


Participants: Some institutes dedicated to developing and breeding varieties that are currently used in production



PROGRAMA SECTORIAL
DE SANIDAD ANIMAL
Y VEGETAL

One Health



INCA, CENSA, INIVIT, IIFT, ICA



SHORT REPORT

Open Access

USA300 Methicillin-resistant *Staphylococcus aureus* in Cuba

Joost Hopman^{1*}, Gilda Toraño Peraza², Fidel Espinosa³, Corné H Klaassen⁴, Dayneris Menéndez Velázquez², Jacques F Meis⁴ and Andreas Voss^{1,4*}

CENSA



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Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

International Journal of Antimicrobial Agents

journal homepage: www.elsevier.com/locate/ijantimicag

Letter to the Editor

MRSA USA300, USA300-LV and ST5-IV in pigs, Cuba

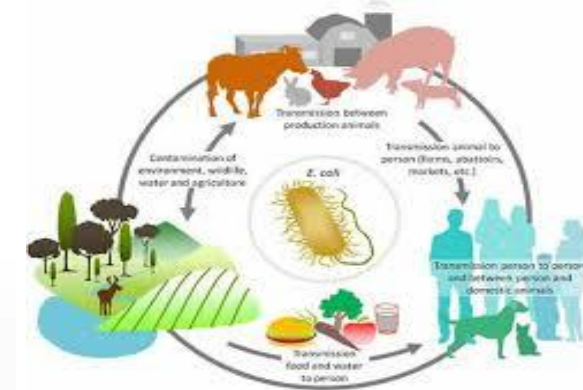
Staphylococcus protein A (*spa*) typing, *SCCmec* typ and *mec*-associated direct repeat unit (*dru*) typi

Antimicrobial Resistance (AMR)

MICROBIAL DRUG RESISTANCE
 Volume 27, Number 7, 2021
 © Mary Ann Liebert, Inc.
 DOI: 10.1089/mdr.2020.0174



Characterization of Third-Generation Cephalosporin-Resistant *Escherichia coli* Isolated from Pigs in Cuba Using Next-Generation Sequencing



CENSA



Article

High Prevalence of CTX-M Type Extended-Spectrum Beta-Lactamase Genes and Detection of NDM-1 Carbapenemase Gene in Extraintestinal Pathogenic *Escherichia coli* in Cuba



✓ <https://doi.org/10.3390/antibiotics10020107>



Article

Genetic Features of Extended-Spectrum β -Lactamase-Producing *Escherichia coli* from Poultry in Mayabeque Province, Cuba

AUBURN UNIVERSITY	<ul style="list-style-type: none"> ▪ Signed a Collaboration Agreement between Auburn University-CENSA-UNAH (May 2015). Main topic: Agriculture. ▪ 2 research Grants were carried out with Auburn University (AAES Cuba Grants Program). Topics: Avian influenza and Essential oils. ▪ Presented 2 Grants with Auburn University (AAES Cuba Grants Program). Topics: Nematology and Functional Ice Application (FICE) to reduce food losses due to deterioration during transport and storage of fish, poultry and meat (this last one together with UNAH).
UNIVERSITY OF CONNECTICUT	<ul style="list-style-type: none"> ▪ Signing of MoU between UCONN-CENSA-ICA-INCA-UNAH (January 2017). Development of an exchange workshop with the leaders. Main topic: Agriculture y Veterinary.
MONTANA UNIVERSITY	<ul style="list-style-type: none"> ▪ A Memorandum of Understanding in progress, from University 2016. Training professionals as well as research in agroecology, weeds, Integrated Plant Management.
UNIVERSITY OF FLORIDA	<ul style="list-style-type: none"> ▪ A Memorandum of Understanding in progress. Training professionals and research in veterinary epidemiology, tick-borne diseases, <i>Anaplasma marginale</i>, <i>Mycoplasma</i>, reproduction in dairy cattle, nematology, milk and dairy products, among others.

<p>PLUM ISLAND ANIMAL DISEASE CENTER</p>	<ul style="list-style-type: none"> ▪ One of our researchers was trained in the diagnostic of exotic diseases. Possibilities to train virologists in this center.
<p>UNIVERSITY OF MINNESOTA</p>	<ul style="list-style-type: none"> ▪ Interesting in Epidemiology and Veterinary Economy, One Health, Food Security, AMR. Dr. Andrés M. Pérez.
<p>Most important events or seminars in which both participated or will participate</p>	<ul style="list-style-type: none"> ▪ International Seminar on Animal and Plant Health (SISA), in Cuba 2011 and 2015. ▪ 52nd Annual Meeting of the Nematology Society (USA, July 2013) ▪ 7thWorld Meeting and 37th Annual Meeting of SETAC (Society of Environmental Toxicology and Chemistry) in Orlando, Florida (USA, 2016). ▪ Organization of Nematologists of the American Tropic (ONTA). Event in Puerto Rico on July 2017. ▪ International Seminar on Animal and Plant Health (SISA), in Cuba 2019. Meeting ONTA. ▪ International Course-Workshop One Health, October 2017, in Cuba. (<i>Univ. of Florida, One Health Institute-Colorado State University, Univ. of Connecticut, One Health Center of Excellent-Univ. of Florida, Univ. of Nebraska-Lincoln</i>)



Thanks