

les dossiers **d'AGROPOLIS** INTERNATIONAL

Expertise of the scientific community

Special Partnership Issue



Agroecological transformation for sustainable food systems

Insight on France-CGIAR research

Number 26
September 2021

CIRAD is implementing a set of interdisciplinary approaches, drawing on qualitative and quantitative research in Asia (Vietnam, Cambodia) and Africa (Mozambique, South Africa, Senegal):

- **participatory approaches** aimed at identifying potential changes in livestock farming practices to enhance animal disease prevention and reduce the use of antimicrobials, while using them rationally and curbing the negative health and socioeconomic impacts on the livelihoods of livestock farmers, particularly in the most vulnerable regions
- **research on therapeutic and preventive alternatives**
- **design and assessment of integrated surveillance systems (One Health)** to detect the emergence of resistance and evaluate

the effectiveness of implemented measures

- **research on resistance circulation between human, animal and environmental compartments**
- **research on antimicrobial supply chains and on the regulatory and institutional frameworks for their use.**

In Vietnam, for example, a stakeholder analysis and companion modeling generated a conceptual and methodological framework for implementing the One Health concept in antimicrobial resistance surveillance. Farmers and other key stakeholders are involved in research and innovation processes to support the transition to safer antimicrobial use.

Contacts

Christian Ducrot (ASTRE, INRAE, France), christian.ducrot@inrae.fr

Samira Sarter (ISEM, CIRAD, France), samira.sarter@cirad.fr

François Roger (DGD-RS, CIRAD, Vietnam), francois.roger@cirad.fr

Other authors

Marion Bordier, Flavie Goutard, Sophie Molia, Alexis Delabougli, Marisa Peyre, Etienne Loire and Éric Cardinale (ASTRE, France)

Muriel Fugué (MOISA, France)

Adrien Rieux (PVBMT, France)

For further information

Roger F. Ducrot C., 2017. Antimicrobials in agriculture: reducing their use while limiting health and socioeconomic risks in the countries of the South. *Perspective*, 39: 1-4. <https://doi.org/10.19182/agritrop/00014>

Controlling hematophagous flies while curbing insecticide dissemination

Development of attractive screens and traps

Hematophagous flies (tabanids, *Stomoxys* spp., tsetse flies) are a major scourge for humans and animals because of their bites and the transmission of parasitic (trypanosomosis, besnoitiosis), bacterial (anaplasmosis, Q fever) and viral diseases (bluetongue, West Nile, African swine fever). These pests are conventionally controlled through massive insecticide treatments (sprays, pour-ons), which are not very effective and result in insecticide uptake in foods and dissemination in the environment. To reduce this pollution, the FlyScreen research program, conducted by CIRAD in collaboration with the University of

Montpellier and Kasetsart University (Bangkok), the National Veterinary School of Toulouse (ENVT) and the AtoZ company, has developed blue and blue-and-white polyethylene screens (Photos A and B), which are specifically attractive to all hematophagous flies (Photo C). **These FlyScreens—pyrethroid-impregnated in an innovative way (patent pending)—enable targeted destruction of pest insects without insecticide dissemination in the environment.** A proof of concept of control efficacy by the Multi Targets Method (about 20 screens per farm) (Photo A) has been reported. FlyScreens will be used in Africa for

controlling tsetse flies and in Asia against other hematophagous flies. This major breakthrough cannot, however, be implemented in Europe and America due to the widespread pyrethroid chemoresistance of flies. The new BioFlyTrap program (modelled on FlyScreen) set up by CIRAD, IRD, INRAE, ENVT and a private partner, aims to develop simple, light, insecticide-free, biodegradable and inexpensive capture traps to be used on farms within a “Multi Targets Method”—a promising project for efficient agro-ecological control, without plastic or insecticide pollution of the environment.



▲ **Photo A.** Multi Targets Method: installation of 20 attractive FlyScreens for controlling hematophagous flies. © M. Desquesnes

▲ **Photo B.** A Polyethylene deltamethrin-impregnated screens used in Thailand. © M. Desquesnes

▲ **Photo C.** A FlyScreen coated with a sticky film, illustrating the high attractiveness to hematophagous flies (here *Stomoxys* spp., in Réunion). © Y. Grimaud

Contacts

Marc Desquesnes (INTERTRYP, CIRAD, France), marc.desquesnes@cirad.fr

Philippe Solano (INTERTRYP, IRD, France), philippe.solano@ird.fr

Philippe Jacquet (IHAP, INRAE, France), philippe.jacquet@envt.fr

For further information

• Onju S., Thaisungnoen K., Masmeatathip R., Duvallet G., Desquesnes M., 2020. Comparison of blue cotton and blue polyester fabrics to attract hematophagous flies in cattle farms in Thailand. *J. Vector Ecol.*, 45(2): 262-268. doi: 10.1111/jvec.12397. <https://pubmed.ncbi.nlm.nih.gov/33207049/>

• Desquesnes M., Bouhsira E., Chalermwong P., Drosne L., Duvallet G., Franc M., Gimonneau G., Grimaud Y., Guillet P., Himeidan Y., Jacquet P., Jittapalpong S., Karanja W., Liénard E., Onju S., Ouma J., Rayaisse J.-B., Masmeatathip R., Salou E., Shah V., Shukri S., Thaisungnoen K., 2019. The multi targets method (MTM): an innovative strategy for the control of biting flies as vectors. *Ecology and Control of Vector-borne Diseases (ECVD)*, 6. www.wageningenacademic.com/doi/epdf/10.3920/978-90-8686-895-7_5

• FlyScreen research program: <https://umr-intertryp.cirad.fr/recherche-et-impacts/projets/flyscreen>