

FOR INFORMATION OR COMMENT
[Use term appropriate to the paper]

SWFSPP Annual Meeting 2024
Agenda Item 5.1
Last updated: 2 September 2024
Prepared by G Brown

Reference Entomologist Update 2024

RECOMMENDATION

1. That the SWFSPP Steering Committee
 - a. **NOTE** the update provided on diagnostic manual and entomology resources
 - b. **NOTE** the update on SWFSPP publications and international updates

BACKGROUND

1. The SWFSPP Steering Committee includes a designated role of a reference entomologist to support the program. Details on the role are as follow:
 - An expert in SWF biology and identification (in the Australian context and with regard to the current SWF risk profile and priority for surveillance).
 - Support SWF entomologists in suspicious fly identification as required (ongoing targeted surveillance).
 - Lead refresher training in SWF identification for government entomologists periodically (triennially).
 - Seek opportunities for involvement of the reference entomologist in training and R&D activities.
 - Support AHA to maintain reference resources for entomologists for SWF identification (integrate with delivery of training).
 - Support AHA to maintain a record of all known reference collections which contain SWF specimens.
 - Support AHA to monitor SWF entomology capacity and capability in Australia.
 - Support SWF entomologists to maintain appropriate numbers of reference specimens.
 - Support AHA management of the program as a member of the SWFSPP Steering Committee.

DISCUSSION

2. **Diagnostic manual and resources available to support entomology**
 - Revised and updated the Diagnostic Manual with the assistance of Leanne Nelson and Natalie Leo (Qld Biosecurity Sciences Laboratory), Madeleine Leydon and Mikhaila Nye (AHA), and Jess Morgan (DAF Animal Science). Section 8.2 was rewritten to clarify any confusion regarding the sensitivity of SWF detection by PCR, along with over 40 other minor changes made to the manual.
 - A LUCID key for the online identification of the Australian flies known or suspected to breed in carrion (Kavazos C. R. J., Meiklejohn K. A., Archer M. S. and Wallman J. F. (2016). *Carrion Flies of Australia*. Centre for Sustainable Ecosystem Solutions,

(University of Wollongong) is currently being reviewed by Nikolas Johnston (University of Wollongong) and colleagues.

3. Publications

New world screw-worm fly

- Failure of doramectin and ivermectin in preventing myiasis caused by natural infestations of *Cochliomyia hominivorax*: a pharmacokinetic-pharmacodynamic study. Sebastián Muchiut, María Victoria Miró, Oscar Anziani, Santiago Nava, Adrián Lifschitz. *This preprint research paper has not been peer reviewed*. Electronic copy available at: <https://ssrn.com/abstract=4912329>
- The results of this study clearly show that doramectin no longer exhibit levels of efficacy against *C. hominivorax* that were reported when the drug was first developed. The observed failure of doramectin 1% in controlling this *C. hominivorax* population, coupled with the fact that substantial concentrations of this drug were detected in plasma and secretions, suggests the presence of resistance of *C. hominivorax* larvae to doramectin. In Argentina, due to the strong dependence on doramectin to prevent myiasis, the development of resistance by this insect could have serious productive health implications. In the case of ivermectin, the results of this study indicate that the use of 3.15% long-acting formulations doesn't enhance the preventive efficacy achieved with conventional 1% preparations.

Old world screw-worm fly

- Mohammed A, Al-Rubaye H, Al-Araby M, Abu-Elwafa S, Abbas I. 2024. Molecular epidemiology of the Old World screwworm fly (OWSF) in Iraq, and the genetic structure of various OWSF populations worldwide. *Veterinary Parasitology: Regional Studies and Reports*. 52:101058.

Abstract

Despite being endemic in Iraq, no reports have been published in the past 10 years to update the molecular epidemiology of the Old World screwworm fly (OWSF), *Chrysomya bezziana*, in this country. In the present study, 130 sheep from 10 Iraqi governorates were found infected with *C. bezziana* larvae, whose identities were PCR-confirmed based on the cytochrome b (Cytb) gene, and 23 isolates from various tested governorates were successfully sequenced. Although most isolates (n = 20) belonged to the common haplotype circulating in Iraq, two new haplotypes were detected. Significant changes in OWSF epidemiology in Iraq were also suggested, since infestations were detected, for the first time, in Nineveh governorate. Isolates of the present study were combined to those previously published from Iraq and worldwide, collected after searching the GenBank, and various genetic and population structure analyses were conducted. These isolates displayed a great statistically significant value when tested for the purifying (negative) selection, suggesting the limited occurrence of genetic variations, which was evidenced by the high sequence conservation (C = 0.937) value detected. A few isolates from Africa were revealed during our search, and clustered in a separate lineage other than that of the Asian isolates. The latter displayed different genetic variation patterns when compared. For example, isolates from geographically separate regions, e.g., the Gulf Arab countries and South-Eastern Asia had marked genetic differences. On the other hand, isolates from regions with close geographic proximity (the Gulf Arab countries and Iran) had limited genetic subdivision. This is not the case when comparing isolates from 10 islands in the Indonesian

Archipelago. Populations from Sumatra and Sumba were isolated and displayed high genetic variations toward the other populations. On the contrary, populations from Sulawesi, Lombok and Sumbawa displayed limited genetic variations. This is particularly important, since it can help detecting the dynamics of establishing the sterile insect technique over various regions as an effective control strategy against the OWSFs.

4. International news and updates

New world screw-worm fly

Costa Rica

Latin American Post, Thursday, July 18 2024

In 1991, Mexico declared itself free of the screwworm, followed by Belize and Guatemala in 1994, El Salvador in 1996, Nicaragua in 1998, and Costa Rica in 2000. However, the disease remained endemic in South America and the Caribbean, with the Darién Gap between Panama and Colombia serving as a containment barrier. The situation changed in July 2023 when Panama reported cases beyond the Darién Province, extending 200 kilometers from the Costa Rican border. Despite intensified preventive and surveillance measures, the disease reached Costa Rica.

In February 2024, Costa Rica declared a national emergency due to the resurgence of the screwworm (*203 cases in cattle, horses, pigs, sheep and dogs; Belize News Feb 12, 2024*). As of June 25, 2024, Costa Rica had registered 2,456 cases, with 77% in cattle and 14% in dogs. Cases have also been reported in goats, sheep, horses, and even humans.

More Resistant and Aggressive Strains. “We have spoken with colleagues from South American countries where *Cochliomyia* infestations are endemic. They have observed that outbreaks in the last three years have been more severe, which we have also seen in Costa Rica. The larvicidal products available are not as effective as before.” Severe consequences have also been observed: animals losing eyes and udders and severely impacting humans. “This is a robust fly strain, resistant to treatments, showing a greater dispersal capacity than in the 1990s.”

Panama has a sterile fly production plant. Since its opening, it has produced insects for release on its border with Colombia. Although the plant did not operate at total capacity for some time, it has increased its production from 20 million to 90 million sterile pupae weekly over the past year, dispersing them in Panama, Costa Rica, and Nicaragua since July 31, 2023. Given the current aggressive variant, Sandí Muñoz details that they are developing a new sterile strain to compete with wild males.

Nicaragua

10 May 2024. Nicaragua reports screwworm outbreak in cattle. The source of the outbreak was the illegal movement of animals.

Nicaragua notified the World Organization for Animal Health (WOAH) of its first confirmed detection of New World screwworm (*Cochliomyia hominivorax*) since June 1996 on April 29, 2024, [according to a recent US Department of Agriculture \(USDA\) Global Agricultural Information Network \(GAIN\) report](#). The WOAH report noted one confirmed detection on March 12, and 68 susceptible animals (or unconfirmed detections). The WOAH report also noted the source of the outbreak as “illegal movement of animals.” On April 3, the Nicaraguan legislature published Executive Decree 030-2024, declaring the screwworm outbreak a national health emergency.

18 July 2024. Nicaragua has confirmed 55 cases, while Honduras, El Salvador, Belize, and Guatemala have yet to report any infestations.

Panama

Prensa Latina News Monday, April 15, 2024

Panama reports more than four thousand cases of screwworm.

Panama City, Apr 11 (Prensa Latina) Panama reported 4,700 cases of screwworm in cattle, an outbreak that is growing if one takes into account that in all of 2023 they registered 10,000 incidents.

At the moment COPEG managed to increase sterile fly production from 20 million in 2022 to 85 million flies per week, however, they expect to reach a ceiling of 100 million by June and then proceed to disperse them in July.

Old world screw-worm fly

Senegal

The Screwworm menace affecting animals and threatening humans in Senegal
Food and Agriculture Organization of the United Nations

[The Screwworm menace affecting animals and threatening humans in Senegal \(fao.org\)](https://www.fao.org/news/story/en/detail/country/SN)

Both the New World Screwworm fly and the Old World Screwworm fly lay eggs in wounds and causes myiasis that can kill or incapacitate the host when not treated. Thousands of animals in Senegal were affected by the Old World Screwworm during the rainy season of July - December 2023. ©FAO

01/08/2024

Senegal's farmers and vets had never seen anything like it before. An infestation tore across the country, inflicting myiasis, a parasitic invasion of a wound by maggots. All mammals, including humans, can fall victim to them. So it is little wonder that the suddenness and severity of the screwworm outbreak set off alarm bells.

"The novelty and the violence of the cases were the trigger" for the country to request a mission by the Food and Agriculture Organization of the United Nations (FAO), says FAO Senior Veterinarian, Frederic Poudevigne, who was part of the Emergency Management Centre (EMC) mission team.

The Screwworm's sudden appearance in Senegal remains a mystery given that there have been no reports of it in the country for over 60 years. Moreover, as mysteriously as it appeared, the wave of Screwworm myiasis decreased in Senegal in January 2024, at the end of the rainy season. But the possibility of a higher number of cases cannot be ruled out when the next rainy season begins.

5. FINANCIAL IMPLICATIONS

NA

6. CONSULTATION/COMMUNICATION

NA

7. NEXT STEPS/ACTIONS

NA

