



SCAR Fellowship Report

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The non-native Diptera *Trichocera* (*Saltrichocera*) *maculipennis* Meigen, 1818 (Diptera: Trichoceridae) on King George Island: status, trajectories and options



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Dates of Activity

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Introduction

The spatial isolation of the Antarctic continent, its extreme weather and the lack of adequate habitat offer some protection against colonization of non-native species. However, human activity, particularly tourism and the activities of national government operators, increasingly contribute to the risk of non-native species transfer and establishment. *Trichocera maculipennis* (Trichoceridae) is a non-native species recently introduced into the maritime Antarctic South Shetland Islands, as well as earlier to the sub-Antarctic Kerguelen Islands in the Indian Ocean sector of the Southern Ocean. Once a non-native species becomes established outside the man-made facilities present in Antarctica, the risk of this species becoming more widely established in the natural environment and potentially invasive is increased. The first step of a coordinated international response to the monitoring and control of species such as *T. maculipennis* is the coordination of monitoring activities between the different scientific stations and operators in the affected area. At present there is no invasive species management plan for King George Island. The current document represents a first step towards the development of such a plan.

Project Objectives

The objectives of this project are to:

1. Develop a draft Management Plan for *Trichocera maculipennis* with which to minimize the risk of unintentional introduction of non-native species and respond effectively in the event of an introduction (the focus of this SCAR Fellowship application). This will then be followed by:
2. Adoption of the Management Plan for *T. maculipennis* by the above-mentioned National Operators forming the Working Group

Methods, Execution and Results

As a first step in the coordinated development and management of appropriate international response among the stations and operators present on King George Island, a survey will be carried out to document and integrate knowledge of the current status of *T. maculipennis* in and around the different stations on King George Island. Based on this survey and working with hosts in the British Antarctic Survey (BAS), a draft Management Plan for the monitoring, control, and/or eradication of *T. maculipennis* will be developed.

As a starting point for the development of the Plan, it will seek to know certain aspects of the species. For that, pitfall traps will be placed in a radius of 1000 m² around the Bases to better document the local distribution of *T. maculipennis*. The facilities of the Bases will be inspected for places of refuge, egg laying and adult emergence. To provide a first assessment of seasonal population cycles, 'sticky' traps will be placed that will remain in the Bases for at least a full annual cycle, with each trap being renewed every month.

Through this project, we aim to provide information on aspects of the biology, distribution and dispersal range of *T. maculipennis* in King George Island. The information obtained will be used to contribute to the development of draft control protocols for *T. maculipennis* to be agreed by the different operators/CEP, and applied in the different stations on King George Island. As

this species is capable of flight and of rapid spread locally, it is necessary to develop adequate measures with the utmost urgency. If the elimination of this species from King George Island cannot be achieved, new control measures will require development to reduce and ideally prevent the further spread of this species. Outcomes of the project should include (1) the establishment of simple monitoring protocols to reports sites of occurrence of the species, along with abundance; (2) preparation of visual material that easily allows the recognition of specimens by non-expert personnel; (3) generation of data on the biology of the species, including periods of maximum adult abundance and egg laying, hatching areas of larvae, and sites with greater abundance of adults.

Project Outcomes

In terms of research, the data available to date suggested that the species has spread beyond the confines of research stations on King George Island. The species is present in the vicinity of all research stations on the Fildes Peninsula, as well as on the Barton Peninsula and in Admiralty Bay. If regular monitoring confirms colonization of *T. maculipennis* in natural ecosystems, with gravid females and viable immature forms found, the probability of any successful eradication attempt may be low and the impact on native species and habitats high. Therefore, it is essential to maintain this regular monitoring as a tool to assess populations of dipterans and other indigenous and non-indigenous invertebrates. This monitoring should be implemented, as a minimum, with a regular inspection of the traps installed in all the stations present on King George Island and also in the stations located on other regional islands. An advantage of setting traps at multiple stations is that it can give an early warning of the import of any other species, as well as an objective record of what is likely to be a reasonably regular import of synanthropic species restricted to station buildings associated with the food supply. It is suggested that the staff of each station be the recipient of the information related to the monitoring, take care of the initial data processing and the preparation of periodic reports and, in case of any dramatic increase in the population levels of the non-native species alert corresponding to operational managers in the Antarctic community. In terms of my personal development, the SCAR scholarship allowed me to work alongside Prof. Peter Covey and Dr. Kevin Hughes who are excellent professionals and with whom I learned a lot. The acquired knowledge allows me to plan to continue working on the importance of invasive species in the Antarctic continent.

Publications, Presentations and Products

No publication of the results yet. From this scholarship it is expected to publish at least two articles. The document prepared will be presented in different scientific meetings.

Capacity Building, Education and Outreach Activities

In Uruguay I have participated in seminars and courses at the Faculty of Sciences, on Antarctica and invasive species. I shared with the students my experience in British Antarctic Survey and the document obtained as a result.

Future Plans and Follow-ups

In the future I plan to continue with the research topic developed in the Fellowship and to be able to do my post-doctorate. I am currently developing a project at the Uruguayan Antarctic Institute (IAU) where I will implement the results obtained with Professor Peter Convey and Dr. Kevin Hughes.

Personal Impact

The realization of this work allowed me to see the damage that non-native species can cause in the Antarctic ecosystem and also to see the importance of environmental monitoring and the value of working together all the different scientific stations of the countries present in the Antarctic continent.

Financial Statement

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