



**Food and Agriculture
Organization of the
United Nations**

Terms of Reference for Consultant

Job Title: Entomologist	
Division/Department: AGE	
Programme/Project Number:	
Location: Seibersdorf, Austria	
Expected Start Date of Assignment: 2017-7-1	Duration: 11 months
Reports to: Name: Mr Marc Vreysen	Title: Laboratory Head, Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture
GENERAL DESCRIPTION OF TASK(S) AND OBJECTIVES TO BE ACHIEVED	
<p>Under the general supervision of the head of the laboratory and in conjunction with the staff of IPCL, the Visiting Expert shall, building on the prior work in IPCL, attempt to develop a practical system for the separation of tsetse fly pupae by gender several days prior to emergence. The Entomologist reports to the Laboratory Head, IPCL and receives guidance from a technical officer (Leader of the Livestock Pests group)</p> <p>The IPCL under the mandate of the Joint FAO/IAEA Division develops nuclear techniques for the control of insect pests. The main focus is on the Sterile Insect Technique (SIT) applied within an integrated area-wide pest management programme. The SIT depends upon the rearing, reproductive sterilization and release of the pest species.</p> <p>Justification</p> <p>Tsetse flies are a very serious pest in sub-saharan Africa, causing the debilitating disease trypanosomosis, which prevents the development of sustainable livestock systems for subsistence farming. The removal of the tsetse fly using an integrated pest management approach is considered the most effective way of managing the disease. The sterile insect technique is a very promising additional control tactic, but a major bottleneck remains the development of an automatic system to separate the males from the females as pupae.</p> <p>Tsetse flies have a very low reproductive rate, so it is important that only male flies are sterilized and released so that the female flies can be kept in the colony. There is no visible character on the puparium of tsetse flies to enable the sexes to be separated, so separation currently relies on hand sorting adults or on the timing of emergence as females emerge before males, with a varying degree of overlap. These processes are labour intensive or inefficient, reducing the efficiency of the rearing process. One recent project has been established on the basis that the sterile males will be supplied by insectaries in other countries. This requires the females to be emerged first for colony maintenance and the remaining male pupae to be chilled to prevent emergence during shipment. This chilling is known to be detrimental to the quality of the males and it is desirable to develop a system that would permit separation of the males several days before emergence so that the pupae can be shipped without the need for chilling.</p> <p>Earlier work at IPCL has shown that male separation can be achieved experimentally by near infrared (NIR) spectroscopy (DOI: 10.1079/BER2005357) and by NIR imaging (DOI: 10.1093/jisesa/iew047) but neither technique has yet resulted in a practical system. This work needs to continue and expanded at the IPCL, but additional staff is needed to proceed with this research.</p>	
KEY PERFORMANCE INDICATORS	
Expected Outputs: <ul style="list-style-type: none"> A practical system to separate male from female pupae available Assess the effect of the system on the flies' fitness in field and laboratory cages All data evaluated and statistically analysed Peer-reviewed publication and reports documenting R&D findings Protocol developed 	Required Completion Date:

