Buffalo Flies Receptive to Wolbachia Infection: An Opportunity for Population Control?†

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Abstract: Buffalo flies, Haematobia (irritans) exigua (BF), are obligate haematophagous ectoparasites of cattle that cause significant economic and welfare impacts in northern Australian cattle. With climate change and the development of resistance to commonly used chemicals, BF are rapidly spreading southwards. Wolbachia is a maternally transmitted bacterial endosymbiont of insects that induces a range of effects on its host, including cytoplasmic incompatibility (male sterility), reduced fitness, and inhibition of pathogen transmission. We are examining the potential for use of Wolbachia in area-wide control of BF. Following a survey of Australian BF populations that showed Wolbachia was not present, we have tested embryonic microinjection, pupal injection and injection of adults as a first step towards the development of a Wolbachia infected BF line. Here we report distribution and growth of Wolbachia in somatic and germline tissue of BF injected with the three Wolbachia strains; wAlbB, wMel and wMelPop. Our results to date suggest that pupal or adult injection may be a more suitable method for transinfecting BF than embryonic microinjection. We also demonstrate Wolbachia induced fitness effects in injected BF including shortened lifespan, decreased pupal emergence, and reduced egg production. Future work will focus on establishing a stably infected BF strain, towards the design of Wolbachia-based control programs for BF.

Keywords: haematobia; buffalo fly; Wolbachia; biocontrol

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