Sustained effects of larval blackfly settlement on further substrate colonisers

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With 8 figures in the text

Abstract: Artificial substrates and histological staining procedures have been used to study interference effects among blackfly larvae. Colonising larvae apply silk to the substratum to attach themselves for filter feeding, locomotion or pupation. We have hypothesised that species might react differently to alterations of the substratum caused by the silk of previously colonisers and have therefore compared Simulium noelleri FRIEDERICHS and Simulium vernum MACQUART, which are characteristic of different habitats. The number of larval colonisers and the number and position of their silk pads on previously colonised and new control substrates were recorded after 24 h of exposure in streams. The results support our hypothesis that blackfly species react to surface properties differently and are thus affected differently by previous colonisers. Whereas S. noelleri seems to prefer previously colonised substrates or, at least, is not negatively affected by silk remnants on the surfaces, S. vernum appears to avoid areas covered by the silk of other larvae. We conclude that interference caused by silk remnants and species-specific differences in tolerance concerning surface properties affect simuliiid density, distribution and colonisation dynamics.

Introduction

An impressive feature of blackfly biology is the enormous colonisation intensity achieved by their larvae. Several species have shown to colonise new substrates within a few hours (PEGEL 1980), sometimes reaching densities of several hundred individuals per 100 cm² within a few days (e.g. KIEL 1996, MATTHAEI et al. 1996). However, blackfly densities often fluctuate markedly, high densities often being quickly followed by sudden decreases within a few days (e.g. KIEL 1996, MATTHAEI et al. 1996, PEGEL 1980). Many factors have been associated with these numerical changes in simuliiid abundance. Current