ABSTRACT

The effect of the exclusion of birds on arthropods within three coffee farms in the Blue Mountains

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Blue Mountain coffee is grown under two distinct management systems: Sun (modern) coffee, represented by Wallenford farm and traditional (shade) coffee, represented by Campbell and Sharp farms respectively.

The current demand for the reduction of the use of synthetic chemicals in coffee cultivation has compelled countries to utilize alternative methods. This study investigated the effects of the exclusion of birds on coffee foliage arthropods and a comparison of arthropod diversity on coffee shrubs among the farms. It also entailed finding a method to sample coffee foliage arthropods adequately.

The carbon dioxide knockdown method was selected as it allowed adequate sampling of arthropods, with minimum damage to the plant. Over 13,029 arthropod specimens, representing 14 orders, 75 families and 208 morpho-species were collected from coffee shrubs. Arthropod abundance distributions at the morpho-species level on the farms followed a log normal distribution. Arthropod diversity varied among the farms and the Shannon, Simpson and Berger-Parker diversity indices all ranked Campbell as the most diverse farm.

The exclusion of birds resulted in a 39% increase in total arthropod numbers ($p< 0.001$). At the order level, the increase was evident in Acarina ($p< 0.001$), Hymenoptera ($p< 0.001$), Homoptera ($p= 0.025$) and Orthoptera ($p= 0.038$). The exclusion of birds had a significant effect ($p< 0.001$) on the pest, Coffee Leaf Miner *Leucoptera coffeella*. In addition, the effect of excluding birds was restricted to arthropods of certain sizes; < 2 mm category arthropod numbers increased by 46% ($P= 0.032$), 1% in 2–5 mm ($P= 0.106$) and 23% in the > 5 mm ($P= 0.031$).

Keywords: Damion L. Whyte; Blue Mountains; Carbon Dioxide Knockdown Method; Exclusion of birds; Foliage Arthropods; Morpho-species; Sun Coffee; Traditional Coffee; Jamaica.