ANALYSIS OF ELECTRICAL PENETRATION GRAPH DATA: WHAT TO DO WITH ARTIFICIALLY TERMINATED EVENTS?

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Observing the durations of hemipteran feeding behaviors via Electrical Penetration Graph (EPG) results in situations where the duration of the last behavior is not ended by the insect under observation, but by the experimenter. These are artificially terminated events. In data analysis, one must choose whether to retain these observations or discard them. This study sought to gain a better understanding of the consequences of this choice. Raw data from two EPG experiments were used, one with cotton-melon aphid (*Aphis gossypii*), and the other with Asian Citrus Psyllid (*Diaphorina citri*), to study the consequences of one's choice under two conditions frequently encountered in analysis of EPG data: 1) data are randomly distributed about some average value, and 2) the special case where each observation of a specific waveform event lasts longer than the previous observation (i.e. monotonically increasing). This situation was predicted in the literature and was observed in the raw data. Simulations in Excel were used to generate three data sets that differed only as follows: 1) no artificially terminated event; 2) last observation artificially terminated; 3) last observation deleted. Analysis found that, in the general case, it is best to delete the artificially terminated event before further analysis. However, artificially terminated events should be retained in many cases if durations are monotonically increasing. Equations and graphs are provided to help decide in which cases one is better off retaining artificially terminated events based on how one's choice biases the estimated mean and standard deviation.