

BEFTA Protocol*Butterfly and dragonfly transect protocol*

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www.oilpalmbiodiversity.com**Background**

BEFTA butterfly and dragonfly transects follow methods originally designed for monitoring temperate butterfly populations (see UK Butterfly Monitoring Scheme: <http://www.ukbms.org/>). These follow simple protocols that can be easily replicated across areas and represent one potential monitoring scheme to inform biodiversity management in plantations.

Methods: Transects

On at least two occasions over the course of 1-2 weeks at the end of the wet and dry season (February-March and September-October) transects are walked around the central 50m square (200m transect) 'Box' and along the road margin of the larger square of each plot (150m transect) 'Road'.

At the start of the transect, the date, time started, weather condition, and temperature (at breast height, using handheld thermometer) is recorded.

Recorders walk at a steady pace and note the species and number of any butterfly or dragonfly seen in an imaginary 5m by 5m box in front of the recorder, together with its activity when first observed (flying, resting, sunning, interacting, nectaring) and what microhabitat or plant it was feeding on (undergrowth, understory, ferns, over water etc). See Figure 1 for an example of the recording sheet.

Plot number			Weather		
Date			Box/road		
Time start			Time finish		
Temperature					
Species	number	Activity	habitat	sample?	notes

Figure 1. Butterfly and dragonfly transect recording sheet

Where a species is not identifiable from field observation, they are caught, killed and stored in a specimen envelope for later identification. The unknown individual is noted on the form as unknown ('unknown dragonfly 1' for example) and this information together with the date, plot number and road or box location is also noted on the specimen envelope.

Where possible, photographs of butterflies and dragonflies are also taken in the field. To aid identification, a number of images are also taken of each specimen when newly returned to the lab. This is particularly important for dragonflies, which can rapidly lose their colour after death

To aid future work, these images and also information on the body length, sex, and wing length (hind-wing for dragonflies) is also recorded as part of the specimen's description. A short description of each new morphospecies is also made. Over time, a species and morphospecies list is therefore developed, against which new specimens can be compared.

Once provisional identification is complete, butterflies are returned to their envelope and stored in the freezer. Dragonflies are soaked overnight in a bath of acetate (to remove the fat and reduce discolouration). After that they are dabbed dry with a tissue and returned to their envelope for storage in the freezer.

As a result of this work, a provisional identification guide of the species present is being produced, with colour images to aid future identification in the field.

Environmental data

To assess the impact of the environment on the number and composition of dragonflies and butterflies found, some basic environmental data were also recorded close to the time of sampling along each transect walk. This included the number of metres of flooded and unflooded ditch for the dry season observations (all flooded during the wet season) and aspects of the vegetation and canopy cover at ten metre intervals along each transect.

At each ten meter point, a meter rule was used to record the free vegetation height (by gently resting an A4 folder on the vegetation and recording the height) and the type of substrate the meter wall was resting on was recorded (bare ground, Empty Fruit Bunch, deadwood, stream, frond). The species of any understory vegetation touching the meter rule was also recorded. At each location the canopy cover was recorded using a spherical densiometer.

Status

Two initial sets of transects have now been carried out. These will be continued twice-yearly throughout the project. Each specimen has already been provisionally assigned to morphospecies and the first draft of a photoguide to the species found has been made. Once identification is confirmed, a reference collection will be established in SMARTRI to facilitate future work.