SUSSEX WILDLIFE TRUST

Timed Butterfly Transect Surveys of the Knepp Estate July 2005 – 2008

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Introduction

Butterflies have been the subject of monitoring through annual surveys in July on the Knepp Estate by the Sussex Wildlife Trust as part of the overall monitoring programme to assess the effects of the naturalistic grazing regime that is being instituted there. The three surveys run to date, in conjunction with fixed point photo monitoring, have detected a total of 23 different species, whereas previous recording by Butterfly Conservation (BC) Sussex branch lepidopterists during 1995-2004 had registered 26 species (mostly the same ones).

Methods

We have consistently used BC's standard methodology for 'Butterfly Site Recording' as the basis for our simple fixed-route timed transect surveys of the main areas of the estate subject to 're-wilding', enabling population densities to be calculated. The rapid walking route, covered in a single day (21 km length?), was divided into 26 discrete parcels (according to vegetation, habitat and management) and the length of time spent in each and the individual numbers seen of each butterfly species were recorded. The walking route taken and transect section locations are given in English Nature Research Report 693 (Map 6), attached also to this report for reference. The weather conditions apparent at the time of survey of each parcel were also recorded, and a summary of maximum temperature, wind speed and direction and amount of sunshine was noted furthermore.

Results

(See each year's individual data tables and summary results for the period in the accompanying Excel file "Knepp butterfly surveys 2005-8" for the entire dataset)

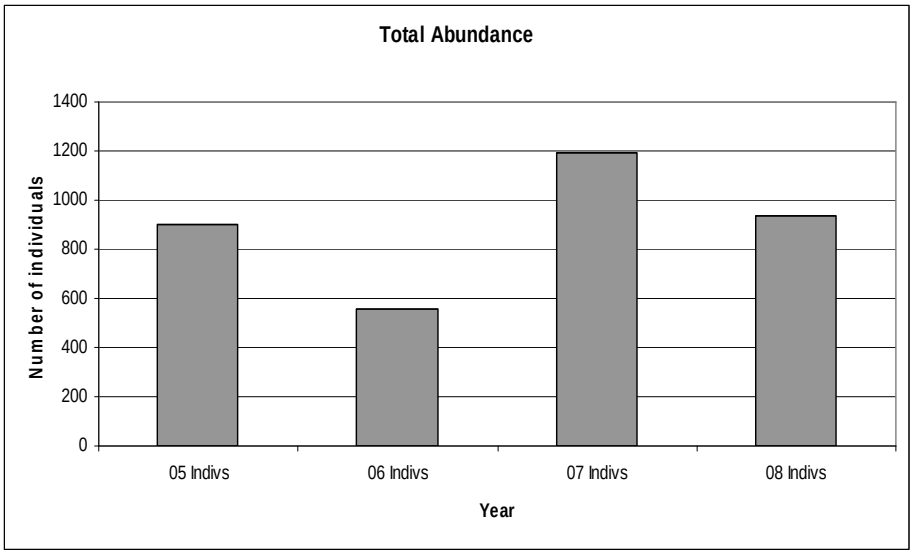
2008 Survey summary

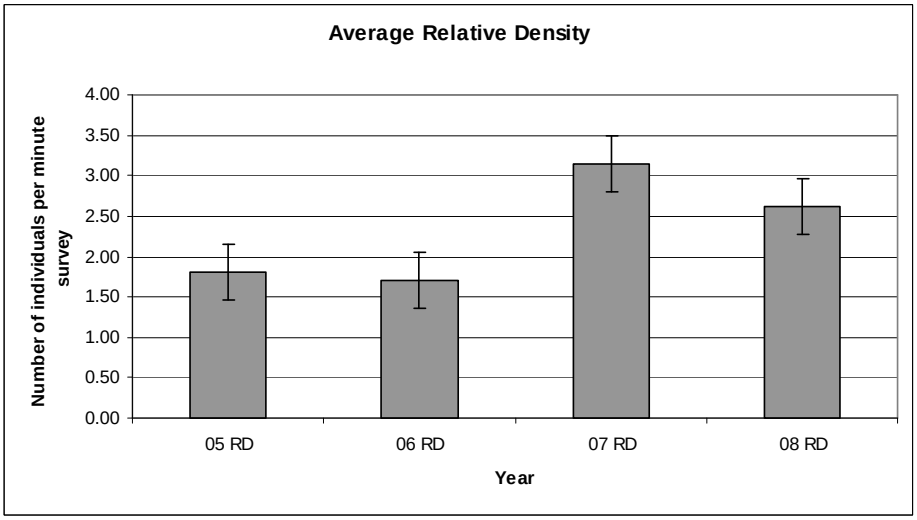
The weather was fairly good on the day of survey, warm and with considerable sun and quite light winds generally. Only 12 species were recorded, however, with an average of just over 4 species per parcel which ranged up to an individual maximum of 8 species in woodland Parcel 8 (Horsham Common). A quite high total number of 937 individual butterflies was recorded over the course of the survey, or 2.61 individuals per minute survey relative density. A high density of butterflies was evident (as previously) in Parcel 7, the long grassland along the stream to the south-west of Horsham Common. The records were dominated as in previous years by Meadow Browns (619 individuals, about two-thirds of the total, at an average density of around 25 per parcel) and then Gatekeepers (138 individuals). Regarding species of interest, Small Skipper numbers seemed healthy (38 individuals in total) and almost as widespread as the previous year (in 9 parcels), and Silver-Washed Fritillaries (19 individuals) were present in nearly all their previously recorded haunts (5 woodlands). No White Admirals were found this year (in woodland Parcel 10) however, nor unusually was a single Common Blue sighted. A single Marbled White butterfly was found, for the first time in this survey series, in the northern grassland area. Lastly, much larger numbers of Peacock butterflies (17 individual across 10 parcels) were evident than previous years, nectaring extensively on the widespread thistle patches this year.

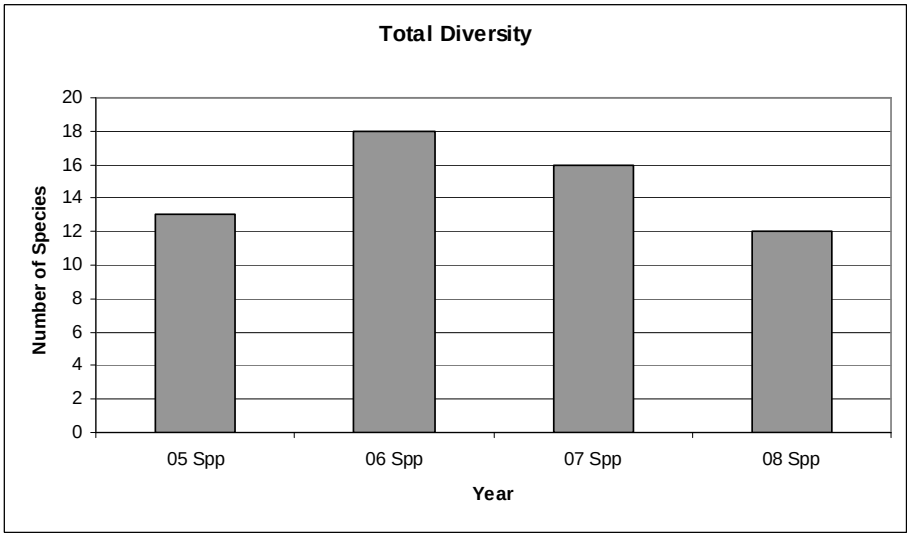
2005-08 Overview

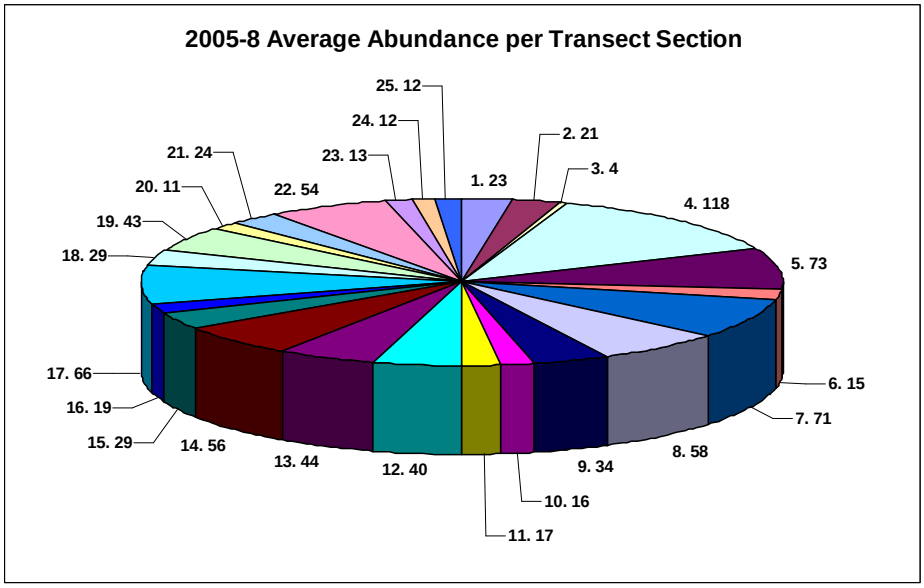
Some simple analyses have been carried out (see Excel spreadsheet for details) to compare the data between transect parcels or sections and between the species recorded between the 4 years of survey work carried out to date. Total figures for each year for three measures covering the whole site are displayed in the bar charts below, although no attempt has been made at statistical analysis of this limited dataset however due to its short duration and especially the fact that any temporal comparisons are likely to be largely explained by the characteristics of the particular day of survey rather than between the years as only a single time sample has been taken each year.

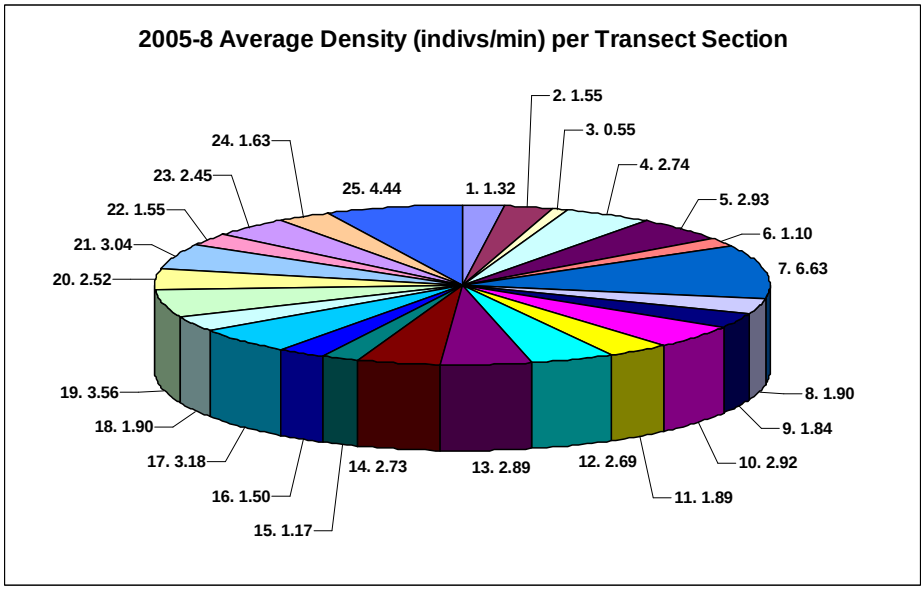
Spatial comparisons between different transect sections averaged over the 4-year series may however reflect a real pattern between different parts of the site for butterflies (see the first set of pie charts below). Species composition has also been averaged for both abundance and transect frequency over the total survey period for the suite of 23 species detected to date through the survey only to summarise the pattern of relative species dominance occurring (see second set of pie charts).

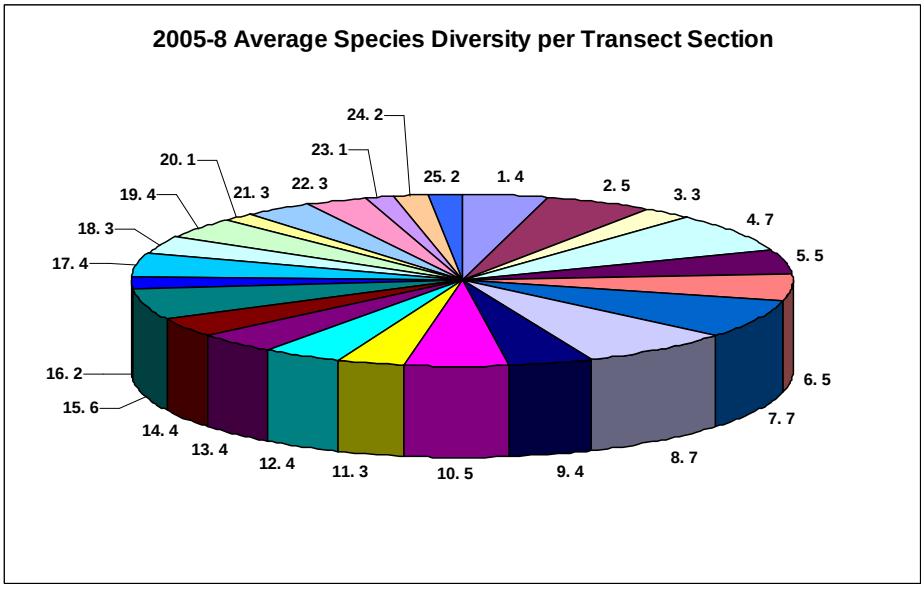




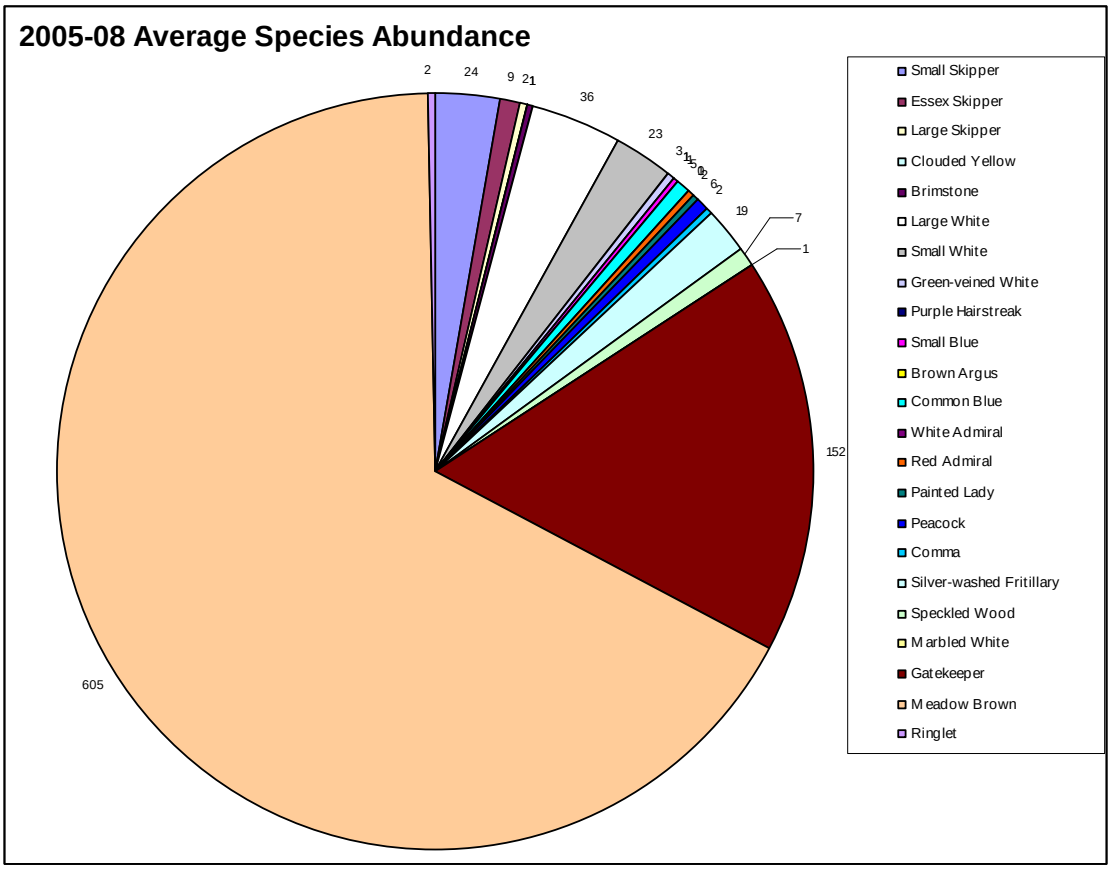


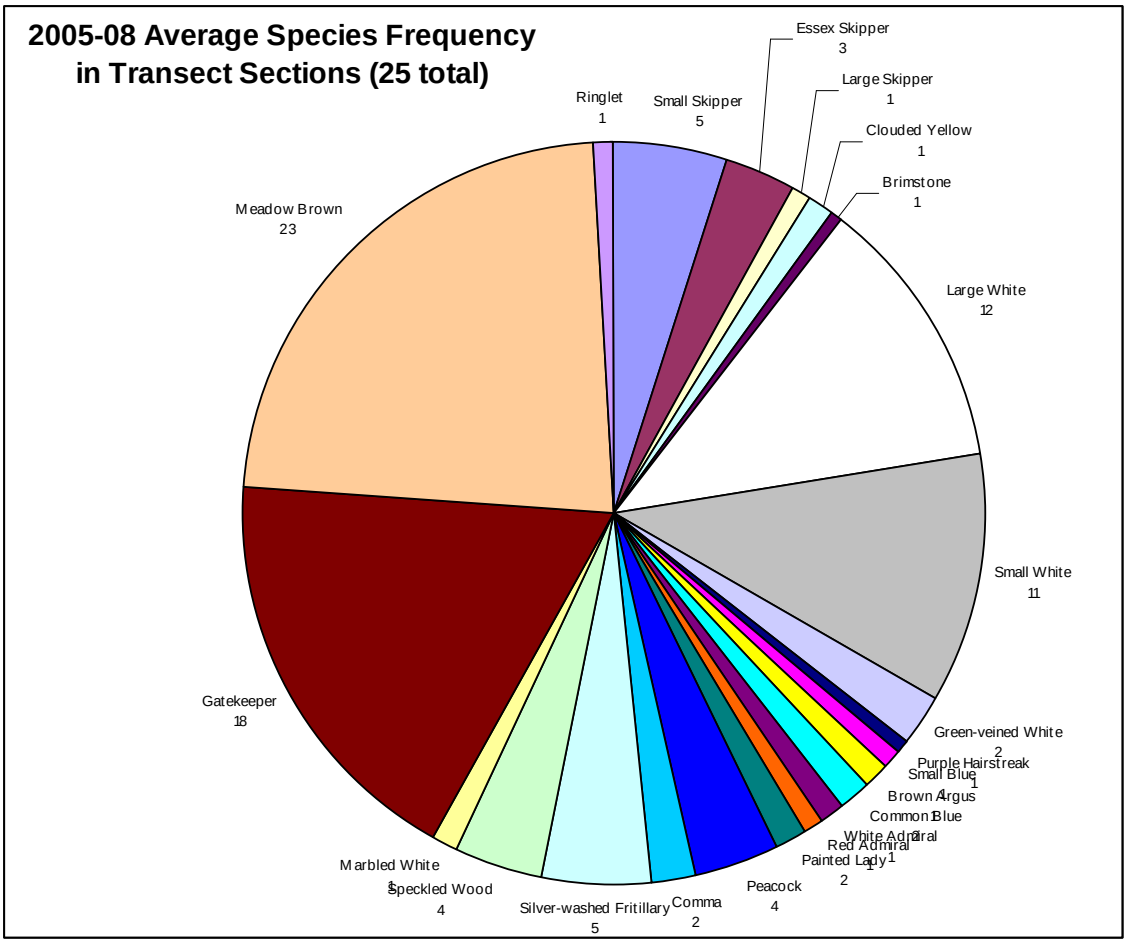






N.B. Numbers 23, 24 and 25 on the pie charts actually correspond to Sections 24, 25 and 26 on the transect (no Section 23 exists).


2005-08 Average Species Abundance
2
24
9
2
1
36
23
3
1
5
2
6
2
19
7
1
152
605
Small Skipper
Essex Skipper
Large Skipper
Clouded Yellow
Brimstone
Large White
Small White
Green-veined White
Purple Hairstreak
Small Blue
Brown Argus
Common Blue
White Admiral
Red Admiral
Painted Lady
Peacock
Comma
Silver-washed Fritillary
Speckled Wood
Marbled White
Gatekeeper
Meadow Brown
Ringlet


2005-08 Average Species Frequency in Transect Sections (25 total)
Essex Skipper 3
Large Skipper 1
Clouded Yellow 1
Brimstone 1
Ringlet 1
Small Skipper 5
Meadow Brown 23
Large White 12
Small White 11
Gatekeeper 18
Green-veined White 2
Purple Hairstreak 1
Small Blue 1
Brown Argus 4
Common Blue 1
White Admiral 2
Red Admiral 1
Painted Lady 1
Peacock 2
Comma 2
Silver-washed Fritillary 5
Speckled Wood 4
Marbled White 1

Discussion

2008

Numbers of individuals were a little lower than in 2007, both summers being impacted by bad weather, but higher than in 2005 and 2006 when the re-wilding initiative of the estate was still at an early stage. It is encouraging to see that the numbers and distribution of species of greater ecological/conservation interest are broadly being maintained, such as the Silver-Washed Fritillary (a 'Species of Conservation Concern') as well as Small/Essex Skippers which appear to be expanding from their wetter area strongholds. The attractive Marbled Whites would also be expected to benefit from the changes taking place at Knepp, especially the increasing prevalence of flowering legumes such as birds-foot trefoil to nectar on which should also benefit Blues as their food plant. The lower than usual diversity of just 12 species recorded in 2008 was disappointing however.

2005-08

No sound conclusions can be drawn from single surveys each year on general site trends over time, a more intensive and sustained sample effort being necessary especially given the inter-annual variability in weather and butterfly populations. However a few spatial patterns are evident from the work to date, with the longer transect sections (e.g. No. 4) tending to have more individuals recorded, as would be expected, and more diverse sections having higher densities (e.g. the short marginal No. 7 comes out highest for this measure). In terms of species composition, the 'frequency' measure serves to assess the geographical distribution of different species, providing a different view from 'abundance' (absolute numbers of individuals) although the two species of Meadow Brown and gatekeeper butterflies are still dominant.

Recommendations

Consideration should be given to expanding this necessarily limited pilot approach to carry out more frequent surveys through the butterfly flight season of part or all of the established transect route to get closer to meeting the Butterfly Conservation Butterfly Monitoring Scheme standard of 26 weeks of the year being recorded. This would enable rigorous statistical analyses to be carried out after at least 7 years of continuous data collection, including potential correlation with other environmental factors being recorded at Knepp (e.g. vegetation diversity, grazing intensity) as well as being able to compare this site with regional and national trends calculated by BC. This would best be achieved most economically by trying to recruit a volunteer butterfly surveyor with sufficient time available and paying their expenses.