

2 June 2015

Latest Release of Butterfly Survey in 24 Solar Terms

Since 2005, Green Power has been conducting Butterfly Surveys in 24 Solar Terms. The butterfly surveying takes place on the day or before or after the two solar terms of each month, at Shing Mun Reservoir and Tai Po Kau Nature Reserve. The 24 Solar Terms are traditionally used by farmers in China to forecast the weather and harvests. Green Power has been conducting ecological studies on butterflies based on the solar terms, to record the butterfly species, number of individual butterflies and their behaviour – and found that an apparent relationship between the numbers of butterflies and the solar terms.

Based on data from the past 10 years, there are three solar terms each year in which the numbers of butterfly species and individual butterflies will markedly increase. These three solar terms are "vernal equinox" (20th or 21st March), "corn on ear" (5th or 6th June) and "winter commences" (7th or 8th November). "Data from our Butterfly Surveys in Solar Terms shows that 'corn on ear' is the time between spring and summer with the highest numbers of butterfly species and individual butterflies, so is a peak time for butterflies to appear." says **Senior Environment Manager of Green Power, Matthew Sin.**

From survey data of the last 10 years, there was an average of 70 butterfly species recorded during the approximately three hours surveys at Shing Mun during "corn on ear". The average number of individual butterflies recorded was 245. The numbers of butterfly species and individual butterflies are 19% and 27% more than the previous solar term, "corn forms", respectively. They are also 9% and 40%, respectively, more than during the next solar term, "summer solstice". Both numbers of species and individual butterflies decline until "winter commences", which is near the end of the year, and the numbers of species and individual butterflies again increase drastically. There are also similar changes recorded in Tai Po Kau Nature Reserve. In the survey for "corn on ear", the average number of species is 32, while the average number of individual butterflies is 124. The numbers of species and individual butterflies recorded are 21% and 57% more than the previous solar term, and 21% and 35% more than the next solar term, respectively.

Matthew recommends Shing Mun reservoir and Tai Po Kau as two good locations for watching butterflies. Both are close to the city and convenient to travel to. "It takes ten minutes to walk from the minibus station at Shing Mun Reservoir to the Butterfly Paradise, and another ten to fifteen minutes to the Butterfly Garden. There are many flowers that

provide butterflies to feed on. People can see the butterflies up close as they feed on the nectar. As for Tai Po Kau Nature Reserve, the Outdoor Study Centre has a number of rare butterfly caterpillar food plants, such as the India Birthwort (*Aristolochia tagala*) and Illigera (*Illigera celebica*) which are food for the caterpillars of Birdwing and White Dragontail, respectively. Therefore, there is a higher chance of seeing these two species of butterflies in Tai Po Kau Nature Reserve. The former is a protected butterfly species in Hong Kong. It is black and yellow and very beautiful, while the latter is listed as second class under the Law on the Protection of Wild Animals in China and the tips of its wings are transparent, which is very special!" says **Matthew**.

Matthew especially recommends watching swallowtail butterflies during "corn on ear". He says "Hong Kong has eleven families of butterflies, and the swallowtails – or Papilionidae – are relatively large, colourful and loved by butterfly watching beginners. There are 23 Papilionidae butterfly species recorded in Hong Kong, and according to past butterfly surveys in solar terms, Common Mormon, Common Bluebottle, Spangle and Great Mormon are those most commonly seen butterfly species. Even some relatively rare species such as Golden Birdwing, Swallowtail and Glassy Bluebottle are not difficult to find. Different species of Papilionidae butterflies have unique patterns on their wings which make them easy to identify, so beginners in butterfly watching and even most people in Hong Kong can easily identify them, which makes butterfly watching more pleasurable."

"Vernal Equinox", "Corn on Ear", "Winter Commences" - Three Peak Times for Butterflies in a year

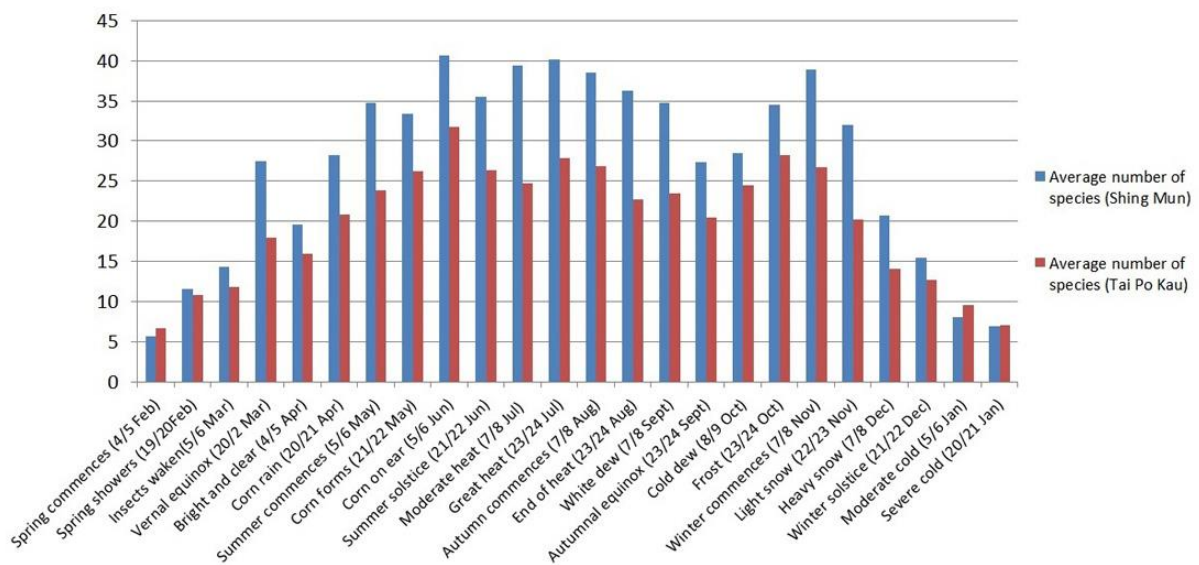
Each Solar Term has its own unique weather condition. The temperature and sunshine duration is crucial for the number of butterflies. According to past 10 years' butterfly surveys in solar terms, "vernal equinox" (20th or 21st March) is the first peak time of the year for butterflies to appear. Take Shing Mun Reservoir for example; the number of butterflies is around 60% to 150% more than during the solar terms before and after, as most butterflies take the form of pupae to pass through the winter, the "vernal equinox" signals the gradual rise in temperature, and many butterflies emerge from their pupae as adults. This explains why butterfly numbers suddenly rises during the "vernal equinox".

"Corn on ear" (5th or 6th June) is the second peak time of the year for butterflies. Analyzing the weather conditions of the "corn on ear" as well as the solar terms before and after it in the past 10 years, the average temperatures of the solar terms increase as summer approaches. From "Ching Ming" to "corn on ear", the numbers of butterflies increase along with the temperature. As such, the number of butterflies should increase along with the continual rise

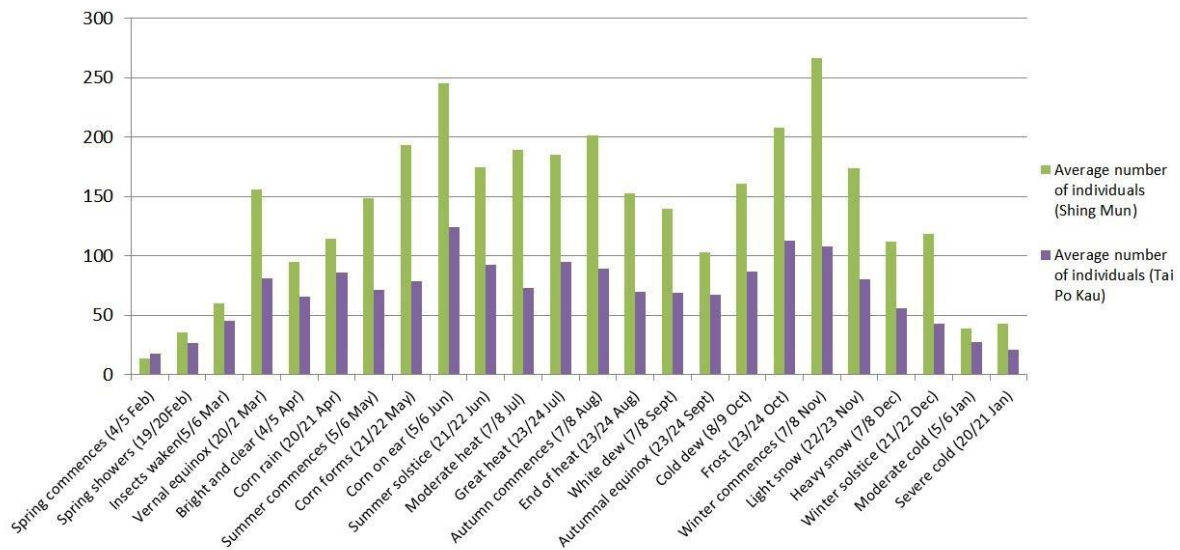
in temperature after "corn on ear". However, due to unstable weather conditions and the increase in rainfall, the numbers of butterflies decrease.

The final solar term of the year with a surge in butterfly numbers is "winter commencing" (23rd or 24th September). The number of individuals is even the highest in the year. "Winter commencing" signifies the arrival of winter, as temperatures start to decline. The number of butterflies is expected to be less than in the summer, but with closer analysis of the butterflies appearing during "winter commencing", 40% of them are Danaids. Danaids have overwintering behaviour, and it is possible that from September onwards, Danaids migrate from the relatively cooler areas north of Hong Kong to Hong Kong during autumn and winter, Therefore, the numbers of butterflies surge during autumn and early winter, and most butterflies recorded at this time are Danaids.

Comprehensive Butterfly Survey on Solar Terms Results (Species)



Comprehensive Butterfly Survey on Solar Terms Results (Individuals)



Butterfly Survey in 24 Solar Terms

The 24 Solar terms is a calendar developed by the ancestors of the Chinese people, which combines meteorology, phenology and farming expertise. Chinese farmers traditionally used the 24 solar terms to forecast the weather and harvests. In 2005, Green Power began butterfly surveying based on the solar terms. The butterfly surveying takes place at Shing Mun Reservoir and Tai Po Kau Nature Reserve during the solar terms. The species of butterflies, numbers of individual butterflies and their behaviour are recorded.

Survey results have shown that there is a slight variation in behaviour and activities for different butterfly species in terms of the solar terms. The behaviour and habits of certain species also vary according to the solar terms. In addition, the data further demonstrates that Shing Mun is one of the stopovers for Danajids overwintering in Hong Kong.