Small Tortoiseshell (Early Stages)

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Eggs and Larvae

The Small Tortoiseshell seemed to have been ever-present in our childhoods, but, since then, numbers have been fluctuating for various reasons. However, there has been a noticeable recovery in the past few years, with 2013 being a very good season.

This species is double-brooded (except in Scotland) and adults hibernate through the winter, emerging in early March, after which they mate. The principal larval host plants are Common Nettle (Urtica dioica) and Small Nettle (Urtica urens), with those growing in full sun being favoured. Eggs are laid in batches of 50-100 on the underside of a young leaf, usually towards the top of the plant. The females are very particular as to where they lay and it is not uncommon to find two individuals ovipositing on the same leaf, or multiple egg batches. The best times for finding egg-laying females seems to be between midday and 2pm and those that I observed were engaged for between 20 minutes and 1 hour depending on the size of the batch.

The eggs hatch in approximately 14 days and the young larvae spin a dense web of silk around the nearest leaf to form a protective tent where they feed, rest and moult communally, though often emerging in sunny conditions.
The early instar larvae of Small Tortoiseshell are very similar in appearance and behaviour to those of the Peacock at this stage, but when they emerge from their second moult, they start to show characteristic yellow striping along their backs and flanks. However, at this stage their colouration can be extremely variable, ranging from mainly yellow to almost completely black.
Initially, the larvae stay together, moving across the plant or on to new plants in search of fresh terminal leaves, forming webs as they go, but after the third moult (which results in the fourth instar), the larvae start to disperse.

After separating into smaller groups the larvae dispense with a protective web and form shelters from nettle leaves and a few strands of silk. An individual leaf is utilised and is either roughly folded downwards (umbrella-style) or carefully folded upwards to form a more symmetrical structure (purse-style). The downward-facing structure was found to be used by individuals and small groups and only appeared in those larvae that were reared. The upward-facing folded leaf was only observed in the wild and seemed, principally, to be a shelter for individual larvae while they moulted. Whilst these may look very similar to shelters created by Red Admiral larvae, they are notable in that they tended to be clustered in a small area, usually close to the old larval web. The larvae were observed to feed at the tips of both types of these shelters for a short while before moving on.
Whilst larvae usually moult in a sheltered area, one of those being reared moulted out in the open. This is a very vulnerable stage in the development of the larva, and they have to remain inactive for over a day while changes take place inside the old skin. Nearing the time of the moult, the old head capsule (which now looks too small for the body) becomes just an empty shell and the new paler head can be seen being formed just behind it.

After moulting the new larval skin quickly dries and the head capsule darkens.

They now feed in the open and can often be found basking on leaves in a characteristic curled position.
There are four moults in all and when fully grown the larva will reach a length of approximately 30mm. They then usually leave the plant and seek a pupation site typically in dense vegetation or on fences and walls. They suspend themselves from a pad of silk in the standard "J" position for approximately 24 hours before pupation takes place.

Pupation itself takes approximately 4 minutes to complete, commencing with the larva elongating and pulsing.
The Pupa

A few hours after pupation the pupa hardens and takes up its final colouration.
The pupa is very similar in appearance to that of the Peacock, but is slightly smaller and slimmer with blunter dorsal spines. Of the two species, that of the Small Tortoiseshell is the one most likely to be encountered in the wild, although I never have, despite monitoring many larval webs and over a thousand larvae in the past year.

The colouration is variable, depending on the pupation site. The intermediate form is shown above, but there is also a dark form.

However, the most common is the beautiful golden form.
This then develops a coppery/green metallic sheen in the day leading towards hatching.
The hatching process itself takes approximately 60-90 seconds.
All adults were released as soon as they were ready to fly, but only one stayed around long enough to be photographed. This turned out to be a very dark individual

![Small Tortoiseshell (dark form) upon release](image)

**Small Tortoiseshell (dark form) upon release**
_Caterham, Surrey 3-July-2013_
_Photo © Vince Massimo_

**Background and other observations**

This report is the result of work carried out during the 2012 and 2013 seasons, with many images being taken in the wild. A batch of 5 third-instar larvae was collected in 2012, but they all died in mysterious circumstances. In 2013 a number of larvae, ranging through 3rd, 4th and 5th instars were collected as well as a small batch of newly laid eggs. These were all reared on potted nettle plants which were kept in an airy outbuilding. Only 5 of the larvae that hatched from eggs were retained (the rest being released). These acted as a "control batch" and none were found to be affected by disease or parasites. Of the 24 larvae taken from the wild, 9 perished, mainly due to parasitism. This equated to a 37% loss rate of wild larvae.

The parasites were all found to be Tachinid flies. Seven parasitic grubs emerged from the butterfly larvae and pupated. However they never hatched and the pupae have tentatively been identified as those of *Sturmia bella*.

![Pupa of Sturmia bella](image)

**Pupa of Sturmia bella**
_Caterham, Surrey 18-June-2013_
_Photo © Vince Massimo_

Another grub emerged, but this time from a discoloured butterfly chrysalis and this eventually emerged as an adult fly which appears to be either *Phryxe vulgaris* or *Phryxe nemea*. 
As the Small Tortoiseshell larvae and pupae were all reared inside a building, their development rates may have been affected compared to those in the wild, so the following summary can only be considered as a guide.

- 02-May-2013 eggs laid
- 9-May-2013 eggs hatched (after 17 days)
- 26-June-2013 larvae pupated (at 38 days old)
- 08-July-2013 adults emerged (after 12 days)

Thanks go to Chris Raper for advice regarding the Tachnid flies.

Reference Images of Adults

Aberrations
Small Tortoiseshell (pale form)  
Crawley, Sussex 12-June-2007  
Photo © Vince Massimo

Small Tortoiseshell (pale form)  
Crawley, Sussex 7-June-2007  
Photo © Vince Massimo

Small Tortoiseshell (ab. nigrita)  
Southwater Wood, Sussex 1-July-2010  
Photo © Vince Massimo