Breeding the Yellow Admiral continuously in a Butterfly House

The Butterfly House

The first thing to consider when setting up the Butterfly House is its position, the most important being the amount of sunshine hours that it will receive during the winter months, it is an easier thing to control the effects of too much sunshine in the summer and therefore the problem of excess heat than it is to cope with a lack of sunshine during the winter months when it is absolutely crucial in order to keep the butterflies active and able to feed on the nectar pads on those rare days when the winter sun shows itself.

My Butterfly House is a greenhouse, dimensions of 10ft long, 4ft wide and 7ft high at the ridge, it is situated in a position where it can receive 3 to 4 hours sunshine on the shortest day of the year, weather permitting. The greenhouse is oriented so that the door end faces south west and obviously the longest reach of 10ft faces south east one side and north west the opposite leaving the back end facing north east, this ensures that when the sun shines in the winter it has the maximum effect in getting the Butterfly House to warm up sufficiently and so induce the butterflies to become active enough to feed and lay ova. There are three automatic air vents 2 on the south east side and 1 on the north west side, they are on the first row of glass down from the ridge so as to let more heat escape during the hottest summer days, they are disconnected during the winter as the aim then is to keep as much heat in as possible instead of letting it out. Shading from excessive summer heat is provided by green shade netting of the type available from most good garden centres, this runs the length of the Butterfly House on the south east side and can be moved around to suit the conditions and removed during the winter months when not required. The inside of the Butterfly House is lined completely with a fine clear to white insect netting, there are a few manufacturers of this type of netting in the UK and prices tend to vary according to quality, but on the whole they are reasonably priced unless you plan on lining a very large Butterfly House. The main thing to remember when choosing which netting to use is to make sure it is ultra violet resistant to some degree and that the hole size is small enough to prevent your stock from escaping, the type of netting I find useful is carrot fly netting, this has good UV tolerance and lasts 4 or 5 years. The netting can be attached to the inside of the frame using clips that slot in to the grooves in the frame of Aluminium Greenhouses or pinned with staples or tacks in wooden framed greenhouses. All joins in the netting and gaps must be sealed to prevent escape, for this purpose I use an all purpose clear or translucent silicon sealant as this will stick to almost any surface, is waterproof and will last for many years. It must be remembered to have a piece of netting hanging right across the inside of the door to prevent escapes when you try to enter the Butterfly House, you will be surprised how quickly butterflies notice the draught caused when opening the door and they will escape quicker than you imagine. It stands to reason that you must make sure that the netting

is secure at the vent openings, butterflies have an uncanny knack of finding the smallest gaps and either escaping or getting trapped in between the netting and the glass thus perishing. I make sure that the vent holes are secure by fixing a sheet of galvanized fine wire mesh across the gap first and then the netting runs under that, this means that when the vents are open not only can the butterflies not escape but birds, cats or other creatures cannot peck, scratch or bite their way in.

Inside the Butterfly House on the south east side I have a bench that runs the 10ft length and is 3ft high and 15in wide. On the bench I have 6 large seed trays laid out side by side the length of the bench and planted with the butterflies' food plants, in this case Stinging Nettles, *Urtica spp*. There is nothing planted under the bench as I leave this area clear for the butterflies to roost in the summer when the temperature can become very high. I keep the floor damp on the hottest days and the butterflies can then roost in comfort on the ground until conditions cool down, this can prevent your stock becoming overheated and prevent unnecessary losses. On the North west side there is no bench and food plants are grown in large planting containers on the floor. There are plants grown other than food plants these are 2 large pots containing Mexican spice bush, *Lantana Camara*, 1 by the door south west end, 1 about 7 ft

away from the door north west side to provide an additional nectar source and a large 7ft lemon tree, *Citrus limon*, at the north east end that the butterflies like to roost in at night. As you can tell my butterfly house has been set up to ensure there are different micro climates throughout and the butterflies can always find some place they feel comfortable except in the most extreme weather conditions. At each end of the bench are fixed a stand 1ft high with a flat square top. The stands are made with dowel wood stems, painted to waterproof them, and attached to the bench by running through the centre of a small plastic tub at the base filled with water to act as a moat. This prevents ants from climbing the stands to access the nectar containers. Ants are a real problem in the summer months and very fond of the nectar supplied for the butterflies. On each of these stands are placed 2 plastic jar tops of the type found on coffee whitener jars, I turn them upside down, and place plastic pot scourers inside, these are cheap to buy and are available from many shops. I have found that the butterflies don't seem to mind which colours I use but show a distinct preference for the blue ones. The tops are then filled with a home

made nectar feed, to make this I use 1/2 pint of warm water, add 2 teaspoons of honey, 8 teaspoons of white sugar, 1 pinch of sea or rock salt and stir until dissolved. This needs topping up at least twice a week depending on whether the butterflies are active and should be changed completely every 1 week in summer and every 2 weeks in winter, because the mixture will ferment very

quickly in summer and although I have not found it to be dangerous to the butterflies it can smell very strong indeed. The butterflies that I breed, *Vanessa Itea*, the Yellow Admiral, prefer the home made nectar to the natural nectar provided by flowers.

Heating is provided in the winter months using a paraffin heater designed for use in a greenhouse but only used when the temperature is likely to fall below freezing. This means more often than not that it is mainly used at night and only rarely in the daytime. *Vanessa Itea*, do not need to be kept active all through the winter months, only to be protected from temperatures that fall below freezing for long periods. On extremely cold winter nights I cover the Butterfly House with a decorators dust sheet tied down to prevent it blowing away should high winds and snow be forecast and this helps to make sure that severe frosts cannot penetrate inside and kill the livestock or the more sensitive plants. This has been very successful so far and my stock has been protected from outside temperatures down as low as -11^{o} centigrade.

The Breeding Programme

The Yellow Admiral *Vanessa Itea* also known as The Australian Admiral

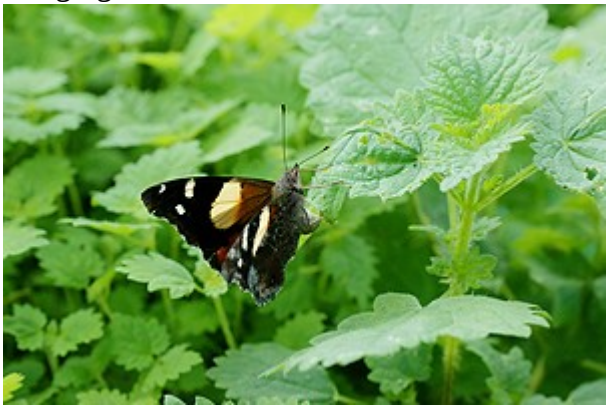
The stock was introduced to the Butterfly House in the summer of 1997 as imagines, a total of 7, obtained as ova and reared through before introduction. This original stock was supplied by a lepidopterist friend who had purchased them from an Entomological livestock dealer. As far as could be ascertained the original stock came that same year from the Christchurch area of New Zealand, where I have been informed this species can be reasonably common in good years and can be seen flying anywhere in New Zealand along with its larger relative the New Zealand Red Admiral, *Vanessa gonerilla*. Although apparently there is some separation of the two species given their preference for different types of stinging nettles, Urtica spp upon which they are dependant to breed, *Vanessa gonerilla* preferring to oviposit on the native Tree Nettle *Urtica ferox* also known as Ongaonga by the Maoris which grows mainly in forests and along river valleys or cliff edges in coastal areas. *Urtica ferox* packs one of the nastiest stings of any Nettle species and has been known to cause death in some small animals that have been badly stung by it. *Vanessa itea* prefers to oviposit on the introduced Small or Annual nettle *Urtica Urens* that is a weed of gardens, wasteland and cultivated farmland. Both the Red and Yellow Admirals are seen flying together on hilltops, this hill topping is a trait the Vanessids are well known for around the world, or when they congregate at Buddleia flowers *Buddleia davidii*. *Vanessa gonerilla* tends to be regarded in New Zealand more as a forest species and *Vanessa itea* a species of gardens and open areas such as farmland and parks because of the separation in the location of their favoured food plants. Both species will also oviposit on the Cut Leaf Nettle, *Urtica incisa*, which can be found in damp partially shaded areas and is a native like *Urtica ferox* and the Perennial Nettle, *Urtica dioica*, which like *Urtica urens* was accidentally introduced from Europe. I have also been informed that neither *Vanessa gonerilla* nor *Vanessa itea* are as

common as they used to be due to the widespread destruction of their food plants, it can be quite hard to find stinging nettles in New Zealand as they are destroyed far more readily than they are even in the UK. New Zealand being an intensively farmed country with a huge agricultural industry tends not to look kindly upon anything classed as a weed and therefore the humble but vital nettle is eradicated without a second thought as to the consequences that this may have on the two admiral butterflies found in these Islands. The few New Zealand lepidopterists I have had contact with tell me that in some areas of New Zealand maybe only half a dozen *Vanessa gonerilla* and *Vanessa itea* are seen in a year but other areas still have viable populations and the population at times increases dramatically in good years. *Vanessa itea* is more fortunate than *Vanessa gonerilla* as it is also found in Australia where it is fairly common in some years and will migrate across the Tasman Sea to New Zealand along with the Australian Painted Lady, *Vanessa kershawi*. *Vanessa gonerilla* is only found in New Zealand with a subspecies on the nearby Chatham Islands so cannot benefit from the occasional top up as *Vanessa itea* can.

Introducing the Livestock

After the Imagines had emerged from their pupae, they were released into the Butterfly House and observed closely. After drinking nectar from the feeding stations for most of the first day, courtship flight was observed late afternoon on the second day. The courtship flight of *Vanessa itea* is almost identical to that of other Vanessids. The males perch or feed at flowers and when a female passes through his territory he sets off in pursuit of her following close behind as the female tries to lose him. In the wild she will sometimes suddenly fall to the ground and hide in a hedge or a clump of long grass or some other foliage to escape his attention, this occasionally works but more often than not the male will perch close by and wait until the female flies off again. When the male does eventually force the female to land he moves to the side of her and with wings closed and vibrating he curls his abdomen around and pairs with her. My captive stock behave in the same way but because of the restricted flight area the females find it more difficult to avoid the attention of the males. With the *Vanessa itea* stock in my butterfly house I have noticed that the females will pair many times with many different males and that each pairing can last anything from 1 hour to 5 hours but only once on any given day.

On the third day the females started laying ova on the food plants provided, these were *Urtica dioica*, Perennial Stinging Nettle and *Urtica urens*, Small or Annual Stinging Nettle. The females show a distinct preference for *Urtica urens* and this came as no surprise as this is the nettle they use the most in New Zealand. The amount of ova laid on *Urtica urens* is of a ratio of about 2/1 above *Urtica dioica* but this is of little significance in the breeding of *Vanessa itea* as they thrive on *Urtica dioica*, as does our own *Vanessa Atalanta* the Red Admiral. The ova are laid singly or in pairs one on top of another mainly on the upperside of a nettle leaf although when there is an abundance of egg laying females in the



Butterfly House they will lay on any part of the food plant and sometimes they will lay on the soil or plant trays nearby, this has also been reported in the wild with *Vanessa atalanta*. If you look carefully at the ova you will notice that the majority are actually attached to the stings protruding from the nettle leaf, but not always, some are attached directly to the leaf itself. I have also tried to get *Vanessa itea* to lay and feed on Pellitory of the Wall, *Parietaria diffusa* and although the females will occasionally lay ova on it, only the small larvae seem to eat it and soon move themselves across to the nearby nettles. In Australia and New Zealand Pellitory is listed as a food plant, maybe they will eat it when they cannot find Nettles but I have to report that my stock don't do well on it and never reach pupation successfully, this does not happen with *Vanessa atalanta* larvae, they seem to do well on pellitory but still show a preference for stinging nettles *Urtica spp*.

Collecting the Ova

In my breeding program most of the rearing of the livestock happens outside of the Butterfly House, which is used mainly as a flight area for the Imagines in order to obtain pairings and as a place for them to lay ova. This does not mean that all stages of development cannot be found inside it at any time of year, in fact even in the middle of winter ova and small larvae can be found along with at times up to 300 Imagines, but most of the pupae at this time of year are gathered up and taken into the house to emerge in higher temperatures, this stage of the development being the most vulnerable to excessive cold in which the fully formed Imagines cannot emerge properly if kept below 12^{o} centigrade.

To collect the ova, the nettle leaves are cut off the plants with the ova still attached and placed in a collecting box, I use a plastic ice cream container for this purpose. The leaves are then taken into the area where the next task must be performed, sterilisation.

Sterilization of Ova

The reason that I sterilise the ova is to prevent outbreaks of viral and bacterial disease, which at times can cause huge losses to my stock, therefore I find preventing these infections from taking place my number one priority. When livestock is kept in captivity in the Butterfly House at population densities many times greater than would be found in the wild it is inevitable that outbreaks of disease will occur and as there is no cure for most of these pathogens, prevention is the only protection available. I find these disease outbreaks more prevalent in late summer than during the winter months probably due to the very high temperatures reached in the Butterfly House accelerating their development and with hot and humid conditions making the problem considerably worse. I consider late winter and early spring the seasons that cause me the least problems due to the food plants being healthier and it is easier to prevent excessively high temperatures. Warm, dry conditions are best but hot dry conditions can assist an explosion in the Red Spider Mite population thus producing a further problem to be solved and Red Spider Mite will rapidly defoliate the plants if not tackled quickly. Ironically the best conditions for keeping Red Spider Mite under control are hot and humid so I find I have to vary the conditions as necessary.

The chemical that I use for sterilising the ova is Formaldehyde solution. Formaldehyde solution is an industrial disinfectant often used in laboratories and as a method of preserving biological specimens in jars, it is mostly supplied as a 36 % solution. Formaldehyde can be obtained from your local chemist at a reasonable cost but the chemist may not agree to sell it to you if he/she is not satisfied that you are competent to use it safely, Always explain to the pharmacist exactly what you want this product for and that you will take all the necessary safety precautions, if you do this you will find most chemists will sell you this product. Formaldehyde is a poison, if breathed in it can cause unconsciousness and death, damage to skin, severe burns, and damage to internal organs. You must protect your hands by wearing rubber gloves, and it must always be used in a well-ventilated area, always read the instructions very carefully and always keep it out of reach of young children.

I use a table in a spare bedroom by the window to lay out the sterilisation equipment this means that I can open all the windows to provide adequate ventilation. The equipment consists of 1. The formaldehyde solution, 2. Three plastic containers, one for the sterilisation fluid and two to be filled with tepid tap water for rinsing the ova after the sterilisation process is complete. The water and the Formaldehyde solution must be at the same temperature. 3. An absorbent medium to lay the sterilised ova on to dry after the process is complete, for this purpose I use paper kitchen towels laid on top of folded newspaper. 4. The plastic rearing box where the ova will be placed after the drying process is complete, the box also lined with paper kitchen towels to make sure any remaining damp from the sterilisation process is absorbed thus preventing mould forming on the ova and killing them before they can develop. 5. A pair of tweezers to move the leaves with the ova, from container to container.

I use the Formaldehyde solution undiluted at 36 % strength and find that the ova come to no harm if soaked for up to 10 minutes, I have occasionally tried up to 20 minutes with no harmful effect but as 10 minutes is normally sufficient this is the time I allow. The leaves with the ova are placed using the tweezers into the container holding the formaldehyde and fully submerged, the leaves are all placed in together so that the sterilising can all be done in one session. When the 10 minutes are complete the leaves are removed one at a time with the tweezers and washed in the 2 rinse containers filled with water, when this is complete the leaves are laid on the absorbent paper towels to dry out, the time this drying process takes varies according to temperature so you have to be patient and wait until it is complete. When satisfied the drying process is complete the leaves with the ova are placed in the plastic rearing box

on a layer of absorbent kitchen towels, I use a box size 280mm Length, 160mm Width and 85mm Depth. These clear plastic boxes can be purchased from Entomological Equipment suppliers of which there are a few in the UK, the lid is then replaced, all that is required now is to move the box to a safe place and await the emergence of the larvae.

The plastic box should be placed in a warm but bright position but out of direct sunlight and away from central heating radiators in the winter and also protected from cold draughts. What is required is a place with stable but warm conditions. Always remove the lid of the box now and again to ensure that the air inside does not become stagnant and that any remaining Formaldehyde gas does not kill the developing larvae inside the ova, this is not normally a problem unless insufficient time was allowed in the drying process. I personally prefer to use a hot pin to melt up to 300 small holes in the lids of my boxes to ensure good ventilation, as the larvae seem to dislike the humid conditions created in an unventilated box. I have a total of 7 plastic boxes of this size and type for rearing my larvae.

Rearing the Larvae

The ova when first laid are pale green, very small, slightly oval in shape with distinct ridges, 8 or 9 running top to bottom. Just before the larvae emerge the ova turn dark grey or purple grey. The freshly emerged larvae are a pale beige grey colour and on close inspection you can see on them very fine dark grey hairs. The first thing the freshly emerged larvae do is to eat the eggshell and then they proceed to move to the base of the leaf and construct a leaf shelter with silk strands in which to feed.
The first instar larvae reared en-masse in plastic boxes do not appear to mind being overcrowded and will happily live 10 to 20 in one leaf tent, by the second instar however they tend to prefer a solitary existence as they would in the wild and live one to each tent.

This solitary existence continues through the remaining instars. I have found that an average of about 30 to 50 larvae per box causes few problems and so these are the densities that I prefer to work with. In captivity the 5th and final instar larvae will feed together in a gregarious manner and also show a preference to feed mainly at night. From the second instar the larvae colours are variable depending on the amount of light falling on them ranging from black to brown, pale brown and even rust brown, I have seen in my stock pale green specimens, the *Vanessa itea* larvae are almost identical in colouration to *Vanessa atalanta* larvae but slightly smaller when full grown. This variation in colouration ensures that the larvae always blend in with their surroundings. Full-grown *Vanessa itea* larvae are approximately 30 to 33mm long.

Larval development takes about 14 days at an average temperature of 20^{o} centigrade and 21 days at 15^{o} centigrade. In the spring months I have found that rearing the larvae at 15^{o}centigrade combined with the better quality food plants available at this time of year produces slightly larger pupae and thus larger Imagines. In the winter months in the Butterfly House, ova and 1st and 2nd instar larvae will slow down their development and in the case of the small larvae will remain in their leaf tents from late autumn to early spring only commencing to feed when the temperature is sufficient, sometimes even during the winter months if it is warm enough.
The larval rearing boxes must be cleaned daily and the absorbent paper changed, fresh food plants must also be provided daily, this is not usually a problem in the spring summer and autumn but winter can be problematic due to the short days and cold weather. My method of collecting food plants for my winter stock is to collect the small winter rosettes of *Urtica dioica* that can be easily found even in a cold winter along the edges of woodland and fields or on local waste-ground, at this time of the year they can be picked and placed in large plastic ice cream containers and will keep for up to 5 days if kept outside in a cold spot away from direct sunlight or better still in the bottom cool area of your refrigerator in the same manner as you would keep your salad vegetables fresh. Also of note is that if snow is forecast or has already fallen it can prevent you from finding the Nettles in the first place, using this method guarantees you can collect supplies for your larvae and hopefully have enough to see you through until the weather improves. I have used this method of supplying winter food for my larvae with no problems and actually find it easier than the summer collecting as the food plants do not wilt so easily and you can fit enormous amounts of these small rosettes in to one ice cream box.

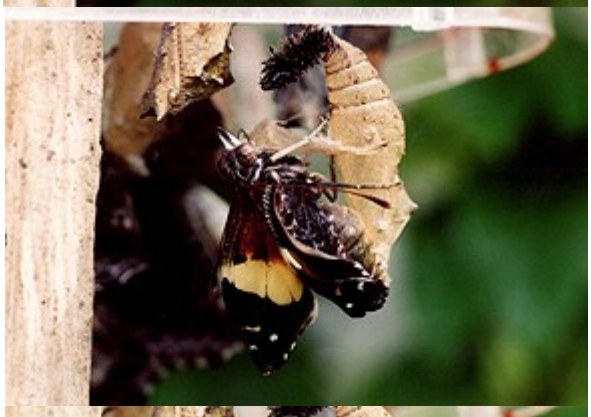
The Pupae

In the wild *Vanessa itea* larvae tend to leave the food plant to pupate, choosing a wide variety of sites such as fences walls, buildings such as sheds and under house eaves, occasionally they will pupate in a large leaf tent on the food plant in a similar manner to *Vanessa atalanta* or they will simply find a nearby shrub or hedge in which to pupate, the pupae suspended directly off one of the branches. In the rearing boxes the larvae simply make their way to the lid and suspend themselves head downwards in the shape of a letter J and pupate together en-masse. Occasionally some larvae will damage freshly formed pupae whilst looking for a space on the lid but some losses are inevitable and this is why it is best to try and keep a reasonable number of stock in development at any given time. Any pupae that fail to attach themselves properly to the silk pad with the cremaster and fall to the base of the container can simply be glued to a twig with an all purpose glue which is in turn fixed to the lid between the other pupae using Sellotape. The pupae colours vary through most shades of brown and occasionally they have a shiny metallic gold lustre once again very similar to *Vanessa Atalanta*. Because of the staggered growth rate of the larvae and to avoid larvae from damaging freshly formed pupae I swap the lids on the boxes when sufficient numbers

of larvae are suspended and ready to pupate thus avoiding the problem referred to earlier. The pupae stage lasts on average from 10 to14 days. In my own stock I keep the pupae at room temperature which is normally about 16^{o} to 18^{o} centigrade and at this temperature the pupae stage lasts approximately 14 days, I have made the pupae stage last up to 21 days by keeping them at an average temperature of 8^{o} centigrade but when the pupae start to colour up the temperature must be increased to 12^{o} centigrade or above or the imagines will be unable to expand and harden their wings properly after emergence.

The Imago stage

In the summer months as soon as the first pupa in any individual box starts to colour up I remove the lid from the rearing container and the lid is then taken to the Butterfly House and suspended on special wire supports that are fixed and stretched below the bench, away from direct sunlight in a cool position, thus the resulting Imagines when emerged can fly freely as soon as they have expanded and hardened their wings and at a time of their own choosing.



In the colder months the Imagines have to be emerged in the plastic containers indoors and then transferred to the Butterfly House, again only after they have expanded and hardened their wings sufficiently. If the Imagines are to be emerged in the plastic rearing containers I always place plenty of absorbent kitchen paper in the bottom to catch the fluid that the Imagines discharge in the process of expanding their wings. I also place a few twigs or similar items into the box so any Imagines that fall before they have completed this stage can climb back to the lid, if they cannot achieve this the result will be deformed Imagines with damaged wings unable to fly.

Diseases

In 2011 I made a fatal mistake in flying native species the Small Tortoiseshell and Peacock butterflies with my Yellow Admirals. The result was the introduction of the disease Wilt (nucleopolyhedrosis virus). This first affected the Peacock larvae so this was the source of the infection before it spread to the Yellow Admirals. This disease is almost impossible to eradicate unless the Butterfly House is left empty, exposed to the cold winter weather, sterilised from top to bottom and all plants and soil changed. Therefore I introduced methods for disease control during the larval stage. This is done by sterilising collected eggs in a solution of Domestos extended germ kill at 10% maximum for not longer than 15 minutes. This method of sterilisation is very similar to the one used for formaldehyde, however with Domestos the eggs detach from the leaves and fall to the base of the plastic box and are sterilised over 100% of the surface area. The eggs must not be left in the solution for longer than the stipulated 15 minutes or they will themselves be dissolved. This method is the best I have discovered so far, but is by no means perfect and the disease will sometimes kill a whole batch of larvae if the sterilisation process fails.

I have also allowed larvae in the butterfly house that have been produced from uncollected unsterilised eggs to mature and then collected final instar survivors to pupate and so perhaps breed some natural disease resistance into the stock.

It is now year 20 of the project and with 6 years of coping with this new disease, the project is still continuing, although the days of producing thousands of healthy pupae are over and I am very fortunate if I can produce batches of 100. I have come very close to losing the stock many times since the introduction of this disease but somehow bounced back from a low number to a greater on many occasions.

Other Observations

All of the Vanessa family are similar as to their basic shape and patterning on the upperside and underside, *Vanessa itea* is very similar to our own *Vanessa atalanta* the main difference being its smaller size 48mm to 55mm wingspan and the fact that the red bands of *V atalanta* are replaced by broader cream yellow bands on *Vanessa itea* and a background colour of pale orange brown. The underside is very close to that of *Vanessa atalanta* but in my captive *Vanessa itea* stock I have noticed that the blue ring on the underside forewing can be filled in as a complete diffused blue spot if the pupae have been kept in prolonged cold conditions during the winter months, however it must be stated that pupae kept in these conditions are very likely to perish if the temperature is allowed to fall below freezing point or for too long a period, short periods of slightly above freezing point are usually the most productive for producing this aberration. Other than this small aberration the Imagines are remarkably consistent in their colouring with only slight changes in the brown background shade or the cream yellow bands, the underside differs in a similar manner.

At any given time of the year in my *Vanessa itea* breeding programme I have all stages of development ongoing with my stock. Imagines, ova, small larvae, large larvae and pupae either in the Butterfly House or in the breeding containers indoors, by adopting this method I ensure that I always have stock at hand ready to replace

others should some major catastrophe occur. This method has served me well over the 20 years I have been running this project and although it can be very time consuming a lot of satisfaction is derived and much knowledge has been gained.

Vanessa itea have a very unusual basking habit, in the morning if the sun is shining and as the Butterfly House begins to warm up for the day many of the Imagines leave their roost from the previous night and fly to the south west and north west side where they proceed to open their wings wide and bask head down, never head up, but slightly inclined from the vertical and toward the direction of the sun, this appears to be a way of rapidly gaining as much heat as possible as fast as possible because as soon as the temperature reaches that which the Imagines find acceptable they rapidly disperse around the Butterfly House to feed and lay ova. This tends to occur mainly in the morning but also at other times especially if it has been a particularly cold day and the sun has shown itself only fleetingly.

The same parasitic wasps that attack *Vanessa atalanta* larvae and pupae will also attack *Vanessa itea*, but by far the most destructive of these is the pupa parasite *Pteromalus puparum*, *Pteromalidae spp* the female of this small wasp can lay many dozens of eggs inside of a freshly formed and still soft pupa, the parasite's larvae consume the contents of the pupa and then pupate inside it, they emerge about one month later as small black wasps by cutting a small hole in the pupa to escape, the pupae are safe from the attention of this wasp once they have hardened off. It is almost impossible to prevent parasitic wasps from entering the Butterfly House but their affects can be minimised by rearing your stock indoors. As these parasitic wasps only attack small 1st and 2nd instar larvae and freshly formed pupae your stock reared indoors is usually safe from their attention. Another parasitic wasp to watch out for is the Brachnonid, *Microgaster sub-completus*, this is a parasitic wasp that injects dozens of ova in to 1st and 2nd instar larvae of *Vanessa atalanta*, and *Cynthia cardui*, the Painted Lady, and I have also had it attack my *Vanessa itea* larvae, it is very similar to *Apanteles glomeratus*, which attacks the Large White, *Pieris brassicae*, larvae, the difference being that the emerging parasitic larvae of *Microgaster sub-completus* are a pale green colour, *Apanteles glomeratus* larvae are yellow. Another recent accidental introduction to the UK of a parasitic fly is *sturmia bella*. I have in recent years reared this from my *vanessa itea* larvae. This parasite is normally found in Peacock and Small Tortoiseshell larvae in the wild but has managed to penetrate my butterfly house although incidence is low.

I have found that I can obtain pairings of *Vanessa itea* in the winter, I have even had pairings on the shortest day of the year, 21st December, as long as the temperature reaches at least 20° centigrade and the sun shines for most of the day, this means that *Vanessa itea* is probably continuously brooded and unaffected by day-length. However it is different with *Vanessa atalanta*, I find it difficult to obtain pairings from this species after about the middle of September; however a number of factors should be taken in to account concerning this, 1. New Zealand has a climate similar to Southern France, 2. *Vanessa Atalanta* may still produce fertile Imagines in Southern France in the winter; this requires further investigation, 3. The difference between the longest and shortest days in the Southern Hemisphere is apparently less than in the Northern Hemisphere, again this may have some bearing on the matter; 4 .If day length is a factor in the fertility of *Vanessa atalanta* why can I achieve pairings from this species in late January after overwintering the Imagines?

I have achieved pairings of *Vanessa Atalanta* in a cage under artificial light, giving the Imagines at least 10 hours of light per day so I assume day length must have some bearing on this question.

Vanessa atalanta can be successfully overwintered in the same manner as I have done with *Vanessa itea*, the only difference being that I find it better to keep *Vanessa atalanta* Imagines inactive through the colder months due to the problem of being unable to secure pairings from them, however the larvae overwinter in the same manner as those of *Vanessa itea*.

Summary of project May 2017

From the original 7 pupae the project started with in 1997 no vanessa itea stock from other sources has been introduced. The blood line is therefore pure. No weaknesses in the stock have been noticed and it is assumed therefore the original stock must have been genetically sound. The often quoted problems with inbreeding have not surfaced over the many bred generations and the stock is still healthy and strong. The only ongoing problem is one of the disease Wilt (nucleopolyhedrosis virus) mentioned in the section Diseases.

Article by Terence Roy Smithers.
Photographs 1-7 & 13 by Jeffrey Frederick Boswell.
Photographs 8-12 by Terence Roy Smithers.