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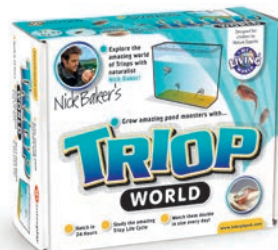
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Manual written by Nick Baker

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Nick Baker's



Explore the wonderful world of Ladybirds with naturalist Nick Baker!

Designed for children by Nature Experts



LADYBIRD WORLD



Set up a ladybird friendly home and see right inside their fascinating world!



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WARNING!



For children over 5 years of age only.



For use under adult supervision. Read the instructions before use. Follow them and keep them for reference.



Not suitable for children under 36 months as this product encourages children to collect small items that may represent choking hazards.



Do not use the magnifying lens to look directly at the sun or other sources of bright light as this could damage your eyes.

Caution! None of the accessories in this kit should be allowed to come into direct contact with foodstuffs. Keep bugs and dirty hands away from the mouth!

Wash hands after using this kit or doing the activities described in this booklet.



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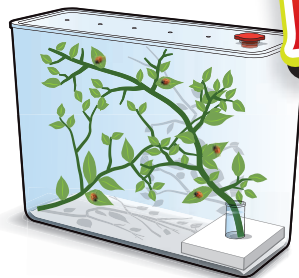
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Explore the wonderful world
of Ladybirds with naturalist
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Nick Baker's

LADY BIRD



WORLD



Contents

- Clear Tank & Lid
- Specimen Tubes
- Paintbrush
- Tweezers
- Field Lens
- Tube Holder
- Instruction Manual

About this Kit!

This kit is a hands-on guide for budding naturalists and contains the equipment you need to observe and study the fascinating lifestyle of ladybirds. The kit is designed to be fun and informative for kids of all ages. However, young children will need the help and supervision of an adult.

To start with, I recommend collecting some adult ladybirds to look after and observe. They should come to no harm if kept as pets for a few days then released back into the wild where they came from. Once you have gained some experience, you can progress into breeding them and observing all stages of development.

The best time of year to use this kit is when ladybirds are active in the summer months between April and September.



DON'T FORGET

Always return your ladybirds to their natural habitat.

Enjoy your Ladybird World!

I believe it's best to collect your own ladybirds locally from gardens or parks near where you live. However, if you prefer to purchase some, there are details at the back of this book of where to buy them.

Finally, I hope you have fun with this kit and discover some fascinating insights into the life of these wonderful creatures.

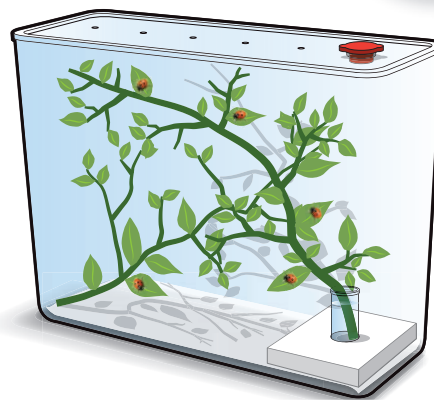
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Introduction

We all know what a ladybird looks like don't we? These brightly coloured beetles are probably the most familiar of garden insects but ask yourself this question - how much do you really know about them? For example what does a baby ladybird look like? What do they eat? And how many different kinds are there?

The answers might surprise you but let's start with the easy one. Ladybirds belong to a family of beetles called the Coccinellidae (which means dressed in red). We have 47 species in the UK and of these around 26 types are recognisable as ladybirds, being brightly coloured and spotty.



Inside this kit box is everything you need to be able to set about answering the other questions and in doing so getting to know your ladybirds much better.

Nick Baker



1. Getting Started

Bagging your Bug!

The first thing you need to do is collect some ladybirds. Fortunately this isn't too hard; you can search your garden, the park or the hedges near where you live and when you see one, using the paintbrush supplied, gently persuade it to step into your specimen tube. Some years ladybird populations can be low, so if you are having trouble finding any there are various companies that farm them for pest control and so you could mail order some (*see details in the back of this book*).



The Harlequin Ladybird



The Two-Spot Ladybird

Which are best?

The common species are the best to start with as they by definition are much less fussy than some of the other rarer ones and will survive well in a variety of conditions and feed on a selection of different foods. So with this in mind I suggest trying to find **Seven-Spot**, **Two-Spot** or **Harlequin Ladybirds**.



The Seven-Spot Ladybird



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Sweeping for Ladybirds!

Beating around the bushes!

Another good way to collect them is to place a white sheet under a low hanging tree branch and then give it a good shake. Any ladybirds hiding in the leaves will fall out and will be easily seen on the sheet and can then be collected as before. This is particularly good for finding ladybird larvae. The best trees to search are Lime, Willow and Sycamore as these usually have lots of aphids living in them.

Sweeping!

A robust type of bug hunting net called a 'sweep net' is very useful. You can buy these from special insect hunter suppliers (see useful contacts) or you could make your own out of white canvas, wire and a broom handle.

Swish the net through low vegetation, especially stinging nettles, thistles and knapweed in early and late summer and you should get lucky.

2. The Who's Who of Ladybirds

Spotted Beetle Spotting

Seven-Spot Ladybird

(Coccinella 7-punctata)

This is probably the most widespread and commonly seen of the ladybirds, best found as adults in the spring and summer almost on any plant that has a healthy (or unhealthy - if it's your own plant) population of aphids - nettle and thistle patches are favorite haunts. This species is the classic ladybird with lovely bright red wing cases with black spots and black legs, thorax and head, with a couple of white splotches thrown in as well. It is a good size insect at around 6-8 mm long. Because of its voracious appetite for many different kinds of aphid it has got itself a good reputation amongst gardeners.



The **Seven-Spot** Ladybird



Aphids Beware!

This hungry ladybird larvae is a creepy fast moving dark grey creature with orange bands and small black hairy warts!



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Two-Spot Ladybird

(*Adalia 2-punctata*)

This is another common and widespread species but because it is much smaller (4-5mm) it often goes unnoticed. It comes in different spot patterns, the most common has bright red wing cases clearly displaying two black spots, one on either side. It has black legs. However, just to confuse things, there are a wide range of different patterns all based on a red and black theme. The larvae are smaller than the Seven-Spot. Black in the early stages, it eventually develops orange blotches.

*The **Two-Spot** Ladybird*

TOP TIP

One of the best qualities about this little ladybird is that it is possible to keep it going through several life cycles in a year as long as you keep providing food and keep the temperature on the cosy side.

The **Harlequin** Ladybird

Harlequin Ladybird

(*Harmonia axyridis*)

This ladybird is an introduced species (first seen in 2004 in the UK) from Asia and has been seen as a threat to many other ladybird species as it eats many different insects including other ladybirds. It is in many places extremely abundant. Although seen as a 'baddie' it is still a very interesting species and its large size (6-8 mm), spectacular colours and variations, as well as varied diet, make it an easy and interesting species to keep and get to know. Some common varieties have an orange/red background colour to the wing cases, with up to 21 black spots as well as one with a black background and 4 large red spots - there are plenty of others. The voracious larva is slate grey with two bands of orange/red that run lengthways along the body. This species can turn up anywhere but is fond of Sycamore and Lime trees.



The **Ten-Spot** Ladybird

Another very common species is the Ten-Spot Ladybird (*Adalia 10-punctata*). Similar in size to the Two-Spot and just as variable, it tends to have more white on its pronotum (this is the section of body between the head and the wing cases) and pale yellowish legs rather than black.



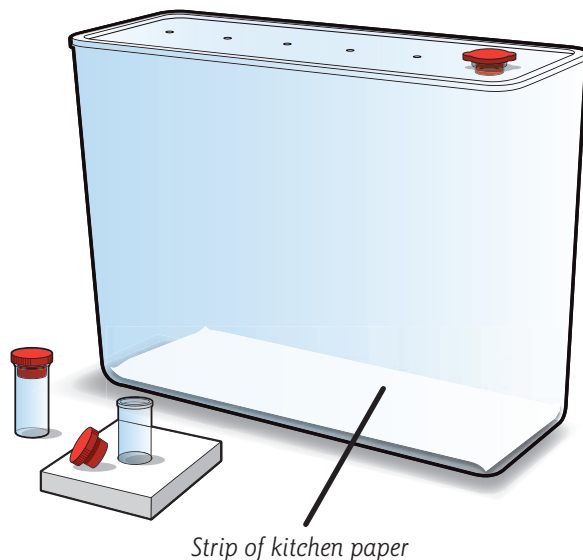


3. Setting Up Your Tank

Once you have collected a few ladybirds, it's time to set up your tank (visularium) to keep them in.

- 1** Line the bottom the 'visularium' with a strip of kitchen paper; this absorbs any excess water, condensation and the sticky 'honey dew' secreted by the aphids, making it much easier to keep things clean.
- 2** You will need to find and cut a stem of a plant with a large cluster of aphids on it.

To keep the stem fresh, stick the cut end in one of your specimen tubes half filled with water, then bung up the neck of the tube with cotton wool or tissue paper to stop any of your charges getting into the water and accidentally drowning. Place the tube in the bottom of the tank, securing it in place with the tube holder provided.





3 There are many different kinds of aphids that different species of ladybird like to eat and do best on certain types. As a rule of thumb, if you see ladybirds eating them in the wild then that is what you need to feed your captive ones!

4 Keep your setup away from direct sunlight and certainly don't place it on a sunny windowsill, as the temperatures will cook your beetles not to mention their food!

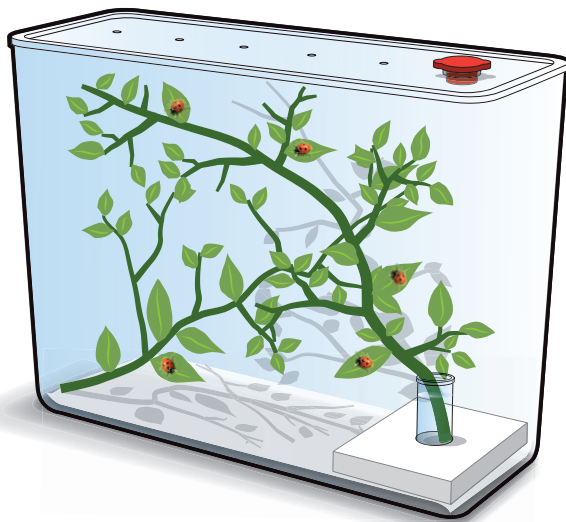
5 Next, add your ladybirds. You can keep up to 10 in the 'visualarium', but they eat a lot so it's best to start off with a small number and get used to their demands.

6 Then it's just a case of watching them getting on with the business of being ladybirds. For more tips on what to look out for see the 'Cool Things to Know about your Ladybirds' section of this booklet.



4. Caring for Your Pet Ladybirds

**It's generally very easy, just keep
your ladybirds clean and well fed.**



Cleaning

The biggest enemy of your ladybirds is mould and disease that is caused by damp and dirty conditions and so it's best to clean them out thoroughly at least every two days. Remove any plant material and throw away the liner and thoroughly wash with soapy water and dry before replacing the ladybirds along with fresh food. Make sure you check the leaves and any liner carefully in case there are any eggs, larvae or beetles you might have missed.

Feeding

You will need to provide plenty of food for your adult ladybirds/larvae, just how much does depend on the type of ladybird and aphid you are feeding to them. As a guide it will take some 15-25 aphids a day to satisfy the appetites of a couple of Two-Spot Ladybirds while the bigger Seven-Spot will probably need twice this. Sounds like a lot doesn't it, but usually aphids live in quite big colonies and you shouldn't have too much trouble finding loads. As a rule of thumb, just make sure there are always some live aphids in with your ladybirds and you know that way they will not be going hungry.



Search for aphids around your garden, park and hedgerows (I always find stinging nettles and roses are best). If you've not got any in your own patch ask a neighbour, you'll find most people are only too willing to let you take them away! To collect them either cut the stem they are sitting on or knock them into a collecting pot with the paintbrush and tip them in with your beetles.

If you have difficulty finding aphids, try a feeding your ladybirds on a few drops of sugar or honey water as a stop-gap. I have also read that a raisin soaked in water can be used as an alternative food source (although, I haven't tried this). This can only be used as a temporary measure as ladybirds and ladybird larvae need to eat aphids for a healthy diet.

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Watering

Well-fed ladybirds should not require water as they get all the moisture they need from the aphids they eat. However, in very dry conditions place a ball of cotton wool or tissue paper soaked in water into the tank and this will give ladybirds all the moisture they need.

TOP TIPS

Keep no more than 10 ladybirds in your visualarium.

Good places to search for wild aphids and ladybirds are roses, knapweed, sweet peas, beans, nettles and thistles.

Bean aphids are good food for many species, check your bean plant or even grow some of your own especially for the aphids and ladybirds! (I find broad bean plants are best).

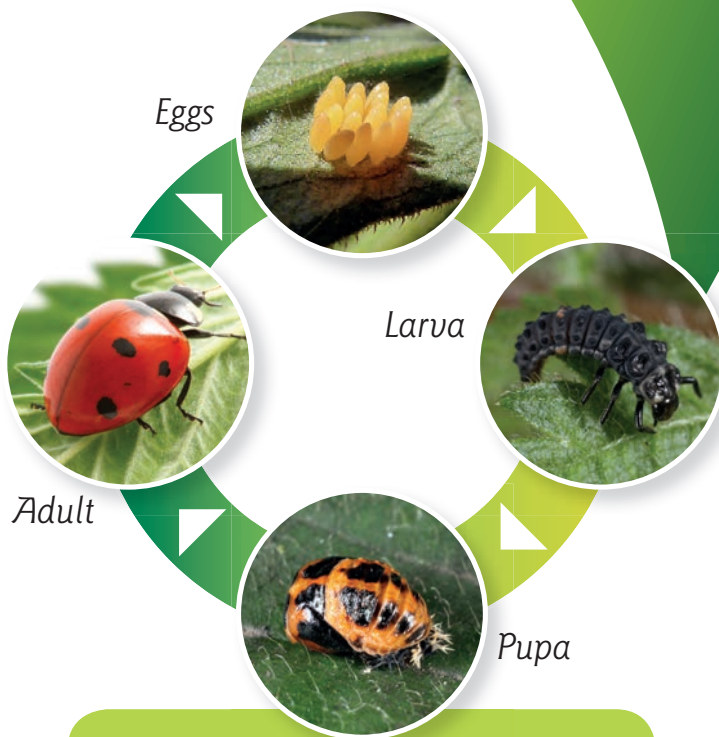
If you want to keep your ladybirds through the winter (Two-Spot are best for this), then aphids can be collected and frozen in the freezer and then thawed out when needed. Ladybirds will eat them as long as they are fed fresh.

Ladybirds have a life-cycle a bit like a butterfly with four stages; egg, larvae, pupae and adult, and in a similar way you can rear the larvae and study all stages in captivity using the materials supplied in this kit. Once you know what you are looking for, you can simply pick up the instructions at the appropriate place and carry on!

Most species of ladybird have one complete cycle a year with adult ladybirds being found in the spring and early summer. These then mate and lay eggs which hatch and the larvae grow through the summer months. As they moult they grow bigger until they form a pupa on the surface of a leaf, this then hatches into a very pale and crinkly adult ladybird beetle with little of the colour or indeed the markings you might be expecting. Given a day to dry and harden they will start to look a bit more familiar.

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5. Ladybird Life-Cycle



This is a diagram showing a ladybird life-cycle so you know what you are looking for...



Ladybird Eggs

Your adult beetles if collected in the spring will happily mate and lay groups of bright yellow skittle shaped eggs. These can be laid on the leaves (which are most handy) but sometimes they will be laid on the sides of your tank. Eggs are really fragile and should not be touched. They do however need to be separated from the adult beetles who might eat them. So either remove the plant with eggs on to another container or remove the adult beetles from the tank (either let them go where you found them or put them in another container). The eggs usually hatch within a week of being laid, if they go a dark colour and seem to collapse the chances are they were duds and not fertile and can be discarded.



Larvae

These are mostly spiky looking creatures, often described as looking a little like bristly crocodiles. They tend to be black with yellow, white or orange blotches on them depending on the species. They are very active and fast moving. After hatching from their eggs they hang around them for a while, eating the egg shells and sometimes their unhatched brothers and sisters (who said Ladybirds were nice? Not me!). Then they start to munch their way through any unfortunate aphids in the area and will continue to do so for the next 3-4 weeks. If the aphid is big they'll jump on its back and begin eating it while it's still alive; later on in life they will chase down their prey and end by pouncing on it (you do start to feel sorry for the aphids!).



How long will they spend as larvae?

This depends on the temperature of the room and the quality of the food you are giving them. As they grow they will moult their skins 3 times; don't disturb them while they are going through this stage, wait for them to move off of their own accord.

This is how they continue for their larval life, eating huge numbers of aphids and growing!

The seventh leg

Watch how the larvae move, they will scurry along using their six legs, but they have a special organ at the tip of their abdomens. This is a special sucker-like organ, which acts as a seventh leg, helping them to hang on tight if the wind blows and if they have a particularly feisty aphid, it means they can use all six of the walking legs to overpower it!





Pupae

Eventually they can eat no more and they appear to stop moving. They will hunch their backs and attach themselves to a leaf or the side of the enclosure, this is a stage called the pre-pupa and they look distinctly unwell.

The colour of the pupa varies with species but also it is influenced by temperature - cooler conditions create darker pupae, some almost black; while if it's warm they are often much lighter brown or orange.



Leave them alone and in a day or so, the skin will split and ruck up like an old sock, revealing an odd shaped thing that looks nothing like a ladybird or a larva - this is the pupa. Just like with butterflies, inside the pupa the ladybird larva is rebuilding itself into an adult beetle. Be patient and wait, for in a week or two

(depending on temperature - they can take over 2 weeks if it's cool or just a few days if it's warm) something amazing will happen!

The beautiful beetle emerges!

If you are lucky you might just get to see this, but I have to confess I'm not very good at catching them out as it often happens very early in the morning. When the ladybird is ready, the pupa splits down the middle of its back and out crawls a very floppy and pale thing, that looks very strange and not anything like the ladybird you might be expecting. But wait! After sitting, usually on top of its old pupal case, for a few hours, slowly the ladybird's wing cases harden up and the beginnings of the more familiar red and black markings appear, although it can take over a day for the process to be complete. This colouring process continues for the rest of the ladybird's life and the older the beetle is the deeper and darker red the wing cases are.

You now have a choice - you can let your ladybirds go where you found them or try and breed them again. Two-Spots and Seven-Spots can be made to go on through the winter and will keep going as long as you keep them warm and supply plenty of food. Getting ladybirds to hibernate well is quite tricky and so I don't recommend this for beginners.





6. Cool Things to Know About your Ladybirds

Although the Seven and Two-Spot Ladybirds are the most familiar, there are many other different kinds, with around 47 native British species to look out for. Some look like ladybirds with equally bright colours, but others are much smaller and quite plain and don't really look much like ladybirds to the untrained eye.

Veggie Ladybirds!

Most ladybirds are carnivorous and feed on other insects, most famously the unfortunate and juicy aphids. But there are some kinds that are vegetarian and feed exclusively on plants, mildew and algae.

Little & Large!

The smallest British ladybird is the Sixteen-Spot at 3mm in length while the biggest is the Eyed Ladybird at 8mm.





A gardener's dream and an aphid's nightmare!

Gardeners love ladybirds because they eat the aphids that feed on flowers and vegetables. Most ladybirds feed on aphids as both larvae and as adult beetles. A single ladybird can put away over 12,000 aphids in a year. You just have to watch yours chewing through a colony of them, mashing them up with their jaws, grazing their way through the herds, leaving a trail of maimed bodies in their destructive wake or if they are tiny larvae riding on the back of an aphid while sucking its juices out to see how they achieve it's gruesome claim to fame!



Bleeding knees and poisons within!

Ladybirds are brightly coloured for a good reason. In nature red, black and yellow tend to be used as a warning. In ladybirds it is an advertisement telling other creatures that to eat them would be a mistake as they contain some pretty unpleasant things. An unpleasant tasting cocktail of chemicals including such nasty sounding stuff as histamines, alkaloids and quinolones. Those that don't have these substances, such as the Larch Ladybird rely on being overlooked and are not brightly coloured and don't hang around out in the open, but rely on camouflage in order to avoid being eaten.

If you roughly handle a ladybird you may notice a horrible yellow ooze coming from its body, but don't worry you've probably not squashed it. This is something called reflex bleeding and the ooze is the nasty tasting blood and it's squeezed out between the ladybirds leg joints.



Fine young cannibals!

Many species of ladybird will turn on their brothers and sisters and eat them, especially if they're too crowded or there are not enough aphids supplied. To cut down on this natural behaviour either release some of your ladybirds back in the wild, on or near aphid colonies or separate them out into other containers.



Stationary but still moving!

Gently touch the pupae of your ladybirds with the paintbrush provided - you might be surprised to see the whole thing wriggle and twitch! These active pupae are thought to flinch to scare off or surprise any predators and parasites that might discover them.

Zombie Beetles!

Some animals will attack ladybirds and seem to be immune to the toxins they contain. There are parasitic wasps that will lay their eggs inside the developing eggs and larvae. If you've collected larvae from the wild you may see this. The grub emerges from the adult ladybird and

spins its own cocoon beneath the still twitching body of the poor zombie beetle, in doing so it gains protection from the just about living ladybird, using it like a living shield. Sometimes remarkably the ladybird survives this horror story!

7. Questions & Answers

Q. *What is a ladybird?*

A. A ladybird is an insect and is part of the beetle family.

Q. *When is the best time to set up my ladybird tank?*

A. The best time to set up your tank is in Spring and Summer months when ladybirds are active.

Q. *How many ladybirds can I keep in my tank at one time?*

A. I recommend no more than ten. The fewer you have the easier it is to keep them supplied with food.

Q. *How long can I keep them in my tank?*

A. I suggest at first you keep ladybirds for just a few days at first. Once you have experience, keep them for longer and see if they breed.

Q. *Where do I find ladybirds?*

A. Ladybirds are found throughout the United Kingdom in gardens, parks and countryside. Try looking on plants that attract lots of greenfly such as bean plants, roses and stinging nettles etc. If you can't find any, there are specialist websites that sell them (*details in next chapter*).

Q. *What do ladybirds eat?*

A. Ladybirds and ladybird larvae eat aphids (commonly known as greenfly or blackfly).





Q. *Do I need to give my ladybirds a drink?*

A. If you give your ladybirds enough juicy aphids they should get all the moisture they need. However, there is no harm adding a ball of damp tissue or cotton wool to your tank just in case they get thirsty.

Q. *What happens to ladybirds in winter?*

A. In winter ladybirds tend to huddle together in dry sheltered places and become inactive until the weather becomes warmer in Spring.

Q. *Is it cruel to keep ladybirds?*

A. No, not if you take care of them properly as described in this booklet. Keeping ladybirds is fun and educational but remember they are dependent on you for their wellbeing. Release them back to the wild when you no longer want to study or observe them or are having difficulty finding food.

Q. *Can you tell the age of a ladybird from the number of its spots?*

A. No, that's an old wives tale. However, a ladybird's spots may fade as they get older.

Q. *Are all ladybirds ladies?*

A. No, that's just their name. Some ladybirds are male, but it's very difficult to tell them apart.



8. Further reading, more information and handy addresses

Ladybirds (Naturalists Handbook 10)

by Mike Majerus & Peter Kearns

A great little book, full of great information on British ladybirds, from identification to keeping them. For both the serious and the interested.

Field Studies Council - Guide to Ladybirds of the British Isles

by Mike Majors, Helen Roy, Peter Brown and Remy Poland.

This is one of the very useful series of laminated fold out field guides produced by the council and this one is excellent with great illustrations of all the British ladybirds to help you identify them, plus loads of great information packed into a handy format to take out into the garden or on walks.

UK Ladybird Survey -

www.ladybird-survey.org

Harlequin Ladybird Survey -

www.harlequin-survey.org

Bug Zoo - This is another book I wrote to help those who want to keep creepy crawlies including a section on ladybirds.

NHBS (stands for Natural History Book Services) is more than a book shop and is an excellent place for any naturalist to mail order the things they need such as pots, pooters and nets.
www.nhbs.com

Ladybirds by Mail Order!

During Spring and Summer months you can buy ladybirds from a number of different online suppliers; they are supplied to gardeners looking for natural ways to control aphid populations. However, they can be expensive to buy so I would always recommend trying to find your own ladybirds first.

To find a supplier, Google 'buy ladybirds UK'. I bought 2 lots of ladybirds from 2 different sources whilst researching this kit, both proved to be good suppliers. They were: www.gardening-naturally.com and www.suttons.co.uk.



About the Author

Nick Baker is a professional naturalist whose career has taken him from being a field ecologist working on birds, butterflies and badgers to top TV broadcaster. Best known for his wildlife programs on BBC, Animal Planet, Discovery and National Geographic, he has had many adventures with many species from gorillas to polar bears, but his real love is that of the wildlife in his own garden, the little things that make the world go around - it was the insects and other invertebrates that started him off as a kid and to this day still hold a very special fascination.



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Nick's TV programmes include:

The Really Wild Show
Nick Baker's Weird Creatures
Nick Baker's Beautiful Freaks

Nick has written over 12 nature study books; titles include:

My First Cockroach
Nick Baker's Bug Book
Nick Baker's British Wildlife
The New Amateur Naturalist
Habitat Explorer Guides
Nick Bakers Bug Zoo

Dedicated to conservation, Nick is involved with many wildlife charities and trusts:

Vice President - Butterfly Conversation Trust
Vice President - RSPB (youth)
Vice President - The Wildlife Trusts
President - Bug Life

To find out more about Nick and his many achievements visit his website: www.nickbaker.tv