An Approach to Insects – a Co-operation between Zoo, Senckenberg Institute, University, Palmengarten, and the Entomological Association Apollo in Frankfurt / M.

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Although insects are the dominant animal group of our time in terms of species numbers and biomass, what we actually know about insects is rather limited. For example, spiders like the tropical *Nephila* shown here (Slide) are often thought to be insects, and many people believe, that dragonflies – here the model of an emerging dragonfly (Slide) – are actually able to sting simply because they look threatening. Of course there are also the so-called “beautiful” insects like butterflies, and these two young ladies dressed up as butterflies immediately won the attention of the visitors of the International Frankfurt Automobil Exhibition (Slide).

World-wide, various institutions like universities, laboratories and conservation organisations are working to extend our knowledge of insects, to protect their habitats and to improve their image. The example of a co-operation between five Frankfurt-based organisations, which has existed for several years, shows how this aim can be achieved with limited personnel and organisational efforts. (Slide) The partners in this co-operation are the Senckenberg Research Institute and Natural History Museum, Frankfurt Zoo, the Palmengarten, Frankfurt University and the Entomological Association Apollo. Hereby, each institution takes on the tasks which are typical for them, and thus demand the least effort for them. —— So, which are these typical tasks?

In general, **universities** carry out basic and applied research. Results are published in national and international journals and presented at meetings to collegues in talks and posters. The disadvantage of this method is that the most up-to-date information is accessible only to a small circle of experts.

It is easier for **natural history museums** to inform the general public. While conducting basic and applied research, the museum’s scientists are also responsible for the presentation of the exhibition. (Slide) Most museums like Senckenberg will show selected insect orders in print, as original specimens and as models. In addition, a few living species like bees can be observed. However, experience shows that visitors of natural history museums are usually considerably less interested in insects than in vertebrates.

Thus we come to the **zoos**, where live insects are bred and tended. Here, different kinds of presentation can be distinguished:

- (Slide) Some institutions, such as the so-called “butterfly gardens” for example in Kuala Lumpur specialise in insects. Here visitors can watch live insects in large greenhouses during food uptake, flight and even copulation (Slide).
- (Slide) Other zoos have large sections set aside specifically for insects like Düsseldorf Zoo, or they keep them in specific insect houses like in the butterfly house in Melbourne Zoo (Slide: under construction in 1985).
- (Slide) Most zoos display some 10 to 20 insect species in a section of one of the houses. The Frankfurt Zoo is an example for this. Here insects, fishes, amphibians and reptiles share one house, the so-called ”Exotarium”.

Despite of the attractive species shown, zoo visitors are generally more interested in vertebrates than in insects, and guided tours with an entomological topic are requested very rarely.

Finally, **botanical gardens** cultivate plant species, which have some relationship with insects. Thus
- (Slide) insects might be involved in pollination or seed dispersal or
- (Slide) insect imagoes or larvae might feed on the plant or
- (Slide) insects might provide the plant with nitrogen, the so-called “carnivorous” plants.

Those sorts of plants are shown in the Palmengarten at Frankfurt as well. Guided tours and talks are offered, but they reach only a small circle of interested people. In contrast, the travelling exhibition ”Insects, the Secret Rulers”, which was shown in 1998, proved to be an extraordinary success. During this exhibition, additional entomologically orientated actions like face-painting (Slide) were offered.

The fifth partner of the co-operation is the **Entomological Association Apollo**. The members are scientists as well as lay-persons, who are dealing with insect breeding, insect photography, and insect systematics. The association maintains biotopes that are suitable for insects, publishes an internationally renowned journal, and organises an annual International Insect Exchange Fair. (Slide) Mounted and live insects are shown at this fair and can be purchased, as long as they don’t belong to species protected by law. Even universities and research institutions exchange and buy material on this occasion. Frankfurt Zoo, for instance, regularly purchases live insects here.

(Slide) Every year, the fair has about 1,000 visitors. Most of them are adults, but children also attend. The fair is held in a big shopping complex which includes a children’s and youth theatre. This theatre offers performances in the afternoon which are usually well-attended. In this way, a considerable number of people is drawn into the fair by chance. Since 1995, I have been organising the so-called **Accompanying Entomological Programme** for the different visitor groups, with various offers for children, teenagers and adults.

(Slide) From the very beginning, the central part of the programme was to offer children the possibility to turn themselves into insects. The aim of this activity is not the disguise itself, but rather the possibility to enter, with the help of play, into a conversation about insects with the children and the accompanying adults. The children may turn themselves into a butterfly, a bee or a ladybird. The dresses, intentionally rather plain, are meant to show the common layout of insect morphology which is exoskeleton, wings and feelers of the imagoes, but also the difference between the three insect orders. The “body” consists of a narrow tube of non-elastic fabric, into which the children have to squeeze themselves, aided by an adult or another child. Thus the difference between an exoskeleton made of chitin and a human endoskeleton made of bones is experienced.

(Slide) The wings are simplified, but anatomically correct constructed:
- The bee has two pairs of differently sized, membraneous wings made of netting, which is stiched onto translucent plastic.
- The butterfly has two pairs of wings made of coloured fabric.
- The ladybird has a pair of wing covers made of fabric, as well as a pair of membraneous wings made of netting.

(Slide) With the aid of photographs, the children have to choose the feelers, which are belonging to “their” insect. This is a good exercise in observation skills, especially with the bee and ladybird. The feelers are made of wooden pearls in the proper form of the segments, hold together by wire and fixed on a hair band.

(Slide) Conversations about the feeding habits of insects are started with the help of two models: A dandelion flower made of paper stands for the food of bees and butterflies, while a leaf with a greenfly represents the food of the ladybird. Especially the greenfly raises curiosity in children and adults, and often makes people willing to discuss the feeding habits of insects, usually considered “disgusting” by many.

- Further items on offer are (Slide) books on insects,
- (Slide) various hand and finger puppets from Folkmanis,
- (Slide) worksheets with questions to answer or insect outlines to colour in.
- (Slide) Children can also draw their own insects on balloons, or
- (Slide) with special markers on t-shirts as well as create their own insect wings.

(Slide) Furthermore, members of the association inform visitors about biological pest control, they explain the biology of native insects, show the food plants of native butterflies and put home-made containers for the rearing of insects and for insect photography on display.

Let’s talk about the **cooperations**.

(Slide) Starting with the second year of the Accompanying Entomological Programme, scientific posters created by Frankfurt **University** and the **Senckenberg Research Institute** were shown. These were posters from previous poster sessions elsewhere; they were therefore not new, but re-used. New was however, that the scientists explained their results to the visitors. This direct contact was perceived as valuable by both – visitors and researchers. Therefore, poster presentations of two entomological work groups of Frankfurt University will be at the centre of the Accompanying Entomological Programme this year.

(Slide) The cooperation with the **Zoological Garden Frankfurt** exists since 1999. Because of the timing of the market in November, there are only few native insects around. We therefore display live tropical insects, which are an attraction for all age groups. We have made the best experiences with the Australian Ghost Insect *Extatasoma tiaratum* (Family Phasmatidae) and the African Rose Beetles *Pachnoda savingii* (Family Scarabeidae). (Slide) Initially, the insects are always introduced in the terrarium like her *Pachnoda*. After that, the visitors may take them in their hands, if they wish to do so.

(Slide) The greatest success is claimed by the Malagassy hissing cockroaches (*Gromphadorhina portentosa*). Due to their habits and behaviour, they are most suitable to accustom people to insects:

- In terms of morphology, they are not the typically “disgusting animals”, as they are neoten, i.e. even the imagoes don’t have complete wing covers.
- They are quite tolerant of bright light.
- They move slowly.
- They make hissing sounds, by pressing the air out of their tracheae, and
- they can also take some rough handling.

If the biology of the hissing cockroaches is properly explained, they can develop into real visitors’ favourites. Done in a sensible way, this works even with visitors, who previously rejected the animals emotionally.

There is no doubt, that the presentation of live insects is very attractive to visitors, but it should be noted that it is also the most demanding display option in terms of required time and manpower. It is therefore a very welcome side effect of the programme, that some children, who have been visiting the Accompanying Entomological Programme for years, are now helping to show and introduce the animals to others.

(Slide) Last year, face-painting based on insect images was offered for the first time. Thos co-operation with the **Palmengarten** goes back to the travelling Insect Exhibition mentioned above. Not only children, but also many adults want to have their faces adorned in this aesthetic way. This activity has therefore become a permanent feature in the programme.

(Slide) At the end of my talk let me **summarize**: What are the **advantages** of these co-operations?

1. With the help of the co-operation we reach a broad public. —— This are not only people interested in biological themes, i.e. the classical zoo or museum visitors, but also passers-by, whose interest has been raised by the hand-painted balloons, by children running around with insect wings and by people with artfully painted faces.
2. Through this co-operation, we advertise for people to come and visit and to join all the organisations involved. —— The partners advertise the International Insect Exchange Fair with flyers and posters, and, in return, activities on offer during the fair are an attractive advertisement for the Zoo, the Senckenberg-Museum and the Palmengarten.
3. With the help of the organisational structures existing within the co-operation, the sharing of tasks and the tried-and-tested offers, we are able to react quickly to new demands. — In the same way as the fair is used as a platform, events organised by the partner organisations may be used to present the offers developed by the Entomological Association.

I hope my talk has given you a stimulus for an approach to insects either alone or in co-operation with other biological organisations to contribute to the conservation of insects. —— Thank You for Your attention.