

EDIT Workpackage 5 – Interview 16 Model Detail

The taxonomist is an entomologist working in MIIZ, Warsaw, specialising on the order *Coleoptera*. His work is exclusively research based, and has two major directions; the production of revisions largely based on the fungus beetles *Erotylidae*, and the production of a checklist describing the *Coccinellidae* family

The following table describes the individual steps of the process model in detail.

Event	Starting trigger	<p>New projects are determined by the current state of knowledge in the field. A taxonomic group will be chosen where the current knowledge is suspect or incomplete, and in which the taxonomist has a personal interest. Preliminary research will take place, which will involve the gathering of a selection of literature and specimens. The details of these activities are described in later sections.</p> <p>Projects are often collaborative efforts, especially when the project will involve a taxonomic group from abroad. Collaborative projects can also attract funding from a wider audience.</p>
Activity	Collecting activities/ Field work	<p><i>Erotylidae</i> are generally found in the wet tropics, and at present collections are not undertaken due to the prohibitive cost of such expeditions. Previously, the taxonomist worked in Japan for some years and described the collecting activities he undertook then.</p> <p>These took place through a long-standing relationship with a Japanese institute. Funding for these expeditions came from a Japanese governmental agency.</p>
Action	Arrange permits and practicalities	<p>Permits can be required to enter a region, to work, and to collect and export materials. CITES and other restrictions may apply. Other practicalities can include the hiring of guides, drivers, the hiring of equipment, arranging camp and others. These tend to be arranged by collaborators in the host country.</p>
Action	Conduct collection	<p>Collection methods include ground sweeping and the setting of traps. Collected specimens are exterminated using acetone, then stored in alcohol, which must be of 90% concentration if molecular examinations are to be performed. If not, 40-80% is sufficient.</p> <p>It was not possible to remove material from these regions, so the specimens were stored in the host institute.</p>
Activity	Select a sub-group to work on	<p>Sub-groups are selected for study due to the impracticality of working on a whole group at once. Sub-groups will be selected by taxonomic group, by availability of specimens, or other practical factors.</p>
Activity	Prepare checklist	<p>The first step is to create a checklist of the group under study. The information from this list is gathered</p>

		<p>from the following sources:</p> <ul style="list-style-type: none"> - Zoological Record - Google Books - Wikipedia - other specialist websites - general reading around the field - consultation with colleagues - personal knowledge of the field <p>The list is used throughout the revisionary process and may be updated and amended as the project proceeds.</p>
Activity	Search Literature	The activity of sourcing and researching the existing body of literature.
Action	Identify existing literature	Literature can be identified from the project checklist
Action	Gather existing literature	<p>The library at MIIZ contains over 230,000 volumes and is considered a valuable resource. Any publications that can not be found in the library can be sourced from:</p> <ul style="list-style-type: none"> - The Polish National Library - Other libraries, via loan - The British Museum, via their online catalogue <p>Visits to institutes will be used to collect literature if possible.</p>
Activity	Gather existing specimens	The process of identifying and acquiring all existing specimens of the group under study
Action	Identify existing specimens	<p>There a number of strategies for identifying the location of existing specimens of the group under study.</p> <ul style="list-style-type: none"> - Contacting a wide range of colleagues and asking about their private collections - Contacting the curators of institutes - Publications may give the location of specimens, especially recent works - Publications detailing the career and collections - Online museum catalogues - Knowledge of collectors' career and the institute in which they worked <p>For older type specimens, it is often the case that there are only a limited number of institutes in which the specimens are likely to be found; these will tend to be the institutes with larger, well established collections.</p>
Action	Gather specimens	<p>Specimens can be sourced by loan, or by visiting the institute in which they are held. As with literature, visits to other institutes are used as an opportunity to examine specimens whilst avoiding the expense of a loan. The taxonomist may also request that any colleague travelling from the host institute to MIIZ brings specimens with them.</p> <p>Loaning requires the completion of a loan form,</p>

		<p>which can normally be sent electronically. The loan may require the taxonomist to provide justification for the loan; a description of the project perhaps. This service is almost always free in European and American institutes.</p> <p>Blanket requests can also be made, where all specimens of the groups, and those which are not formally identified by thought to be of the group, are requested. In cases such as these is it not uncommon for the group to be sent out piecemeal, with a further batch of specimens sent out on return of previous loans. This can be inconvenient, but is unavoidable.</p>
Activity	Examine specimens	The process of preparing and examining the gathered specimens. Examination notes are recorded with pen and paper.
Action	First visual examination	Examinations always start with a first pass, a preliminary unaided examination to establish the basic features and broad taxonomic grouping of the specimens.
Action	Sort specimens	The specimens are physically sorted by taxonomic group. Grouping like this helps to highlight the morphological features that specimen may share, and those which differ between them.
Activity	Prepare specimens	Specimens must be prepared for examination.
Action	Hot water treatment	Specimens are left in hot water overnight. This relaxes the stiff, dried body-parts and allows successful dissection
Action	Dissection	The specimen is dissected to reveal internal characters, and to remove broad sections for examination. The abdomen is typically removed prior to further treatment.
Action	Remove soft tissues	Specimens are bathed in a cold potassium hydroxide solution to remove all soft tissues and allow clear microscopic examination of the remaining structures.
Action	Mount on slide	Specimens are mounted on a slide in transparent glycerine.
Action	Detailed visual examination	Examination of morphological structures under the light microscope.
Action	Prepare illustrations	The taxonomist prepares his own illustrations. First sketches are prepared using the light microscope with a camera lucida attachment.
Action	Prepare photographs	Again prepared by the taxonomist, using a Nikon D70 digital camera. Photographs are especially valuable when examining specimens in their host institute, as they provide an opportunity for further examination, albeit the limited examination that one can perform from an image. The specimen label will also be

		photographed for identification.
Decision	Further analysis?	Once the detailed examinations are complete, a decision is made as to whether further examinations are needed.
Action	Further analysis	Further analysis takes two forms: SEM – will be undertaken if necessary, but this is a time consuming exercise so will only be performed when it is needed. MIIZ has it's own electron microscope at the collection site at Lomna, where a technician performs the scans. Phylogenetic analysis – this will be based on the observed morphological characters.
Decision	Assess emerging theory	As with most revisions, assessing the emerging theory is a continual process. Nevertheless a stage is always reached when the examination is judged to have extracted all necessary information to put together an accurate taxonomic theory. At this point the examination is complete.
Activity	Apply nomenclatural rules	A broad category representing the application of the rules of nomenclature to the specimen groups.
Action	Resolve type specimens	Type specimens are assigned to each group, according to the rules of the ICBN.
Action	Resolve nomenclature	Nomenclature is resolved for the type specimens in each group.
Activity	Publish paper	The process of compiling and submitting a manuscript for publication.
Action	Compile manuscript	The various sections of the manuscript are prepared and compiled according to the editorial guidelines of the intended journal. Typical sections include: <ul style="list-style-type: none"> - taxonomic treatment (descriptions and diagnosis) - locations of type specimens - illustrations (can be drawings or photographs) - comparison tables - distribution maps - references and bibliography Adobe Photoshop is used to prepare images. Coral Word Perfect is used for all word processing.
Action	Friendly review	Informal review of a manuscript carried out by colleagues in order to gather comment before formal submission. Manuscript can be sent by email or printed copy.
Action	Revise paper	The manuscript is revised in the light of comments.
Action	Submit to journal	Formal submission to the journal in question, in accordance with editorial guidelines.

Decision	Manuscript review	Although this decision is outside of the taxonomist's work process it is included as it affects process flow. Formal review general results in either a recommendation for minor or major revisions. The manuscript is then returned and the taxonomist revises the paper while taking into account the comments made by the peer-review, then will re-submit. Papers may also be accepted or rejected outright, but both of these are very rare.
Activity	Curation activities	This broad activity refers to the management of collections and the handling of loaned specimens. The taxonomist here uses no collection database, either electronic or paper based. The specimens are stored in a cabinet in the office, and curation information is held in memory. The collection is relatively small, so this is possible.
Action	Label specimens	Specimens are stored in boxes, either pinned through the thorax or glued to card, which is then itself pinned. Labels are attached to the same pin, and may be hand written or printed out using Word Perfect.
Action	Return loaned specimens / send out paratypes	Loaned specimens are boxed, and wrapped in polythene. Generally, the specimens are securely packaged and returned by post. If a visit to an institute offers an opportunity to return specimens, then this will be taken advantage of.
Action	Place specimen in local collection	The specimen is placed in the appropriate drawer or the appropriate cabinet.

Notes:**Bottlenecks in the taxonomic process:**

Generally, the position of traditional taxonomy in relation to molecular techniques is seen as unfairly weak. Taxonomy as a science is seen to take time and experiences, and a broad knowledge of the past literature. It is the taxonomist's opinion that a theory developed from molecular techniques is in no way more inherently valuable than one derived from traditional techniques. Indeed, over-reliance on molecular work, or any one technique, can be at the expense of the broader knowledge required for a comprehensive taxonomic theory

Possible new resources:

An online catalogue of type specimens complete with images would be very useful