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IN THIS ISSUE:
- Peter Schausberger spotlights three recent mite articles
- Mohamed W. Negm on the knowledge of Phytoseiidae in Saudi Arabia
- PhD and MSc theses from Finland, Austria, The Netherlands and Turkey

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DEAR ACAROLOGISTS

We are pleased to present you the 8th volume of the EURAAC Newsletter. In the Spotlight section, the past EURAAC president Peter Schausberger (University of Natural Resources and Life Sciences, Austria), takes once again the liberty of presenting his personal selection of recent mite papers. In the Forum section, Mohamed W. Negm (King Saud University, Saudi Arabia) reports the current state of knowledge of the Phytoseiidae in Saudi Arabia. The Theses section contains the abstracts of recently finished PhD and MSc theses from the Netherlands, Finland, Turkey and Austria. In the Media section, we advertise the comprehensive checklist of phytoseiid mites compiled by Vikram Prasad.

This volume is the last EURAAC Newsletter edited by us, Stefan Peneder and Peter Schausberger. Thanks to all contributors for sharing their news with us during the past four years. We are now putting the fate of the Newsletter into the hands of the new EURAAC president, Paco Ferragut (Universidad Politecnica de Valencia, Spain; fjferragut@eaf.upv.es). Please keep on informing the future editors, the Newsletter lives from your contributions. The deadline for news to be included in the 9th issue (May 2013) is end of April 2013.

It was a great pleasure to revive the idea of the EURAAC Newsletter and edit its first online version.

The Editors (euraacnews@boku.ac.at)
Peter Schausberger + Stefan Peneder

CONTENTS

Spotlight ..... page 3

Forum ..... page 5

MSc & PhD theses ..... page 8

Media ..... page 13

Events ..... page 15

Peter Schausberger highlights three recent mite papers spanning from paleontology, entomopathology to behavioral ecology.
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June 2012

Fossil records of mites, especially of soft-bodied taxa such as the Astigmata, are extremely rare. Scrutiny of amber inclusions by **J. E. Dunlop*, S. Wirth, D. Penney, A. McNeil, R.S. Bradley, P.J. Withers, R.F. Preziosi** allows looking back in time and get an idea of the life of phoretic mites, riding on their closest relatives, spiders, millions of years ago. *Biology Letters* 8: 457-460.
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A MINUTE FOSSIL PHORETIC MITE RECOVERED BY PHASE-CONTRAST X-RAY COMPUTED TOMOGRAPHY

High-resolution phase-contrast X-ray computed tomography (CT) reveals the phoretic deutonymph of a fossil astigmatid mite (Acariformes: Astigmata) attached to a spider's carapace (Araneae: Dysderidae) in Eocene (44–49 Myr ago) Baltic amber. Details of appendages and a sucker plate were resolved, and the resulting three-dimensional model demonstrates the potential of tomography to recover morphological characters of systematic significance from even the tiniest amber inclusions without the need for a synchrotron. Astigmatids have an extremely sparse palaeontological record. We confirm one of the few convincing fossils, potentially the oldest record of Histiostomatidae. At 176 µm long, we believe this to be the smallest arthropod in amber to be CT-scanned as a complete body fossil, extending the boundaries for what can be recovered using this technique. We also demonstrate a minimum age for the evolution of phoretic behaviour among their deutonymphs, an ecological trait used by extant species to disperse into favourable environments. The occurrence of the fossil on a spider is noteworthy, as modern histiostomatids tend to favour other arthropods as carriers.

June 2012

Mites and ticks are well-known for their potential to vector micro-organisms including entomopathogens. **S.J. Martin*, A.C. Highfield, L. Brettell, E.M. Villalobos, G.E. Budge, M. Powell, S. Nikaido, D.C. Schroeder**** impressively describe the potential of *Varroa* mites to mediate the spread and prevalence of the deformed wing virus (DWV) in honey bees. *Science* 336: 1304-1306.
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GLOBAL HONEY BEE VIRAL LANDSCAPE ALTERED BY A PARASITIC MITE

Emerging diseases are among the greatest threats to honey bees. Unfortunately, where and when an emerging disease will appear are almost impossible to predict. The arrival of the parasitic *Varroa* mite into the Hawaiian honey bee population allowed us to investigate changes in the prevalence, load, and strain diversity of honey bee viruses. The mite increased the prevalence of a single viral species, deformed wing virus (DWV), from ~10 to 100% within honey bee populations, which was accompanied by a millionfold increase in viral titer and a massive reduction in DWV diversity, leading to the predominance of a single DWV strain. Therefore,

the global spread of *Varroa* has selected DWV variants that have emerged to allow it to become one of the most widely distributed and contagious insect viruses on the planet.

August 2012

Plant-inhabiting mites have a long tradition as study animals in behavioral ecology, with social interactions and group-living being especially fascinating aspects. **M.A. Strodl* and P. Schausberger** determined one of the assets of making friends in the group-living predatory mite *Phytoseiulus persimilis*. Larvae living together with friends are more vigilant against predators and survive longer than larvae living together with unfamiliar individuals. *PLoS ONE* 7(8): e43590.
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SOCIAL FAMILIARITY REDUCES REACTION TIMES AND ENHANCES SURVIVAL OF GROUP-LIVING PREDATORY MITES UNDER THE RISK OF PREDATION

Background

Social familiarity, which is based on the ability to recognise familiar conspecific individuals following prior association, may affect all major life activities of group-living animals such as foraging, reproduction and anti-predator behaviours. A scarcely experimentally tested explanation why social familiarity is beneficial for group-living animals is provided by limited attention theory. Limited attention theory postulates that focusing on a given task, such as inspection and assessment of unfamiliar group members, has cognitive and associated physiological and behavioural costs with respect to the attention paid to other tasks, such as anti-predator vigilance and response. Accordingly, we hypothesised that social familiarity enhances the anti-predator success of group-living predatory mites, *Phytoseiulus persimilis*, confronted with an intraguild predator, the predatory mite *Amblyseius andersoni*.

Methodology/Principal Findings

We videotaped and analysed the response of two *P. persimilis* larvae, held in familiar or unfamiliar pairs, to attacks by a gravid *A. andersoni* female, using the behavioural analyses software EthoVision Pro®. Familiar larvae were more frequently close together, reacted more quickly to predator attacks, survived more predator encounters and survived longer than unfamiliar larvae.

Significance

In line with the predictions of limited attention theory, we suggest that social familiarity improves anti-predator behaviours because it allows prey to shift attention to other tasks rather than group member assessment.

EURAAC COMMITTEE CHANGES

The composition of the EURAAC committee changes every 4 years. As agreed upon at the 7th EURAAC Symposium, July 9-13 2012, Vienna, Austria, the EURAAC committee for the term 2012 to 2016 is as follows:

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THE TAXONOMIC STATUS OF PHYTOSEIIDAE IN SAUDI ARABIA

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Phytoseiid mites comprise 90 genera and more than 2,300 nominal species (Beaulieu et al., 2011). This family includes the most important natural enemies of mite pests (Kostiainen & Hoy, 1996; McMurtry & Croft, 1997).

However, the first record of this family in Saudi Arabia was in 1982 on the basis of two unidentified species, *Amblyseius* sp. Berlese, 1914 and *Phytoseius* sp. Ribaga, 1904 associated with unidentified plants, soil and animal manure (Dabbour & Abdel-Aziz, 1982). These species were re-examined and identified as *Neoseiulus barkeri* Hughes, 1948 and *Phytoseius plumifer* (Canestrini & Fanzago, 1876) (Negm *et al*., 2012b). In 2010, *Euseius scutalis* (Athias-Henriot, 1953) was recorded from eggplant leaves at Hail region, Saudi Arabia (Al-Shammery, 2010). During surveys of phytophagous and predaceous mites associated with vegetable crops and some trees, four phytoseiid species were collected, three of which, *N. barkeri*, *N. cucumeris* (Oudemans, 1930) and *N. mumae* (Shehata & Zaher, 1969) were published as new records for Saudi Arabia (Al-Atawi, 2011a,b). In the same year, Fouly and Al-Rehiayani (2011) surveyed predaceous mites at Al-Qassim region reporting three new records, *Amblyseius cydnodactylon* Shehata & Zaher, 1969, *Typhlodromus pyri* Scheuten, 1857 and *Typhlodromips swirskii* (Athias-Henriot, 1962).

Recently, taxonomy of beneficial mites and their use in biological control against phytophagous species have become subjects of intensive study in Saudi Arabia. Furthermore, the newly introduced programs such as organic farming and biological control encouraged entomologists to pay attention to the value of beneficial predatory mites mainly phytoseiids, therefore, projects are underway to identify the phytoseiid fauna and select the species that may have potential as biological control agents. Within the scope of searching for biocontrol agents of the old world date mite, *Oligonychus afrasiaticus* (McGregor, 1939) (Acari: Tetranychidae), a comprehensive study has been conducted over three years (2010-2012) on the phytoseiid fauna associated with date palm orchards at different regions. Thirteen species of phytoseiid mites were reported from date palm orchards in Saudi Arabia. Ten of them were first records for this country: *Cydnoseius negevi* (Swirski & Amitai), *Neoseiulus bicaudus* (Wainstein), *N. conterminus* (Kolodochka), *N. makuwa* (Ehara), *N. rambami* (Swirski & Amitai), *N. paspalivorus* (De Leon), *Proprioseiopsis asetus* (Chant), *P. beatus* (Chaudhri), *P. messor* (Wainstein), *P. ovatus* (Garman), in addition to *Neoseiulus saudiensis* Negm, Alatawi & Aldryhim, a new species described from Bermuda grass *Cynodon dactylon* L. (Poaceae) in a date palm orchard in Riyadh region and a key to the 19 known species of Phytoseiidae from Saudi Arabia is also provided (Negm *et al*., 2012a,b). These are the most comprehensive works conducted on the phytoseiid fauna in Saudi Arabia so far. The new species and the new records may indicate that this area is rich in phytoseiid species. Furthermore, recording *N. makuwa* and *P. asetus* for the first time in the Middle East as an alien species may show that phytoseiid mites could work well as biological

control agents in this semi-arid area. Therefore, further and extensive studies are recommended for phytoseiid mites on other plant species.

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Al-Atawi, F.J. (2011b) Six new records of predaceous mites associated with trees from Riyadh, Saudi Arabia. *Acarines*, 5, 37–39.

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Negm, M.W., Alatawi, F.J. & Aldryhim, Y.N. (2012a) A new species of *Neoseiulus* Hughes, with records of seven species of predatory mites associated with date palm in Saudi Arabia (Acari: Phytoseiidae). *Zootaxa*, 3356, 57–64.

Negm, M.W., Alatawi, F.J. & Aldryhim, Y.N. (2012b) Incidence of predatory phytoseiid mites in Saudi Arabia: new records and a key to the Saudi Arabian species (Acari: Mesostigmata: Gamasina). *Systematic & Applied Acarology*, 17(3), 261–268.

BIO-SYSTEMATICS OF PREDATORY MITES USED FOR BIOLOGICAL CONTROL OF THE COCONUT MITE

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Ever since its discovery as a pest of coconut palms in Mexico in 1965, the coconut mite *Aceria guerreronis* Keifer has been reported from other countries, first in South-America, then in Africa and finally also in Asia. With the aim to establish biological control of this pest, a search for candidate natural enemies associated with this pest has been conducted in several countries in each of these geographic areas. Prior to the work described in this Thesis, two species of predatory mites (Acari: Phytoseiidae) were found to co-occur in Brazil, Tanzania, Benin and Sri Lanka and, based solely on morphological criteria, they have been identified as *Neoseiulus paspalivorus* DeLeon and *N. baraki* Athias-Henriot. Because these species inhabit widely different geographic areas, there may be genetic variation between geographic populations of each of these two species that is worth to be explored in order to improve the effectiveness of biological control. The aim of the work presented in this Thesis is to assess the genetic entities (biotypes, cryptic species, subspecies and species) that should be considered for their impact on biological control. Therefore, this Thesis is largely a biosystematic study that serves as a basis for future studies on biological control. This is done by a combination of morphological measurements, crossbreeding experiments and molecular analysis.

It was found that geographic populations of *Neoseiulus paspalivorus* were morphologically similar, yet reproductively incompatible. Females of each population were able to mate with males from the other populations, but they laid fewer eggs and most of these eggs did not hatch because they shrivelled. Moreover, the populations were genetically identical, based on the mitochondrial cytochrome oxidase subunit I (CO1-sequences). Then, using the 16S rDNA primers, the three populations were checked for the presence of two endosymbiotic bacteria, *Wolbachia* and *Cardinium* known to cause reproductive abnormalities in their hosts, and their phylogenetic relationships were analysed. Different *Wolbachia* strains were detected in the populations from Benin and Brazil whereas a population from Ghana harboured only *Cardinium* symbionts. An antibiotic test showed that removing the symbionts from females of each population made them incompatible with males of the same population. Moreover, these tests restored compatibility between the populations from Benin and Brazil in one direction, but not in the reciprocal cross, suggesting incompatibility arising from interactions between nuclear and cytoplasmic genes. Antibiotic-treated females of the population from Ghana produced hardly any progeny, so that we were not able to establish a *Cardinium*-free line and hence no crossings with other populations. Given the symbiont-associated reproductive isolation, genetic differentiation between the three populations remains a possibility worth to be explored for traits relevant to biological control. However, we conclude that the three populations belong to a single species.

Following the same approach we found that geographic populations of predatory mites, previously identified as *N. baraki*,

are reproductively incompatible, differ genetically with respect to mitochondrial CO1 sequences and some morphological traits (i.e., number of teeth on the fixed digit of female chelicera) and therefore do not belong to one species. In particular, the population from Benin was distinct from the other populations studied (Brazil, Tanzania and possibly also Sri Lanka) and may represent a cryptic species. Because scrutiny of the holotype was not possible, it cannot be inferred which of the two cryptic species is the real *N. baraki*. Nevertheless, these genetic entities seem worth to be explored for genetic traits relevant to biological control.

Whereas in each of the geographic areas studied *N. paspalivorus* co-occurs with one or the other cryptic species closely related to *N. baraki* and in Africa also with another predator species, i.e., *N. neobaraki*, they may also co-occur in the same palm tree. However, they almost never co-occur within the same bunch of coconuts and on the same coconut. This lack of coexistence at a local scale, yet apparent coexistence at a larger scale, may arise from priority effects emerging in Lotka-Volterra competition models for two species competing for the same resource, and in models of reciprocal intraguild predation. However, the cross-pairing studies described in this Thesis also revealed another mechanism preventing local coexistence. Cross-pairings between species revealed intraguild predation by females of one predator species on the males and larvae of the other. Since size determines who is the intraguild predator and who is the intraguild prey, the largest of the three predator species (*N. neobaraki*) was more aggressive than the smallest (*N. paspalivorus*). Such intraguild interactions may drive the intraguild prey extinct not only because of the mortality inflicted on the intraguild prey, but also because it reduces the chances for females of the intraguild prey to find a male.

In the final part of the thesis an up-to-date review is provided of all species of predatory mites found under the bracts of coconuts. Out of a total 60 species, 32 species belong to the Phytoseiidae which in terms of their abundance represent 53% of all specimens found. Among the Phytoseiidae three species stand out as being predominant: *N. paspalivorus*, *N. baraki* and *N. neobaraki*. In most geographic areas studied the most dominant of these three is *N. paspalivorus*, possibly because it may have better access to the area under the bracts of the coconut due to its smaller size. However, in Tanzania, *N. neobaraki*, the largest of the three predator species, dominates, but the reasons for this dominance are still unclear. Virtually always the predators with intermediate abundance are the two cryptic species closely related to *N. baraki*, being the predator of intermediate size. For two of the abundant predator species, the biological characteristics are summarised, as far as available in the literature, and supplied, where no data are available. This shows that *N. baraki* and *N. paspalivorus* from Brazil tend to have higher capacity for population increase on a diet of coconut mites than the same two species from Africa. However, the cryptic species closely related to *N. baraki* from Benin is better able to survive and reproduce on coconut pollen than that from Brazil. Compared to species closely related to *N. baraki*, populations of *N. paspalivorus* have equal or higher capacities for population increase on a diet of coconut mites and they also vary in the ability to utilize coconut pollen. The populations from Ghana and Brazil (Acarau) are relatively better in pollen utilization whereas that from Benin is relatively worse. Overall,

there is a trend for populations to have lower capacities for population increase (on a diet of coconut mites) when they are better in utilizing pollen. Which of these combinations is best for biological control of coconut mites is still to be determined.

DETECTION AND MOLECULAR EPIDEMIOLOGY OF TICK-BORNE ENCEPHALITIS VIRUS

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Tick-borne encephalitis (TBE) is a potentially severe central nervous system infection endemic in many European and Asian countries. The causative agent of the disease is a tick-transmitted flavivirus, tick-borne encephalitis virus (TBEV). There are three subtypes of the virus: European (TBEV-Eur), Siberian (TBEV-Sib) and Far Eastern (TBEV-FE). The vectors for TBEV are *Ixodesricinus* (sheep tick) and *I. persulcatus* (taiga tick).

We developed an IgM enzyme immunoassay based on secreted recombinant prM and E antigen produced in insect cells for diagnosis of acute TBE. The test proved sensitive and specific and is now in use at the diagnostic laboratory of Hospital District of Helsinki and Uusimaa, Finland. We also studied the prevalence and molecular epidemiology of TBEV in Finland and Russia, and old as well as emerging TBE foci in Finland. The epidemiology of TBE depends on (micro)climatic and ecological factors, and based on predicted climate change it is likely that TBE will become more prevalent in northern Europe, including Finland.

In Finland the disease has been endemic in the Åland Islands, archipelagos of Turku, Helsinki, and Kokkola, and in Lappeenranta region. New endemic foci have appeared recently, including the world's northernmost TBE-endemic focus in Simo in northern Finland. We isolated seven TBEV-Eur strains from *I. ricinus* ticks and human sera from the southern regions of the country. The Finnish TBEV-Eur strains showed small-scale geographical clustering which supports the hypothesis that the endemic foci are maintained independently without the need of introducing new viral strains each summer. Unexpectedly, we found the western coast being inhabited by *I. persulcatus* ticks, which carry TBEV-Sib in Kokkola archipelago but unorthodoxly, TBEV-Eur in Simo. We isolated 11 TBEV-Sib strains from *I. persulcatus* from Kokkola archipelago. From Simo we isolated six TBEV-Eur strains, two from *I. persulcatus* and four from bank voles. *I. persulcatus* has distributed to Simo within the last 50 years, and the establishment of a new focus by unusual combination of virus subtype and vector species indicates different dispersal routes of the virus and its vector.

We also studied ticks from two republics in the Russian Federation, Karelia in the north-west and Buryatia in eastern Siberia, and isolated two TBEV-Sib strains and one TBEV-FE strain, respectively, from *I. persulcatus*. The TBEV-Sib strains isolated from Finland and Russian Karelia belonged to the "Baltic" lineage of the Siberian subtype.

The prevalence of TBEV in ticks was about 1% in most of the studied endemic

foci within a large geographical area. We characterized the Finnish TBE foci and found a new tick species for Finland, *I. persulcatus,* distributed in western Finland, carrying both TBEV-Eur and TBEV-Sib subtypes.

https://helda.helsinki.fi/handle/10138/27419

MOLECULAR DETECTION OF *RICKETTSIA* IN TICKS (ACARI: IXODIDAE) FROM TOKAT REGION

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Ticks harbor and transmit many dangerous pathogens such as bacteria, fungi, virus and protozoa to animals and humans. *Rickettsia*, a basil formed gram-negative intercellular bacteria are one the most common bacteria reside in ticks as they present within the eukaryotic cells of many parasitic arthropods. Ticks are one of the most common vector and reservoir of *Rickettsia* species. Therefore they play an important role in the transmission of the rickettsial diseases to human. The rickettsial diseases can be classified in two groups: spotted fever group and typhus group. Prevalance and diversity of *Rickettsia* species in the ticks of Turkey are unknown. In this study, the existence of *Rickettsia* is surveyed by using molecular techniques in the example of 600 ticks that replicate in human cells between the years of 2006 and 2008 was investigated by using polymerase chain reaction (PCR). Results showed that *Rickettsia* species were detected in 38 (7,40%) hard ticks. The sequencing and BLAST analysis results indicated that the species of *Rickettsia* in hard ticks were *Rickettsia aeschlimannii, Rickettsai raoulti, Rickettsia sibirica, Ricketssia slovaca, Rickettsia marmionii, Rickettsia japonica* and *Rickettsia hoogstraalii*.

EFFECTS OF MYCORRHIZA ON LONG DISTANCE ATTRACTION OF SPIDER MITES TO BEAN PLANTS

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The root symbionts arbuscular mycorrhiza fungi (AMF) tend to change various attributes of their host plants, commonly improving plant health and constitution. The mycorrhiza-induced changes in plant performance may also have an influence on other plant-associated organisms such as aboveground living herbivores and their natural enemies. These influences are mainly caused by morphological, physiological and biochemical changes of the plant resulting from their symbiosis with the AMF. The effects of arbuscular mycorrhizal symbiosis (AM) on aboveground herbivores are highly variable, ranging from positive to neutral to negative. In the case of the leaf-sucking two-spotted spider mite *Tetranychus urticae* feeding on common bean plants *Phaseolus vulgaris,* previous studies revealed that AM enhances

the fitness of the spider mites and changes the plant-emitted volatiles to more strongly attract the natural enemies of the spider mites, the predatory mite *Phytoseiulus persimilis*. However, there is no current information that can tell of the effects of AM on long-distance attraction of the spider mites via plant-emitted volatiles. We took on the task to determine if AM has an influence on the foraging behavior of *T. urticae* when it comes to choose between bean plants to colonize and feed. Y-tube olfactometer tests were performed in order to analyze the preference of mycorrhiza-naive and -experienced spider mites to volatiles of bean plants, inoculated with the AMF *Glomus mosseae* or not and infested with the spider mites or not. Experienced mites were those previously reared on mycorrhizal bean plants. The olfactometer experiments revealed that AM does have an effect on the host plant choice of the spider mites. Mycorrhiza-experienced mites showed a preference towards the volatiles of AMF-inoculated non-infested plants. In contrast, mycorrhiza-naïve mites exposed to volatiles of non-infested mycorrhizal and non-mycorrhizal plants and mycorrhiza-naïve and -experienced mites exposed to volatiles of spider mite-infested mycorrhizal and non-mycorrhizal plants did not have a preference. These results provide evidence of adaptive learning because experience allowed the mites to select those host plants that were the most favorable to their fitness.

BOOKS

CHECKLIST OF PHYTOSEIIDAE OF THE WORLD (ACARI: MESOSTIGMATA)

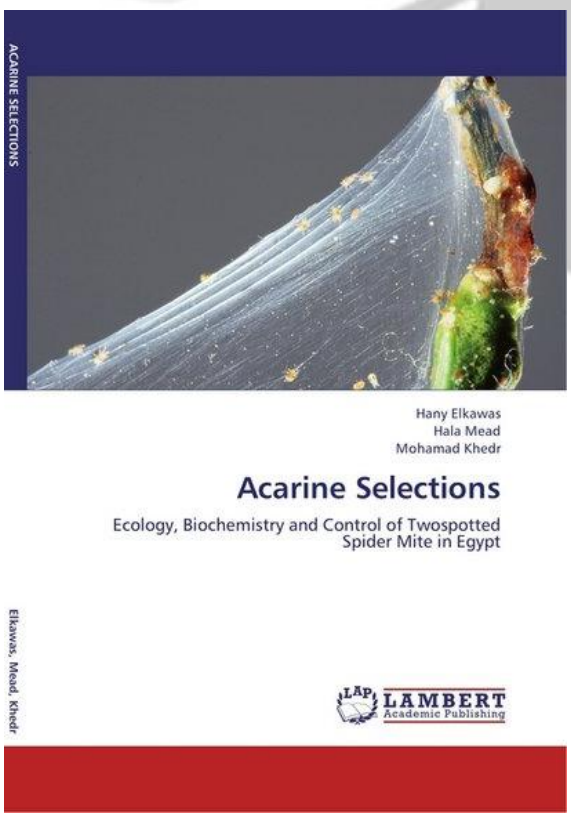
V. Prasad (2012), Indira Publishing House, West Bloomfield, Michigan, USA, ISBN: 0-930337-30-1

The book may be ordered directly from the publisher (v.prasad@ix.netcom.com; www.indirapublishinghouse.com) or from the booksellers.

ACARINE SELECTIONS - ECOLOGY, BIOCHEMISTRY AND CONTROL OF TWO SPOTTED SPIDER MITE IN EGYPT

H. Elkawas (2012), LAP LAMBERT Academic Publishing, ISBN: 978-3-659-27164-9

https://www.morebooks.de/store/gb/book/acarine-selections/isbn/978-3-659-27164-9



JOURNALS

Acarines

H. Elkawas informed (via the acarology list, acarology@nhm.ac.uk) that the abstracts of the new issue (2012) of ACARINES (published by The Egyptian Society of Acarology) is available at the following link:
http://www.esaeg.org/volumes/volumes.htm

Persian Journal of Acarology

An information (sent via the acarology list, acarology@nhm.ac.uk) by **A. Saboori**, Editor-in-Chief.

I am very glad to inform you that the 2nd issue of Persian Journal of Acarology is published and is available online at http://www.acarology.ir/journal.htm.

PJA is included in Thomson Reuters master journal list and indexed by Thomson Reuters. Please visit the following website: http://ip-science.thomsonreuters.com/cgi-bin/jrnlst/jlcovchanges.cgi?PC=MASTER or http://ip-science.thomsonreuters.com/cgi-bin/jrnlst/jlresults.cgi or http://ip-science.thomsonreuters.com/cgi-bin/jrnlst/jlchange.cgi?Full=Persian+Journal+of+Acarology

Systematic & Applied Acarology

An information (sent via the acarology list, acarology@nhm.ac.uk) by **Z.-Q. Zhang,** Editor-in-Chief

I am pleased to inform that the second issue of Systematic & Applied Acarology 17 (2012) is published. This issue has 10

papers from authors in Brazil, Chile, China, Germany, Iran, New Zealand, Poland, Russia, Thailand and USA.

The journal is accessible at http://www.nhm.ac.uk/hosted_sites/acarology/saas/saa/saa17.html

WWW LINKS

NEW TAXA PUBLISHED IN ELECTRONIC JOURNALS

B. Halliday (http://www.csiro.au/people/Bruce.Halliday.html) informed (via the acarology list, acarology@nhm.ac.uk) about recent developments to publish new taxa in electronic-only journals.

It is now possible to publish descriptions of new taxa in electronic-only journals. More information is available on the ICZN web site, here: http://iczn.org/content/iczn-amendment-electronic-publication. It is important to note that electronic-only publication is acceptable only under strict conditions, which are explained in the associated press releases and in the paper „Amendment of Articles 8, 9, 10, 21 and 78 of the *International Code of Zoological Nomenclature* to expand and refine methods of publication", *Zootaxa* 3450: 1–7 (2012) http://www.mapress.com/zootaxa/2012/f/zt03450p007.pdf.

2013

ISBCA 2013 - 4TH INTERNATIONAL SYMPOSIUM ON BIOLOGICAL CONTROL OF ARTHROPODS

March 4-8, 2013; Pucón, Chile

http://www.isbca.org

4TH MEETING OF THE IOBC-WPRS WORKING GROUP "INTEGRATED CONTROL OF PLANT FEEDING MITES"

September 9-12, 2013; Paphos, Cyprus

http://www.cut.ac.cy/iobccy

2014

14th INTERNATIONAL CONGRESS OF ACAROLOGY

July 14 to 18, 2014; Kyoto, Japan

http://ica14.acarology-japan.org/

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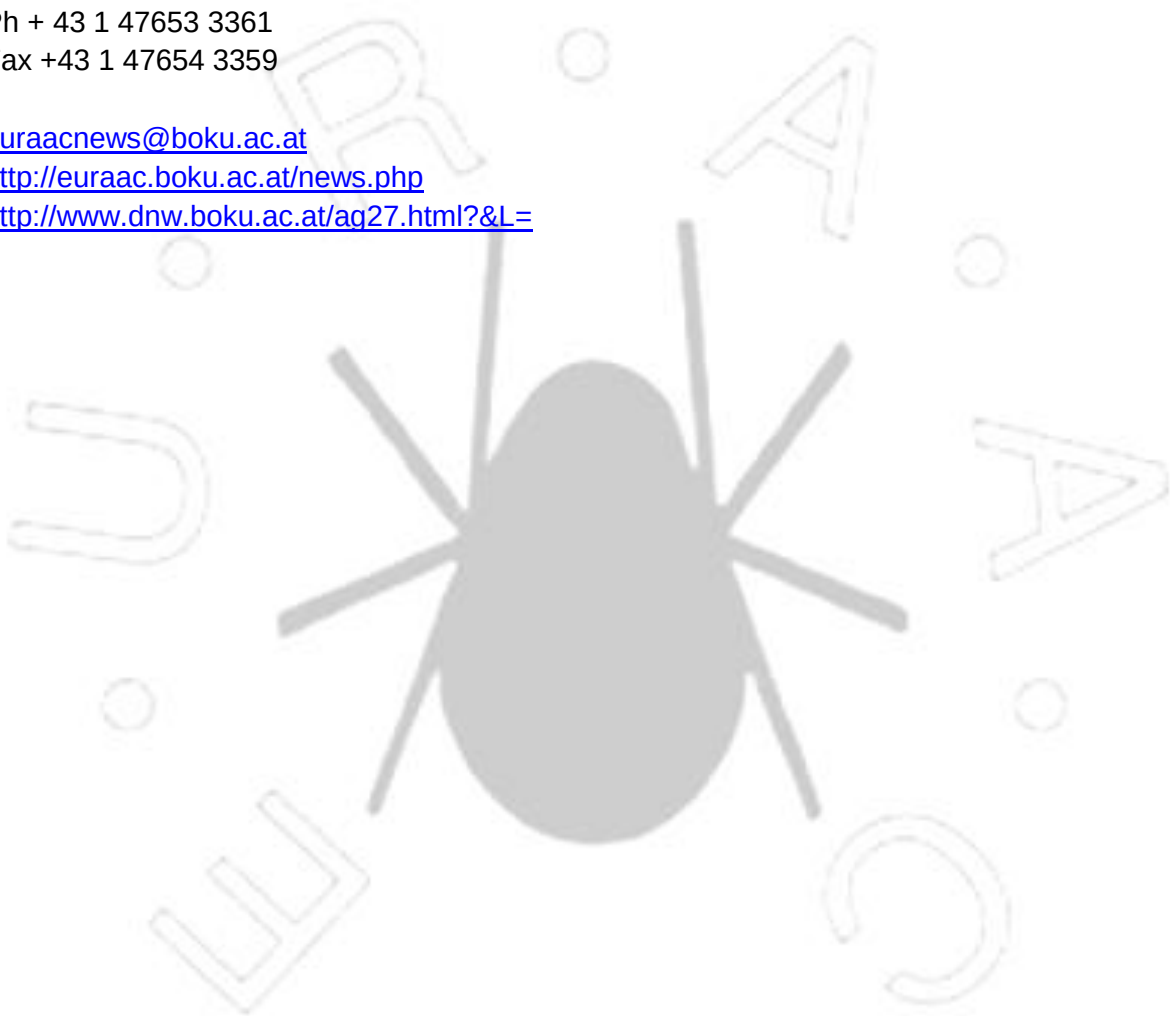

Vienna, November 2012