

PREFACE

## Causal and historical evolutionary biology: Papers in honour of Professor Klaus Peter Sauer



Klaus Peter Sauer. Photo 2007 by H. Kullmann.

During the last decades, Professor Klaus Peter Sauer, who will soon retire as Director of the Institute for Evolutionary Biology and Ecology at the University of Bonn, Germany, exerted an invaluable influence on the development of evolutionary biology and zoology in Germany. Besides his own seminal scientific work he has been – and still is – a very active member of different scientific societies and organizations, highly dedicated to the advancement of his university, faculty and institute and last but not least an eminently inspiring teacher who filled large numbers of students with enthusiasm for evolutionary biology. With this special issue of ZOOLOGY we honour the extraordinary scientific work of Klaus Peter Sauer upon the occasion of his retirement.

Klaus Peter Sauer studied biology at the Justus-Liebig-University of Gießen, Germany from 1962 to

1966. Afterwards, he continued at the Zoological Institute of the same university with his dissertation study under the late Professor Wulf Emmo Ankel, who stimulated his interest in ecology and marine biology. In 1969, Klaus Peter Sauer obtained his Dr. rer. nat. with a thesis entitled “Zur Monotopbindung einheimischer Arten der Gattung *Panorpa* (Mecoptera) nach Untersuchungen im Freiland und im Laboratorium” (Investigations in the wild and in the laboratory on habitat preferences of autochthonous species of the genus *Panorpa* (Mecoptera)) and published in “Zoologische Jahrbücher, Abteilung Systematik, Ökologie und Geographie der Tiere” in 1970. This fascinating taxon would accompany Klaus Peter Sauer’s scientific work throughout his scientific career.

Scorpionflies (see the cover of this issue showing a male *Panorpa vulgaris*; photo by A. Vermeulen) are especially suited for studying principles of sexual and natural selection due to their mating system. This special mating system is best described by Klaus Peter Sauer himself (Sauer et al., 1998):

“Recent research on sexual selection in animals has begun to indicate that handicaps, honest signalling, and indicators of ecological quality may play more important roles than hitherto thought (Maynard Smith, 1991; Andersson, 1994). *Panorpa* scorpionflies are ideal animals for understanding the adaptive significance of honest signaling. [...]”

“[...] *P. vulgaris* is an ideal animal for understanding both the mating system and the conspicuous mating behaviour of males that have evolved around food limitation. Males of *Panorpa* scorpionflies provide the females with different numbers of salivary masses during copulation. This conspicuous, sexually dimorphic character requires an evolutionary explanation. We hypothesize that variation in the capability of secreting salivary masses acts as a signal that indicates different ecological quality (viability) of males.”

“*P. vulgaris* males employ three alternative tactics to obtain copulations. Two alternatives involve nuptial offering, i.e., the male either presents a dead arthropod

and the female feeds on it throughout copulation, or the male initiates matings by secreting salivary masses on which the females feed. The third male behaviour is to initiate matings without any nuptial offering but without use of force. From this intrapopulation variation in male reproductive behaviour the question arises as to whether the three male alternatives are differentially profitable in terms of genetic propagation. Because females terminate copulations within approximately 20 min if they receive no or no further nuptial offering, males employing alternative mating tactics obtain copulations of varying duration according to the following sequence: saliva secretion > food offering > without nuptial offering (Sindern et al., 1994, 1995; Sindern, 1996). This implies a sexual conflict over mating duration (Thornhill and Sauer, 1991)."

After obtaining his Ph.D., Klaus Peter Sauer held postdoctoral positions in two different research groups (under Prof. H.D. Cremer and Prof. A. Wessing) in Gießen, and in 1971 he joined the group of Professor Günther Osche who held a chair in Evolutionary Biology and Ecology at the Albert-Ludwigs-University of Freiburg. This was a decisive step in his scientific career and resulted in a lifelong friendship with his teacher who is well known for his contributions to historical evolutionary biology. In Freiburg, Klaus Peter Sauer conducted his classic study on photoperiodism in *Panorpa vulgaris*. The results entered into his habilitation thesis, which gave him the status of Associate Professor in 1977.

In 1979, Klaus Peter Sauer was appointed a Full Professor in Evolutionary Research at the University of Bielefeld, where he continued his research on scorpionflies, extended by research on photoperiodism in butterflies. Here, he started his well-known studies on sexual selection in scorpionflies, which continue till the present day. In Bielefeld, he also had the opportunity to pursue his interest in marine organisms and started research on competition for space in sea anemones.

In 1992, Klaus Peter Sauer was appointed full professor and chair of Evolutionary Biology and became director of the Institute of Evolutionary Biology and Ecology at the Friedrich-Wilhelms-University of Bonn. Here, he extended his research on scorpionflies to all central European and some Asian and North American species, including phylogeny, comparative research, assessment of parentage using microsatellites, sperm competition, immunocompetence, chemical communication, male and female choice, male-male aggression, food-finding ability, and quantitative genetics. Scorpionflies are now one of the few taxa in which sexual selection has been studied in great detail. His research was partly embedded in two major interdisciplinary research programs initiated and coordinated by himself and funded by the German Science Foundation (DFG): "Genetic analysis of social systems" in which

researchers from different German universities were brought together, and "Biodiversity in time and space" which united researchers from different fields in biology and palaeontology of the University of Bonn.

The research of Klaus Peter Sauer is characterized by experimentation and integration of proximate and ultimate aspects of sexual and natural selection. But causal evolution is not his only field of scientific interest. He also studies historical evolution (Misof et al., 2000, 2001; Sauer and Kullmann, 2005; Pollmann et al., in press) and the history of biology (e.g. Sauer and Kullmann, in press).

His scientific achievements are greatly acknowledged within and outside of Germany. In 1999, he was elected a member of the German Academy of Sciences "Leopoldina", the oldest and most prestigious science academy of Germany.

Klaus Peter Sauer's interest in causal and historical aspects of evolution is also reflected in his teaching. He is a gifted and motivated teacher, who is highly estimated by his students. His lectures which cover a wide range of subjects from the evolution of metazoans and human evolution to evolution and sexuality are well known for their clarity and an enthusiasm for the causal and historical aspects of evolution. A description of Klaus Peter Sauer's teaching would not be complete without mentioning his numerous excursions with students to Banyuls-sur-Mer, France. During the last decades, several hundreds of students on these occasions had the opportunity to profit from his enormous knowledge of species and many were infected by his enthusiasm for all living beings.

Another characteristic of Klaus Peter Sauer is his energetic commitment to science management in Germany and at the university. He has been and still is very active in scientific societies like the German Zoological Society (DZG) in which he served as a member of the Advisory Council from 1990 to 1994, as Vice-President from 1991 to 1993, and as President from 1994 to 1996. From 2005 till the present day he is President of the German Society of History and Theory of Biology (DGGTB), and organized its 2007 meeting in Bonn. His historical interest is also reflected in his published laudations and historical essays (1996: Prof. Günther Osche; 1998: Prof. Peter Berthold; 2002 and 2007: Prof. Hermann Schaaffhausen; 2003: Prof. Franz Huber; 2005: Nachruf Prof. Clas Naumann; all published in German). Klaus Peter Sauer also played a very active role as a major reviewer of research project grants in Zoology funded by the German Science Foundation (DFG) during 1992–1996 and 1996–2000, and of Ph.D. grants by the "Studienstiftung des deutschen Volkes" during 1977–1979 and 1990–1992.

Within the university he held numerous management positions. The most prominent were Associate Dean from 1980 to 1981 and Dean from 1987 to 1989 at the Faculty

of Biology at the University of Bielefeld, and Chairman of Biology at the University of Bonn from 1999 to 2000.

At the age of 65, the regular retirement age in Germany, Klaus Peter Sauer was granted permission to extend his duties for another two years. Everyone who knows him well feels confident that Klaus Peter Sauer's retirement will be another period of productive and stimulating contributions to evolutionary biology. The scientist and the person Klaus Peter Sauer are so tightly linked that a retreat from scientific work is unthinkable.

In this issue of ZOOLOGY, some of his students, colleagues, and the editors of ZOOLOGY honour Klaus Peter Sauer who has been a driving force of research in evolutionary and comparative biology in Germany, with strong international influence. The contributions in this issue analyse causal and historical evolutionary biology with an emphasis on the former, as does Klaus Peter Sauer's own research.

## References

- Andersson, M., 1994. Sexual Selection. Princeton University Press, Princeton.
- Maynard Smith, J., 1991. Theories of sexual selection. *Trends Ecol. Evol.* 6, 146–151.
- Sindern, J., 1996. Einfluß der nahrungsdichte auf die lebensgeschichte und fitness von Individuen der Skorpionsfliege *Panorpa vulgaris*. Thesis, University of Bonn.
- Sindern, J., Kullmann, H., Fleck, S., Sauer, K.P., 1994. Does "male choice" exist in the scorpionfly *Panorpa vulgaris*?. *Verh. Dtsch. Zool. Ges.* 87.1, 58.
- Sindern, J., Kullmann, H., Sauer, K.P., 1995. Evidence for mate choice in both sexes in the scorpionfly *Panorpa vulgaris*. *Verh. Dtsch. Zool. Ges.* 88.1, 52.
- Sauer, K.P., 1966. Der Winterhaft *Boreus westwoodi*. *Mikrokosmos* 55, 117–120.
- Sauer, K.P., 1970. Zur Monotopbindung einheimischer Arten der Gattung *Panorpa* nach Untersuchungen im Freiland und Laboratorium. *Zool. Jb. Syst.* 97, 201–284.
- Sauer, K.P., 1972. Zur Analyse der ökologischen Umwelt. *Biologie in unserer Zeit* 2, 60–63.
- Sauer, K.P., 1973. Untersuchungen zur Habitatselektion bei *Panorpa communis* mit einem Beitrag zur Theorie des Begriffs Monotop und seine Beziehung zur ökologischen Nische. *Zool. Jb. Syst.* 100, 477–496.
- Sauer, K.P., 1975. Untersuchungen zur klinalen Variation des Diapauseverhaltens von *Panorpa vulgaris* unter besonderer Berücksichtigung der Unterschiede zwischen Berg- und Flachlandpopulationen. *Verhandl. d. Ges. f. Ökologie* 5, 77–88.
- Sauer, K.P., Hensle, R., 1975. *Panorpa communis* L. und *P. vulgaris* Imhoff und Labram, zwei Arten. *Experientia* 31, 428–429.
- Sauer, K.P., 1977. Die adaptive Bedeutung der genetischen Variabilität der photoperiodischen Reaktion von *Panorpa vulgaris*. *Evolutionsökologische Untersuchungen zum Einfluß des Witterungs- und Tageslängenverlaufs auf die Generationenfolge der Skorpionsfliegen (Mecoptera, Panorpidae)*. *Zool. Jb. Syst.* 104, 489–538.
- Sauer, K.P., Hensle, R., 1977. Reproduktive Isolation, ökologische Sonderung und morphologische Differenz der Zwillingarten *Panorpa communis* L. und *P. vulgaris* Imhoff und Labram (Insecta, Mecoptera). Eine vergleichende biologische und evolutionsökologische Studie. *Z. Zool. Syst. Evolut.-forsch.* 15, 169–207.
- Sauer, K.P., 1979. Sonnenlicht und zeitliche Ordnung der Tiere. *Freiburger Universitätsblätter* 66, 55–64.
- Sauer, K.P., 1980. Klinale Unterschiede in der genetischen Variabilität der photoperiodischen Reaktion von *Panorpa vulgaris*. *Zool. Jb. Syst.* 107, 113–147.
- Sauer, K.P., 1984. The evolution of reproductive strategies as an adaptation to fluctuating environments. In: Engels, W. (Ed.), *Advances in Invertebrate Reproduction*, vol. 23. Elsevier, Amsterdam, pp. 317–336.
- Sauer, K.P., 1985. Die evolutionsbiologische Bedeutung der Konkurrenz. *Z. Zool. Syst. Evolut.-forsch.* 23, 241–243.
- Sauer, K.P., 1986. Grundzüge der Evolution. *Funkkolleg Psychobiologie Verhalten bei Mensch und Tier. Studienbrief 1*, Deutsches Institut für Fernstudien an der Universität Tübingen. Beltz, Weinheim, Basel, pp. 52–92.
- Sauer, K.P., 1986. Strategien der zeitlichen und räumlichen Einnischung. *Verh. Dtsch. Zool. Ges.* 79, 11–33.
- Sauer, K.P., Spieth, H., 1986. Zeitliche Orientierung in fluktuierender Umwelt durch das Messen einer Anzahl von Langtagen. *Zool. Jb. Syst.* 113, 373–388.
- Sauer, K.P., Grüner, C., Collatz, K.G., 1986. Critical points in time and their influence on life cycle, life span and aging. In: Collatz, K.G., Sohal, R.S. (Eds.), *Insect Aging*. Springer, Berlin, pp. 9–22.
- Sauer, K.P., Müller, M., Weber, M., 1986. Alloimmune memory of glycoprotein recognition molecules in sea anemones competing for space. *Mar. Biol.* 92, 73–79.
- Sauer, K.P., Spieth, H., Grüner, C., 1986. Adaptive significance of genetic variability of photoperiodism in Mecoptera and Lepidoptera. In: Taylor, F., Karban, R. (Eds.), *The Evolution of Insect Life Cycles*. Springer, Berlin, pp. 153–172.
- Sauer, K.P., 1987. Anpassung – eine biologische Notwendigkeit. *Festschrift des Naturwissenschaftlichen Vereins Mannheim 1833*, 37–51.
- Sauer, K.P., Müller, J.K., 1987. Ursachen und Mechanismen der Evolution. *Studienbrief 2*, Evolution der Pflanzen und Tiere. Deutsches Institut für Fernstudien an der Universität Tübingen. Beltz, Weinheim, Basel, pp. 1–217.
- Grüner, C., Sauer, K.P., 1988. Aestival dormancy in the cabbage moth *Mamestra brassicae* L. (Lepidoptera: Noctuidae). 1. Adaptive significance of variability of two traits: day length thresholds triggering aestival dormancy and duration of aestival dormancy. *Oecologia* 74, 515–523.
- Sauer, K.P., 1988. Aggression und Raumkonkurrenz bei Seeanemonen. *Sitzungsber. Ges. Naturforsch. Freunde Berlin (N.F.)* 28, 45–71.
- Sauer, K.P., Grüner, C., 1988. Aestival dormancy in the cabbage moth *Mamestra brassicae* L. (Lepidoptera: Noctuidae). 2.

## Publications by Klaus Peter Sauer (excluding abstracts, translations and editorial work)

- Geographical variation in two traits: day length thresholds triggering aestival dormancy and duration of aestival dormancy. *Oecologia* 76, 89–96.
- Sauer, K.P., Gerhardt, A., 1989. Täuschblumen und Coevolution. *PdN-Biologie* 7/30, 1–9.
- Gerhardt, A., Sauer, K.P., 1990. Beobachtungen zur Blütenökologie. Vergleichende Beobachtungen zur Morphologie der Blüten und ihrer Bestäuber – ein Beispiel freilandbiologischer Arbeit aus dem vorigen Jahrhundert (Teil 1). *PdN-Biologie* 8/39, 38–42.
- Sauer, K.P., 1990. Evolution und Konkurrenz. In: Streit, B. (Ed.), *Evolutionsprozesse im Tierreich*. Birkhäuser, Basel, pp. 223–238.
- Bockwinkel, G., Sauer, K.P., 1991. Entstehung und Stabilisierung alternativer Paarungstaktiken bei Männchen von *Panorpa vulgaris* (Mecoptera: Panorpidae). *Verh. Westd. Entom. Tag* 1990, 171–192.
- Gerhardt, A., Sauer, K.P., 1991. Beobachtungen zur Blütenökologie. Die Evolution der Maskenblüte (Teil 3). *PdN-Biologie* 2/40, 37–39.
- Sauer, K.P., Baumann, R., 1991. Phenotypic plasticity of phenological traits: genetic basis, evolutionary change and adaptive significance. *Zool. Jb. Syst.* 118, 346–358.
- Spieth, H., Sauer, K.P., 1991. Quantitative measurement of photoperoidism and its significance for the induction of diapause in *Pieris brassicae* (Lepidoptera: Pieridae). *J. Insect Physiol.* 37, 231–238.
- Thornhill, R., Sauer, K.P., 1991. The notal organ of the scorpionfly *Panorpa vulgaris*: an adaptation to coerce mating duration. *Behav. Ecol.* 2, 156–164.
- Sauer, K.P., 1992. Morphologie und Evolution. *Verh. Dtsch. Zool. Ges.* 85.2, 349–357.
- Thornhill, R., Sauer, K.P., 1992. Genetic sire effects on the fighting ability of sons and daughters and mating success of sons in a scorpionfly. *Anim. Behav.* 43, 255–264.
- Bockwinkel, G., Sauer, K.P., 1993. *Panorpa* scorpionflies foraging in spider webs: kleptoparasitism at low risk. *Bull. Br. Arachnol. Soc.* 9, 110–112.
- Bockwinkel, G., Sauer, K.P., 1994. Resource dependence of male mating tactics in the scorpionfly, *Panorpa vulgaris* (Mecoptera, Panorpidae). *Anim. Behav.* 47, 203–209.
- Sauer, K.P., 1996. Sexuelle Selektion und ökologische Differenzierung. *J. Zool. Syst. Evol. Res.* 34, 235–249.
- Sauer, K.P., Sperlich, D., 1996. To Professor Dr. Günther Osche on his 70th birthday. *J. Zool. Syst. Evol. Res.* 34, 181–182.
- Sauer, K.P., Sindern, J., Kall, N., 1997. Nutritional status of males and sperm transfer in the scorpionfly *Panorpa vulgaris* (Mecoptera: Panorpidae). *Entomol. Gen.* 21, 184–204.
- Bukacińska, M., Bukaciński, D., Epplen, J.T., Sauer, K.P., Lubjuhn, T., 1998. Low frequency of extra-pair paternity in Common Gulls (*Larus canus*) as revealed by DNA fingerprinting. *J. Ornithol.* 139, 413–420.
- Gerken, T., Kurtz, J., Sauer, K.P., Lubjuhn, T., 1998. DNA preparation and efficient microsatellite analysis from insect hemolymph. *Electrophoresis* 19, 3069–3070.
- Epplen, C., Over, I., Lubjuhn, T., Epplen, J.T., Sauer, K.P., 1998. Genetic distinction of scorpionflies (*Panorpa vulgaris*) by microsatellites. *Mol. Ecol.* 7, 1256–1258.
- Sauer, K.P., 1998. Laudatio für Peter Berthold–Vogelkundler und experimenteller Evolutionsforscher. *Mitt. Dtsch. Zool. Ges.* 91, 19–23.
- Sauer, K.P., Lubjuhn, T., Sindern, J., Kullmann, H., Kurtz, J., Epplen, C., Epplen, J.T., 1998. Mating systems and sexual selection in scorpionfly *Panorpa vulgaris* (Mecoptera: Panorpidae). *Naturwissenschaften* 85, 219–228.
- Kurtz, J., Sauer, K.P., 1999. The immunocompetence handicap hypothesis: testing the genetic predictions. *Proc. R. Soc. London B* 266, 2515–2522.
- Lubjuhn, T., Sauer, K.P., 1999. DNA fingerprinting/profiling in behavioural ecology. In: Epplen, J.T., Lubjuhn, T. (Eds.), *DNA Profiling and DNA Fingerprinting*. Birkhäuser, Basel, pp. 39–52.
- Sauer, K.P., Epplen, C., Over, I., Lubjuhn, T., Schmidt, A., Gerken, T., Epplen, J.T., 1999. Molecular genetic analysis of remating frequencies and sperm competition in the scorpionfly *Panorpa vulgaris* (Imhoff and Labram). *Behaviour* 136, 1107–1121.
- Kurtz, J., Nahif, A.A., Sauer, K.P., 2000. Phagocytosis of *Vairimorpha* spec. (Microporida, Nosematidae) spores by *Phutella xylostella* and *Panorpa vulgaris* hemocytes. *J. Inv. Path.* 75, 237–239.
- Kurtz, J., Wiesner, A., Götz, P., Sauer, K.P., 2000. Gender differences and individual variation in the immune system of the Scorpionfly *Panorpa vulgaris* (Insecta: Mecoptera). *Devel. Comp. Imm.* 24, 1–12.
- Misof, B., Erpenbeck, D., Sauer, K.P., 2000. Mitochondrial gene fragments suggest paraphyly of the genus *Panorpa* (Mecoptera: Panorpidae). *Mol. Phyl. Evol.* 17, 76–84.
- Engqvist, L., Sauer, K.P., 2001. Strategic male mating effort and cryptic male choice in a scorpionfly. *Proc. R. Soc. London B* 268, 729–735.
- Kurtz, J., Sauer, K.P., 2001. Gender differences in phenoloxidase activity of *Panorpa vulgaris* hemocytes. *J. Inv. Path.* 78, 53–55.
- Misof, B., Rickert, A.M., Buckley, T.R., Fleck, G., Sauer, K.P., 2001. Phylogenetic signal and its decay in mitochondrial SSU and LSU rRNA gene fragments of Anisoptera. *Mol. Biol. Evol.* 18, 27–37.
- Engqvist, L., Sauer, K.P., 2002. Amorous scorpionflies: causes and consequences of the pairing prelude of *Panorpa cognata*. *Anim. Behav.* 63, 667–675.
- Engqvist, L., Sauer, K.P., 2002. A life history perspective on strategic mating effort in male scorpionflies. *Behav. Ecol.* 13, 632–636.
- Sauer, K.P., 2002. Hermann Schaaffhausens Beitrag zur Entwicklung des Evolutionsgedankens und des Artbegriffs vor Darwin. *Mitt. Dtsch. Zool. Ges.* 93, 39–51.
- Sauer, K.P., 2002. Natürliche und sexuelle Selektion und die Evolution des Paarungssystems der Skorpionsfliegen. *Jahrb. d. Dtsch. Akad. d. Naturf. Leopoldina (R. 3)* 47, 521–547.
- Sauer, K.P., Hoch, M., 2002. Evolution des Nervensystems. *AINS* 2002/6, 305–313.
- Engqvist, L., Sauer, K.P., 2003. Influence of nutrition on courtship and mating in the scorpionfly *Panorpa cognata* (Mecoptera, Insecta). *Ethology* 109, 911–928.
- Engqvist, L., Sauer, K.P., 2003. Determinants of sperm transfer in the scorpionfly *Panorpa cognata*: male variation,

- female condition and copulation duration. *J. Evol. Biol.* 16, 1196–1204.
- Sauer, K.P., 2003. Laudatio für Franz Huber. *Mitt. Dtsch. Zool. Ges.* 96, 13–17.
- Sauer, K.P., Vermeulen, A., Aumann, N., 2003. Temperature-dependent competition hierarchy: a mechanism stabilizing the phenological strategy in the scorpionfly *Panorpa communis* L. *J. Syst. Zool. Evol. Res.* 41, 109–117.
- Kullmann, H., Sauer, K.P., 2005. Life histories and mating system aspects of two Caucasian scorpionflies: *Panorpa similis* Esben-Petersen and *P. connexa* Mac Lachlan. *Zool. Anz.* 244, 1–9.
- Sauer, K.P., 2005. Nachruf Naumann. *Mitt. Dtsch. Zool. Ges.* 97, 57–63.
- Sauer, K.P., Kullmann, H., 2005. Analyse der biologisch-ökologischen Ursachen der Evolution der gastroneuronalen Metazoa – Testen einer phylogenetischen Hypothese. *Bonner Zool. Beitr.* 53, 149–163.
- Engels, S., Sauer, K.P., 2006. Resource-dependent nuptial feeding in *Panorpa vulgaris*: an honest signal for male quality. *Behav. Ecol.* 17, 628–632.
- Engels, S., Sauer, K.P., 2006. Love for sale and its fitness benefits: nuptial gifts in the scorpionfly *Panorpa vulgaris* represent paternal investment. *Behaviour* 143, 825–837.
- Kock, D., Hardt, C., Epplen, J.T., Sauer, K.P., 2006. Patterns of sperm use in the scorpionfly *Panorpa germanica* L. (Mecoptera: Panorpidae). *Behav. Ecol. Sociobiol.* 60, 528–535.
- Engels, S., Sauer, K.P., 2007. Energy beyond the pupal stage: larval nutrition and its long-time consequences for male mating performance in a scorpionfly. *J. Insect Physiol.* 53, 633–638.
- Kock, D., Ruther, J., Sauer, K.P., 2007. A male sex pheromone in a scorpionfly. *J. Chem. Ecol.* 33, 1249–1256.
- Missoweit, M., Engels, S., Sauer, K.P., 2007. Foraging ability in the scorpionfly *Panorpa vulgaris*: individual differences and heritability. *Behav. Ecol. Sociobiol.* 61, 487–492.
- Sauer, K.P., 2007. Laudatio zur Verleihung der Ehrenmitgliedschaft in der Deutschen Zoologischen Gesellschaft an Dr. Dr. h. c. Günther Osche, Professor Emeritus und vormalig Direktor am Zoologischen Institut der Universität Freiburg. *Zoologie 2007. Mitt. Dtsch. Zool. Ges.*, 13–16.
- Sauer, K.P., 2007. Von Darwins Evolutionstheorien zur Synthetischen Theorie: Spuren der Auseinandersetzung um deren Anerkennung in den Verhandlungen der DZG. In: Wägele, J.W. (Ed.), *Höhepunkte der zoologischen Forschung im deutschen Sprachraum*. Basiliken-Press, Marburg, pp. 111–134.
- Engels, S., Sauer, K.P. A secondary sex trait under construction: age- and nutrition-related salivary gland development in a scorpionfly (Insecta: Mecoptera). *J. Zool. Syst. Evol. Res.*, in press.
- Kock, D., Sauer, K.P. High variation in sperm precedence and last male advantage in the scorpionfly *Panorpa germanica* L. (Mecoptera, Panorpidae): possible causes and consequences. *J. Insect Physiol.*, in press.
- Missoweit, M., Engqvist, L., Lubjuhn, T., Sauer, K.P. Nuptial feeding in the scorpionfly *Panorpa vulgaris*: maintenance of genetic variance in sexual advertisement through dependence on condition influencing traits. *Evol. Ecol.*, in press.
- Missoweit, M., Sauer, K.P. Not all *Panorpa* (Mecoptera: Panorpidae) scorpionfly mating systems are characterised by resource defense polygyny. *Anim. Behav.*, in press.
- Pollmann, C., Misof, B., Sauer, K.P. Molecular phylogeny of panorpid scorpionflies – an enigmatic species poor family of the Mecoptera (Insecta). *Org. Div. Evol.*, in press.
- Sauer, K.P. Hermann Schaaffhausen 1816–1893 – sein Beitrag zum Evolutionsgedanken. *Decheniana*, Bonn, in press.
- Sauer, K.P., Kullmann, H. Die Entdeckung der Evolution. In: Höxtermann, E., Hilger, H. (Eds.), *Lebenswissen – Eine Einführung in die Geschichte der Biologie*. Verlag Natur und Text, Berlin, in press.

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