



Cover: A distinct feature of freshwater mayfly nymphs is an elaborate abdominal cuticular extension, commonly referred to as tracheal gills. The tracheal gills possess ventilation as well as respiratory function, and have long been speculated to participate in ion regulation. Nowghani et al. (pp. 3997–4006) provide evidence that the tracheal gills of *Hexagenia rigida* (pictured) participate in the regulation of salt and water balance by directly measuring Na^+ uptake at the gills in real time. The integrated function of *H. rigida* nymph tracheal gills, alimentary canal and Malpighian tubules provides new insight into the ionoregulatory strategies of freshwater arthropods. Photo credit: Chun Chih Timothy Chen.

INSIDE JEB

- 3837 Superparasitism is a price worth paying for parasitic wasps; King crabs can't cope below 1250 m; Crucian carp recover from winter brain damage; Did we inherit silicosis from our ancient ancestors?

OUTSIDE JEB

- 3840 When natural armour does more than protect; Flying high, no training required; Speed limits for the animal kingdom; Home invaders provoke neighbouring cichlids

REVIEWS

- 3843 Ammonia and urea handling by early life stages of fishes
Zimmer, A. M., Wright, P. A. and Wood, C. M.
- 3856 Studying emotion in invertebrates: what has been done, what can be measured and what they can provide
Perry, C. J. and Baciadonna, L.

SHORT COMMUNICATIONS

- 3869 Waiting for the Sun: the circannual programme of reindeer is delayed by the recurrence of rhythmical melatonin secretion after the arctic night
Hazlerigg, D., Blix, A. S. and Stokkan, K.-A.
- 3873 Humeral loads during swimming and walking in turtles: implications for morphological change during aquatic reinvasions
Young, V. K. H., Wienands, C. E., Wilburn, B. P. and Blob, R. W.

METHODS & TECHNIQUES

- 3878 Bringing the analysis of animal orientation data full circle: model-based approaches with maximum likelihood
Fitak, R. R. and Johnsen, S.

RESEARCH ARTICLES

- 3883 Re-oxygenation after anoxia induces brain cell death and memory loss in the anoxia-tolerant crucian carp
Lefevre, S., Stecyk, J. A. W., Torp, M.-K., Løvdal, L. Y., Sørensen, C., Johansen, I. B., Stensløkken, K.-O., Couturier, C. S., Sloman, K. A. and Nilsson, G. E.
- 3896 Functional morphology of terrestrial prey capture in salamandrid salamanders
Stinson, C. M. and Deban, S. M.
- 3908 Beneficial effects of a heat wave: higher growth and immune components driven by a higher food intake
Dievel, M. V., Stoks, R. and Janssens, L.
- 3916 Metabolic costs imposed by hydrostatic pressure constrain bathymetric range in the lithodid crab *Lithodes maja*
Brown, A., Thatje, S., Morris, J. P., Oliphant, A., Morgan, E. A., Hauton, C., Jones, D. O. B. and Pond, D. W.
- 3927 Frequency organization of the Johnston's organ in male mosquitoes (Diptera, Culicidae)
Lapshin, D. N. and Vorontsov, D. D.
- 3939 O_2 binding and CO_2 sensitivity in haemoglobins of subterranean African mole rats
Weber, R. E., Jarvis, J. U. M., Fago, A. and Bennett, N. C.
- 3949 Induced parental care in a poison frog: a tadpole cross-fostering experiment
Pašukonis, A., Beck, K. B., Fischer, M.-T., Weinlein, S., Stückler, S. and Ringler, E.

- 3955 The metabolic costs of fighting and host exploitation in a seed-drilling parasitic wasp
Boisseau, R. P., Woods, H. A. and Goubault, M.
- 3967 Hydrodynamic function of dorsal fins in spiny dogfish and bamboo sharks during steady swimming
Maia, A., Lauder, G. V. and Wilga, C. D.
- 3976 Upper thermal limits of growth in brook trout and their relationship to stress physiology
Chadwick, J. G. and McCormick, S. D.
- 3988 Early gametogenesis in the Pacific oyster: new insights using stem cell and mitotic markers
Cavelier, P., Cau, J., Morin, N. and Delsert, C.
- 3997 Strategies of ionoregulation in the freshwater nymph of the mayfly *Hexagenia rigida*
Nowghani, F., Jonusaite, S., Watson-Leung, T., Donini, A. and Kelly, S. P.
- 4007 Silica-induced fibrosis: an ancient response from the early metazoans
Pozzolini, M., Scarfi, S., Gallus, L., Ferrando, S., Cerrano, C. and Giovine, M.
- 4016 Natural epigenetic variation within and among six subspecies of the house sparrow, *Passer domesticus*
Riyahi, S., Vilatersana, R., Schrey, A. W., Ghorbani Node, H., Aliabadian, M. and Senar, J. C.
- 4024 Plausible link between circa bi'dian activity rhythms and circadian clock systems in the large black chafer *Holotrichia parallela*
Kawasaki, Y., Nishimura, H. and Shiga, S.
- 4035 Mitochondrial capacity, oxidative damage and hypoxia gene expression are associated with age-related division of labor in honey bee (*Apis mellifera* L.) workers
Cervoni, M. S., Cardoso-Júnior, C. A. M., Craveiro, G., Souza, A. de O., Alberici, L. C. and Hartfelder, K.
- 4047 Function of the hypobranchial muscles and hyoidiomandibular ligament during suction capture and bite processing in white-spotted bamboo sharks, *Chiloscyllium plagiosum*
Ramsay, J. B. and Wilga, C. D.
- 4060 Variation in developmental trajectories of physiological and somatic traits in a common songbird approaching fledging
Cornell, A. and Williams, T. D.
- 4068 Sex hormones and the development of sexual size dimorphism: 5α -dihydrotestosterone inhibits growth in a female-larger lizard (*Sceloporus undulatus*)
Pollock, N. B., Feigin, S., Drazenovic, M. and John-Alder, H. B.

CORRESPONDENCE

- 4078 The importance of controlling genetic variation – remarks on 'Appropriate rearing density in domesticated zebrafish to avoid masculinization: links with the stress response'
Delomas, T. A. and Dabrowski, K.
- 4079 Response to "The importance of controlling genetic variation – remarks on 'Appropriate rearing density in domesticated zebrafish to avoid masculinization: links with the stress response'"
Ribas, L., Valdivieso, A., Díaz, N. and Piferrer, F.