

EDITORIAL

Integration of ecology and biology for the management of rodents: International perspectives 2

Most papers presented in this, the previous and the next special issue of *Integrative Zoology* were presented at the 3rd International Conference on Rodent Biology and Management (3rd ICRBM) that was held in early August in Hanoi, Vietnam 2006¹. The conference attracted an international audience of 130 participants from 35 countries and provided an opportunity for all participants to refresh and update their knowledge of scientific, technical and extension developments in the field of rodent biology. There were about 110 spoken papers and about 50 posters. The three main themes of the conference were (1) rodent biology, (2) rodent ecology, and (3) rodent management.

Papers from the two previous conferences held in Beijing, China, in 1998 (1st ICRBM) and in Canberra, Australia, in 2003 (2nd ICRBM) were also published (Singleton *et al.* 1999; Singleton *et al.* 2003). The papers presented in this special issue of *Integrative Zoology* focus mainly on the biology and ecology of rodents. They reveal basic aspects of rodent biology and ecology and provide vital knowledge that can aid in developing more appropriate management strategies for pest rodents and for the conservation of non-pest rodent species.

Rodent biology - One highlight of the present special issue is the article by Jerry O. Wolff on the social biology of rodents (Wolff 2007). Gerry Wolff is one of the internationally best known scientists in the field of mammalian social behaviour. In the article he summarizes selected basic elements of rodent social behaviour including spacing, signalling and mating systems. Growth and reproduction in captive Malagasy tufted-tailed rats (*Eliurus myoxinus*) was described in a

paper by Randrianjafy *et al.* (2007) adding essential knowledge to the poorly known biology of the endemic rodents of Madagascar.

Rodent ecology - Avenant *et al.* (2007) describe how the species composition of rodents in a South African nature reserve correlates to disturbance and succession. The results of this paper can help in developing effective small mammal trapping regimes in the region. Sluydts *et al.* (2007) report on demographic parameters in *Mastomys natalensis* based on a detailed long-term capture-mark-recapture study. The results suggest that rainfall affects both maturation rates (cumulative rainfall in previous three months) and survival (cumulative rainfall in previous year) and that maturation rates in addition are dependent on the population density of the previous month. The population dynamics of the same species was investigated in upland regions of Tanzania where *Mastomys natalensis* expands its range due to the conversion of forest habitat to crop fields (Makundi *et al.* 2007). There, above average rainfall seemed to support population growth in *Mastomys natalensis* but overall population density was much lower than in lowland habitats. An extensive trapping study conducted by Kaleme *et al.* (2007) in the eastern Democratic Republic of Congo provides a more complete list of small mammal species in Kahuzi-Biega National Park. An assessment of habitat requirements of these species can aid conservation efforts in the region where a large proportion of small mammal species is endemic.

¹ For a summary of conference, see C. J. Krebs editorial in *Integrative Zoology* 1, 194–195.

Rodent management - Singleton *et al.* (2007) point out that there was little progress in the development of new tools for lethal control of overabundant rodent populations during the last 25 years. The main culling methods for rodents (rodenticides, kill traps) are not species-specific and may affect a range of non-target species. The authors provide examples that demonstrate how ecologically-based approaches that combine several management techniques can minimize the unwanted effects of culling rodent pests. Fertility control may be appropriate to supplement control techniques for rodent pests. Chemical actives can impact fertility and could be used in the future to manage rodent pests. Recently, colleagues in China have been testing the effect of levonorgestrel and quinestrol for rodent pest control. Zhao *et al.* (2007) report on the anti-fertility effects of these substances in Brandt's voles (*Lasiopodomys brandtii*).

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REFERENCES

- Avenant NL, Cavallini P (2007). Correlating rodent community structure with ecological integrity, Tus-sen-Die-Riviere Nature Reserve, Free State Province, South Africa. *Integrative Zoology* **2**, 212-219.
- Kaleme KP, Bates J, Kerbis Peterans J, Jacques MM, Ndara BR (2007). Small mammal diversity and habitat requirements in the Kahuzi-Biega National Park and surrounding areas, eastern Democratic Republic of Congo. *Integrative Zoology* **2**, 239-246.
- Makundi RH, Massawe AW, Mulungu LS (2007). Reproduction and population dynamics of *Mastomys natalensis* Smith, 1834 in an agricultural landscape in the Western Usambara Mountains, Tanzania. *Integrative Zoology* **2**, 233-238.
- Randrianjafy RV, Ramilijaona O, Rakotondravony D (2007). Growth in captivity of the tufted-tailed rat (*Eliurus myoxinus*) and determination of age class structure in a natural setting. *Integrative Zoology* **2**, 205-211.
- Singleton GR, Brown PR, Jacob J, Aplin KP, Sudarmaji (2007) Unwanted and unintended effects of culling – a case for ecologically-based rodent management. *Integrative Zoology* **2**, 247-259.
- Singleton GR, Hinds LA, Krebs CJ, Spratt DM (2003). 'Rats, mice and people: rodent biology and management.' ACIAR Monograph 96. 564 pp. (Australian Centre for International Agricultural Research: Canberra.)
- Singleton GR, Hinds LA, Leirs H, Zhang Z (1999). 'Ecologically-based management of rodent pests.' ACIAR Monograph No. 59. 494 pp. (Australian Centre for International Agricultural Research: Canberra.)
- Sluydts V, Crespin L, Davis SA, Lima M, Leirs H (2007). Survival and maturation rates of the African rodent, *Mastomys natalensis* from a ten-year capture-recapture study: density-dependence and rainfall. *Integrative Zoology* **2**, 220-232.
- Wolff JO (2007). The social biology of rodents. *Integrative Zoology* **2**, 193-204.
- Zhao M, Liu M, Li D, Wan X, Hinds LA, Wang Y, Zhang Z (2007). Anti-fertility effect of levonorgestrel and quinestrol in Brandt's voles (*Lasiopodomys brandtii*). *Integrative Zoology* **2**, 260-268.