Brazilian ants diversity and the local geomagnetic field: A ferromagnetic resonance study

Wajnberg E., Alves O.C., Harada A.Y., De Souza Esquivel D.M.

Centro Brasileiro de Pesquisas Físicas, R Xavier Sigaud 150, 22290-180, Rio de Janeiro, Brazil; Universidade Federal Fluminense, Niterói; Museu Paraense Emílio Goeldi, Belém, Brazil

Abstract: Ants have the ability of homing and some species can migrate or move over long distances (nomadic). The presence of magnetic particles as geomagnetic sensors is the most accepted hypothesis to explain ant orientation mechanisms. The room temperature Ferromagnetic Resonance (FMR) spectra of migratory, nomadic, arboreal, trap-jaw and fire ants, applied to 11 samples are presented. The spectra were studied taking into account two components: the low field (LF) with a maximum at gmax values higher than 8 and the high field (HF) at the geff=2.1 with a linewidth of about 900 Oe. This study tests the systematization plausibility of ant magnetic material characteristics based on absorption spectra area and the ratios between the peak-to-peak amplitude spectral components (LF/HF). The HF component predominates in the spectra of the migratory and one nomadic ant, while the LF is the dominant one in the arboreal and six fire ants studied. The Solenopsis absorption spectra area, proportional to the magnetic material amount, increases as the local magnetic field intensity increases, suggesting an adaptation of these ants to the magnetic environment characteristic. © Springer 2005.

Author Keywords: Ant orientation; Ferromagnetic resonance; Magnetic material

Year: 2005
Source title: BioMetals
Volume: 18
Issue: 6
Page : 595-602
Cited by: 3
Link: Scorpus Link
Document Type: Article
Source: Scopus

Authors with affiliations:

1. Wajnberg, E., Centro Brasileiro de Pesquisas Físicas, R Xavier Sigaud 150, 22290-180, Rio de Janeiro, Brazil
2. Alves, O.C., Universidade Federal Fluminense, Niterói
3. Harada, A.Y., Museu Paraense Emílio Goeldi, Belém, Brazil
4. De Souza Esquivel, D.M., Centro Brasileiro de Pesquisas Físicas, R Xavier Sigaud 150, 22290-180, Rio de Janeiro, Brazil