Entomopathogens in *Ips typographus* (Coleoptera: Scolytidae) from Several Spruce Stands in Bulgaria

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**Abstract:** The pathogen complex of the spruce bark beetle, *Ips typographus* of the Vitosha and the Rhodope mountains area in Bulgaria was surveyed and evaluated. Beetles were collected from four different localities including one reserve and three managed spruce stands from March 2003 to August 2005. The following pathogens were recovered: *I. typographus* Entomopoxvirus (*It*EPV), *Gregaria typographi*, *Chytridiopsis typographi*, *Beauveria bassiana*, and the nematodes *Contortylenchus diplogaster* and *Cryptaphelenchus macrogaster*. *It*EPV, *G. typographi*, *Ch. typographi*, *C. diplogaster* and *C. macrogaster* are new species to the Bulgarian fauna. The dominant pathogen species was *G. typographi*, which was found in beetles from all sites. In several cases male beetles showed significantly higher *G. typographi* infection rates than female beetles. No gender dependant differences in the infection rates were observed for *C. typographi* and *It*EPV. The pathogen distribution in single and mixed infections was higher in the beetles from the Bistrishko Branishte Reserve.

**Key words:** Bulgaria, *Ips typographus*, pathogens, infections

**Introduction**

*Ips typographus* is one of the major insect pest species on Norway spruce (*Picea abies*) in Bulgaria. The economical loss is very high and the damage caused by this insect species is one of the major reasons for laminar spruce death in Bulgaria. *Ips typographus* infests wind-thrown trees or wind-broken logs, but also attacks physiologically stressed living trees (TZANKOV, MIRCHEV 1985).

The biology of *I. typographus* makes control very difficult. The whole life cycle occurs in galleries in the phloem, only during dispersion-swarming beetles appear outside of trees. The control methods currently used are sanitation measures, which are expensive and usually result in large clear-cut areas. This method is not allowed in natural conservation forests, national parks and reserves. The use of biological control agents such as pathogens via augmentation and/or conservation may be the best option for control of bark beetles, particularly of *I. typographus*.