COLEOPTERA COLLECTED IN A PLANTATION OF *Eucalyptus urophylla* S. T. BLAKE (MYRTACEAE) IN THE REGION OF NIQUELÂNDIA, STATE OF GOIÁS, BRAZIL

COLEOPTEROS COLETADOS EM PLANTAÇÃO DE Eucalyptus urophylla S. T. BLAKE (MYRTACEAE) NA REGIÃO DE NIQUELÂNDIA, ESTADO DE GOIÁS, BRASIL

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ABSTRACT: The objective of this work was to evaluate population fluctuation of species of the order Coleoptera in Niquelândia county, State of Goiás, Brazil in a plantation of *Eucalyptus urophylla* S. T. Blake (Myrtaceae). Insects were collected with five light traps every fifteen days from May 1992 to April 1993 and identified according to the literature and entomological collections at species and/or family levels. A total of 5,615 individuals of the order Coleoptera were collected, with 346 and 5,269 identified at species and family levels, respectively. The most abundant species were *Premnobius cavipennis* Eichhoff, 1878 (Coleoptera: Scolytidae) with 174 individuals what represented 50.29% of the total number of individuals identified by species followed by *Cardiorhinus* sp. (Elateridae) and *Pinotus ascanius* Mannerheim, 1929 (Coleoptera: Scarabaeidae) with 134 and 18 individuals and 38.73% and 5.20% of the total number of individuals of this group, respectively. The family Carabidae had the highest number of individuals and species with 58.19% of the individuals identified at family level, followed by Scarabaeidae and Anobiidae with 19.30 and 8.33%, respectively. Population peaks of Coleoptera species were registered in October and December 1992.

UNITERMS: Beetles associated with eucalyptus, Population fluctuation

Eucalyptus M. Willdenow (1789) (Myrtaceae) species are cultivated in many parts of the world due to its high capacity of growing in different habitats (ZANUNCIO *et al.*, 1994). In Brazil, they are cultivated in most parts of the country and its wood is used, mainly, for cellulose and coal (IWAKIRI *et al.*, 1999). Monocultures such as those of eucalyptus can favor the occurrence of pests (ZANUNCIO *et al.*, 1993a) which makes necessary to develop techniques aiming to reduce their damage (SCHOWALTER *et al.*, 1986). Considering the fact that *Eucalyptus* species are grown during several years it is necessary to use methods of pest control which consider the ecological impacts and also the necessity of integrated pest management with different techniques (CROCOMO, 1990).

In Brazil, eucalyptus defoliators of the Lepidoptera order are being studied with higher intensity because they are responsible for most damage to forest plantations (PEREIRA *et al.*, 2001; ZANUNCIO *et al.*, 2000) after the leaf cutting ants group. Coleoptera species represent the third most important group of insect pests of eucalyptus in Brazil, specially those of Scolytidae, Cerambycidae, Scarabaeidae, Chrysomelidae, Curculionidae, Buprestidae and Platypodidae families (ZANUNCIO *et al.*, 1993b). However, species of Scarabaeidae, Chrysomelidae and Curculionidae are among the most important insect pests in areas where eucalyptus species are native (OHMART and EDWARDS, 1991).

The objective of this work was to evaluated the annual the annual population fluctuation of species of the Coleoptera order in a plantation of *E. urophylla* S. T. Blake (Myrtaceae) in the region of Niquelândia, State of Goiás, Brazil.

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This study was developed in the Municipality of Niquelândia, State of Goiás, Brazil from May 1992 to April 1993 in a plantation of *E. urophylla* with about 10.000 ha. Coleoptera individuals were collected during one night every fifteen days with five light traps with black light and 12 volt batteries at two-meter high (ZANUNCIO *et al.*, 1990, ZANUNCIO *et al.*, 1993b). Light traps were maintained in the same place during the period of collection and they were installed at a distance of about one kilometer from the other one at the border of eucalyptus blocks. A plastic bag containing ribbon paper and a glass container, with ethyl acetate, was coupled to the bottom of the trap, aiming to reduce damage to insects collected (FERREIRA and MARTINS, 1982). These insects were conditioned in entomological blankets, labeled with place and date

of collection, which were sent to the "Laboratório de Entomologia Florestal" of the "Departamento de Biologia Animal da Universidade Federal de Viçosa" in Viçosa, State of Minas Gerais, Brazil where they were separated, counted and classified. Ten individuals of each species were mounted, dried in a oven at 40° C and labeled. Coleoptera individuals were identified according to the literature and entomological collections, and divided in two groups: identified per species and/or per family.

Species collected are deposited at the "Instituto de Biotecnologia Aplicada à Agropecuária" of the "Universidade Federal de Viçosa" in Viçosa, State of Minas Gerais, Brazil.

A total of 5,615 individuals of the order was collected Coleoptera with 346 and 5,269 identified at species or family levels which represented 6.16% and 93.84% of the total collection respectively. One thousand one hundred and ninety-two individuals identified per family were collected in October and they belong mainly to Carabidae, Scarabaeidae and Elateridae with 2.588 in December with most of them of Carabidae, Scarabaeidae and Anobiidae (Table 1).

Table 1. Number of individuals identified per family of the Coleoptera order collected with light traps in a plantation of *Eucalyptus urophylla S. T. Blake (Myrtaceae)* in the Municipality of Niquelândia, State of Goiás, Brazil. May 1992 to April 1993.

	1992								1993					
Family	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Total	%
Anobiidae	0	0	0	0	0	0	46	314	3	43	16	17	439	8.33
Carabidae	1	15	17	0	70	621	2	1,795	40	370	36	99	3,066	58.19
Cerambycidae	0	0	0	0	0	1	16	4	0	0	0	0	21	0.40
Chrysomelidae	2	0	1	0	0	1	0	0	1	0	1	0	6	0.11
Cicindelidae	0	0	0	0	0	0	1	0	0	0	0	2	3	0.06
Coccinelidae	3	0	0	0	0	0	0	0	0	4	0	1	8	0.15
Curculionidae	0	0	0	1	0	7	8	64	0	0	4	7	91	1.73
Dytiscidae	0	0	0	0	0	0	0	0	0	0	0	1	1	0.02
Elateridae	0	0	0	0	10	115	154	16	1	7	0	0	303	5.75
Hydrophilidae	0	2	0	0	0	8	0	48	0	0	0	0	58	1.10
Meloidae	0	0	0	0	20	0	0	0	0	0	0	0	20	0.38
Nitidulidae	0	0	0	0	0	1	0	0	0	1	0	4	6	0.11
Passalidae	0	0	0	0	0	1	0	0	0	0	0	0	1	0.02
Scarabaeidae	6	1	3	1	46	428	24	347	9	68	37	47	1,017	19.30
Scolytidae	0	0	0	0	0	0	0	0	0	8	32	7	47	0.89
Staphylinidae	0	0	0	0	0	9	0	0	0	16	88	68	181	3.44
Tenebrionidae	0	0	1	0	0	0	0	0	0	0	0	0	1	0.02
Total	12	18	22	2	146	1,192	251	2,588	54	517	214	253	5,269	100.00

Results with collection of Coleoptera in Niquelândia, State of Goiás show that months with populations peaks of species of the order Coleoptera can be different with region. Zanuncio *et al.* (1993b) collected higher number of insects of this order between November and April in the State of Espírito Santo, Brazil while this

was found by Pinto *et al.* (2000) in September in the State of Minas Gerais, Brazil and Oliveira *et al.* (2001) recorded it in October in another region of this State but all these results were recorded in months with higher and rainfall. The first authors worked with ethanolic traps while light traps were used in the present research but independently of the trap type it is necessary to study the factors that affect population fluctuation of insects of the order Coleoptera aiming to predict its tendency in forested areas and to develop control methods for these insects (MORALES *et al.*, 2000).

Most individuals collected and identified at species levels belong to *Premnobius cavipennis* Eichhoff, 1878 (Coleoptera: Scolytidae), *Cardiorhinus* sp. (Coleoptera: Elateridae) and *Pinotus ascanius* Mannerheim, 1929 (Coleoptera: Scarabaeidae) with 174, 134 and 18 individuals respectively representing 50.29%, 38.73% and 5.20% of the total number of Coleoptera species. These three species represented 94.22% of individuals identified by species (Table 2) with distribution in defined periods. *Cardiorhinus* sp. and *P. escanius* were collected in November and March, respectively, and *P. cavipennis* from February to April which is important to define management strategies aiming to rationalize application of preventive measures against insect pests. The predominance of many individuals of a few families can be explained by lower vegetation diversity in *Eucalyptus* plantations (SANTOS *et al.*, 1979) since more diversified habitats present higher number of species (MEZZOMO *et al.*, 1998).

Table 2. Number of individuals of the Coleoptera order identified to the species level collected with light traps in a plantation of *Eucalyptus urophylla* S. T. Blake (Mytaceae) in the Municipality of Niquelândia, State of Goiás, Brazil. May 1992 to April 1993.

	1992								1993					
	Mai	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Total	%
Family/Species														
Carabidae														
Calosoma scrutador	0	0	0	0	0	1	0	0	0	0	0	0	1	0.29
Elateridae														
Conoderus stigmosus	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*1*	*0.29*
Heteroderes sp.	0	0	0	0	2	4	0	0	0	4	0	1	11	3.18
Cardiorhinus sp.	0	0	0	0	0	0	134	0	0	0	0	0	134	38.73
Scarabaeidae														
Cyclocephala laminata	*2*	*1*	*2*	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*6*	*1.73*
Pinotus ascanius	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*18*	*0*	*18*	*5.20*
Stenocrates laborator	*0*	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*0*	*1*	*0.29*
Scolytidae														
Premnobius cavipennis	0	0	0	0	0	0	0	0	0	106	17	51	174	50.29
Total	2	1	2	0	2	6	135	0	1	110	35	52	346	100.00

Premnobius cavipennis can be found in many countries and in Brazil it has been recorded in the States of Minas Gerais, Espírito Santo, Rio de Janeiro, São Paulo, Paraná and Rio Grande do Sul. It attacks trunks or branches of plants of *Pinus elliotti* Engel with diameter above three centimeters where it builds galleries to cultivate fungi which can be entrance channels for diseases (PEDROSA-MACEDO, 1993). This was the most frequent species in the Municipalities of Mogi-Guaçu, Altinópolis and São Simão, State of São Paulo in a plantation of *Eucalyptus grandis* W. Hill ex Maiden (Myrtaceae) where it represented 97.96% of all individuals of the Scolytidae collected between July 1991 and July 1992. This insect was found in 7.6% of the trees specially in those stressed but vigorous trees were also infested by *P. cavipennis* under heavy population pressure (ROCHA, 1993).

Species of the Scolytidae family are responsible for about 60% of tree mortality in the world. This family presents high number of species in the tropics including important ones such as *Xyleborus affinis* Eichhoff, 1867 (Coleoptera: Scolytidae), *Xyleborus paraguayensis* Schedl, 1949 (Coleoptera: Scolytidae) and *Xyleborus ferrugineus* (Fabricius, 1801) (Coleoptera: Scolytidae)

which were collected by Morales *et al.* (1999) in an *E. grandis* plantation in the region of "Vale do Rio Doce", State of Minas Gerais, Brazil damaging *Eucalyptus* stumps and, for this reason, it was considered an important pest (MORALES *et al.*, 2000).

Individuals identified at family level were distributed in 17 families with higher number of them belonging to Carabidae, Scarabaeidae and Anobiidae with 3,066, 1,017 and 439 individuals, respectively which represented 58.19%, 19.30% and 8.33% of individuals of this group (5,269) (Table 1). Diversity of species and of individuals of Coleoptera families order can be different with region and trap type because Pinto *et al.* (2000) collected higher number of individuals of Carabidae, Aphodiidae and Melolonthidae with light traps in the Municipality of Três Marias, Minas Gerais while Mezzomo *et al.* (1998) reported higher number of individuals of Scolytidae, Bostrichidae and Cerambycidae with ethanolic traps in the municipalities of Paineiras and Paraopeba, State of Minas Gerais, Brazil.

The family Carabidae was more frequent with 3,066 individuals (58.19%) with individuals being collected during all months except in August with population peak in December (1,795 individuals) and significant numbers in October (621) and February (370) (Table 1). It is important to study population peaks of species of this family are important because many of them are predators of Lepidoptera defoliators of eucalyptus (ZANUNCIO *et al.*, 1993b).

Scarabaeidae showed higher abundance of individual in October and December with 428 and 347 individuals respectively (Table 1). This family is important because it has pest species of eucalyptus including *Bolax flavolineatus* (Mannerheim, 1829) (Coleoptera: Scarabaeidae) which defoliate plants of this group in Brazil (SANTOS *et al.*, 1996).

Anobiidae has no species reported as pests of eucalyptus and most of individuals of this family collected during the rainy period from November to April with population peaks in December (314 individuals) (Table 1).

Curculionidae had 91 individuals (Table 1) and *Gonipterus gibberus* (Boisduval, 1835) (Coleoptera: Curculionidae) and *Gonipterus scutellatus* (Cyllenhal, 1833) (Coleoptera: Curculionidae) of this family are important eucalyptus pests. Larvae and adults of these specie feed on eucalyptus leaves. These species are disseminated in most countries including Brazil and many programs have been developed to control them (PAINE and MILLAR *et al.*, **2002) but** they are originated from Australia (PEDROSA-MACEDO, 1993).

Chrysomelidae is another family with pests of eucalyptus in Brazil species such as *Sternocolaspis quatuordecimcostata* (Lefréve, 1877) (Coleoptera: Chrysomelidae) and *Costalimaita ferruginea* (Lefréve, 1877) (Coleoptera: Chrysomelidae). These species has been managed in eucalypt plantation including monitoring in vulnerable areas and control where necessary (CAMARGO *et al.*, 2001; PEDROSA-MACEDO, 1993).

The family Cerambycidae presents *Phoracantha semipunctata* (Fabricius, 1775) (Coleoptera: Cerambycidae) as the most important wood borer of eucalyptus and this species can cause serious damage in most countries where eucalyptus are cultivated including Brazil (PAINE *et al.*, 2002; RIBEIRO and ZANUNCIO, 2001; RIBEIRO *et al.*, 2001). *P. semipunctata* does not present aggregation pheromone or associated fungi what could increase its ability to colonize alive plants but tree mortality can occur in heavy infestation of this pest (CALDEIRA *et al.*, 2002).

Monitoring programs can indicate tendency of populations of Coleoptera pest species of eucalyptus and their natural enemies. For this reason it is recommended to intensify these programs aiming to increase efficiency of Insect Pest Management (MIP) Programs.

RESUMO: O objetivo deste trabalho foi avaliar a flutuação populacional de espécies da ordem Coleoptera na região de Niquelândia, estado de Goiás, Brasil, em plantios de *Eucalyptus urophylla* S. T. Blake (Myrtaceae). Esses insetos foram coletados utilizando-se cinco armadilhas luminosas durante uma noite, a cada quinze dias, de maio de 1992 a abril de 1993 e identificados de acordo com a literatura e coleções entomológicas por espécie e, ou por família. Foram coletados 5.615 indivíduos da ordem Coleoptera, sendo 346 e 5.269 identificados em nível de espécie e família, respectivamente. As espécies mais abundantes foram *Premnobius cavipennis* Eichhoff, 1878 (Coleoptera: Scolytidae) representando 50,29% do total de indivíduos identificados, seguida por *Cardiorhinus* sp. (Coleoptera: Elateridae) e *Pinotus ascanius* Mannerheim, 1929 (Coleoptera: Scarabaeidae) com 38,73% e 5,20% dos indivíduos, respectivamente. A família com maior número de indivíduos e de espécies foi Carabidae, com 58,19% dos indivíduos identificados em nível de família, seguida por Scarabaeidae e Anobiidae com 19,30 e 8,33%, respectivamente. Os picos populacionais dos coleópteros, nessa região, foram registrados em outubro e dezembro de 1992.

UNITERMOS: Besouros associados a eucalipto*;* Flutuação populacional.

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