Direct sampling technique of bees on *Vriesea philippocoburgii* (Bromeliaceae, Tillandsioideae) flowers

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Abstract

In our study on *Vriesea philippocoburgii* Wawra pollination, due to the small proportion of flowers in anthesis on a single day and the damage caused to inflorescences when netting directly on flowers, we used the direct sampling technique (DST) of bees on flowers. This technique was applied to 40 flowering plants and resulted in the capture of 160 specimens, belonging to nine genera of Apoidea and separated into 19 morph species. As DST maintains the integrity of flowers for later bees' visits, it can enhance the survey's performance, constituting an alternative methodology for the collection of bees visiting flowering plants.

Key words: sampling technique, bees, Hymenoptera, Bromeliaceae, *Vriesea philippocoburgii*

Resumo

Técnica de amostragem de abelhas em flores de *Vriesea philippocoburgii* (Bromeliaceae, Tillandsioideae). Em nosso estudo sobre a polinização de *Vriesea philippocoburgii* Wawra, devido à pequena proporção de flores abertas por dia e ao dano causado à inflorescência quando utilizada a redada dirigida sobre a planta, foi utilizada a técnica de coleta direta de abelhas sobre as flores. Esta técnica foi aplicada em 40 plantas floridas e resultou na captura de 160 exemplares de abelhas, que foram identificados em nove gêneros e separados em 19 morfo-espécies de abelhas. Como esta técnica não compromete a viabilidade das flores, ela aumenta o sucesso da amostragem desses insetos, além de constituir-se numa metodologia alternativa para a coleta de abelhas.

Unitermos: amostragem, abelhas, Hymenoptera, Bromeliaceae, *Vriesea philippocoburgii*

Studies of bees visiting flowers, in Brazil, which involve the capture of specimens (Sakagami and Laroca, 1971; Laroca et al., 1982; Viana et al., 1997; Zanella et al., 1998), generally follow the sampling technique described by Sakagami et al. (1967). Nevertheless, there are some other studies that do not specify in detail their bee sampling methodologies (Carvalho and Bego, 1997; Schlindwein and Wittmann, 1997; Pinheiro and Schlindwein, 1998; Siqueira Filho, 1998; Macedo and Martins, 1999; Rebêlo and Silva, 1999). Although Sakagami, Laroca and Moure´s technique (Sakagami et al., 1967) is quite efficient in sampling the Apoidea fauna in different ecosystems, in some cases it is unfeasible due to the architecture and resistance of the branches of the studied plant. This method can also bias the results of studies, such as those of pollination ecology, when the capture of bees is carried out by netting directly onto flowers. In this case,

the procedure becomes an aggressive factor that can damage the flowers or even cause them to drop. This may lead to an alteration in the proportion between flower visits and the value of the fruit set. Also, for naturalistic studies and/or surveys of visiting bees on plants with panicle-like inflorescences and with alternate flowering, or with a small proportion of flowers opening on a single day, this technique can cause lesions or decrease the number of floral buds, flowers or inflorescences, leading to the reduction of bee visits.

In our study on *V. philippocoburgii*, because of the small proportion of flowers opening on a single day and the damage to inflorescences, both leading to the reduction of bee visits, we used the direct sampling technique (DST) of bees on flowers. Due to the architecture and resistance of the branches of the apple trees, this technique was also used by Orth (1983) for collecting bees on such flowers.

According to Kearns and Inouye (1993), for some insects it is easier to use a killing jar to catch them on a flower if you approach it slowly without disturbing the insects and if you wait next to the plant for insects to arrive. We adopted both procedures, using tubular killing jars made from transparent plastic material, approximately 15 cm in height and 2.5 cm in diameter, containing potassium cyanide. We believe that this procedure is already being used by entomologists in the field, but if indeed this is the case, they do not mention the fact in their methodological descriptions.

Bees visiting *V. philippocoburgii* flowers for nectar enter the long tubular corolla of the flower (50mm) in order to reach the nectaries. When using DST, Apoidea individuals were captured while the bees were visiting these flowers by introducing the visited flower inside a killing jar, without removing the flower from the plant. At the same time, a piece of non-absorbent cotton was gently placed on the jar's opening to prevent the bees from escaping. Like the Sakagami et al. (1967) technique, DST is also

dependent on the ability to detect and catch the bees, which may differ among collectors.

This study was developed at the UCAD/UFSC site, an environment conservation area located on Santa Catarina Island, Santa Catarina State.

The direct sampling of bees on *V. philippocoburgii* flowers was carried out on 40 flowering plants from March to May 2001 (100 hours of sampling effort), and was clearly shown to be successful since it resulted in 94 Apidae and 66 Halictidae specimens captured. The bees belonged to nine genera and 19 morph species. This is the first time that such bee diversity and abundance has been documented for a Bromeliaceae species.

As *V. philippocoburgii* flowers present a prolonged tubular corolla, this procedure was quite easy. In flowers with wide-open corolla, DST should be more efficient for collecting bees which have less active flight patterns, or on flowers that possess higher amounts or concentrations of trophic resources which stimulate a longer bee visiting time. In apple trees, Orth (1983) obtained an efficiency of 60 to 70% when capturing through the DST method.

As DST maintains the integrity of flowers for later bee visits, it can enhance the survey's performance, constituting an alternative methodology for collecting bees visiting flowering plants.

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