

MOSQUITOES OF CENTENNIAL PARK, SYDNEY

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Summary

A short survey of the mosquito populations within Centennial Park, Sydney, was undertaken between January and April 2006. Dry-ice baited light traps were used to sample the host seeking adult mosquito populations and surveys of aquatic habitats within the parklands were undertaken for immature mosquitoes. A total of eight species was collected but, despite extensive aquatic habitats (e.g. ponds, creeks), the overall numbers of mosquitoes were relatively low. The most abundant species was *Aedes notoscriptus* (Skuse), a mosquito closely associated with small water holding containers and tree holes. The nuisance-biting and public health risks of the mosquito populations associated with the parklands are low.

Keywords: mosquitoes, *Aedes notoscriptus*, constructed wetlands, metropolitan parklands

INTRODUCTION

There are over 50 species of mosquito known to exist in the Sydney basin region of NSW (Webb *et al.* 2001) and, while mosquitoes associated with metropolitan areas have the potential to cause nuisance biting impacts, public health risks in these areas are considered low (Russell and Kay 2004). However, arboviruses such as Ross River virus (RRV) and Barmah Forest virus (BFV) have been isolated from mosquitoes collected in the Sydney metropolitan area (Russell and Kay 2004) and small outbreaks of arboviral disease have been recorded in the western regions of the greater Sydney area (Amin *et al.* 1998, Brookeshire *et al.* 2000).

The absence of extensive natural wetlands restricts the abundance and diversity of mosquito fauna in metropolitan areas. However, the increasing use of constructed wetlands within urban areas for wastewater treatment, water storage and wildlife conservation increases opportunities for pest mosquitoes (Russell 1999). Little is known of the existing mosquito fauna within the established parklands of major metropolitan areas such as Sydney's Centennial Park.

The aim of this investigation was to document the mosquito fauna of Centennial Park (located approximately 5 km southeast of Sydney's central business district) and identify potential pest species that may be associated with the wetlands within the park.

MATERIALS AND METHODS

The Centennial Park study site is over 200 ha in size and contains 11 freshwater ponds that, collectively, cover approximately 26 ha. The ponds are fed by runoff from the surrounding suburbs and range in size, depth and their vegetation density. In addition to the

ponds, there is a low-lying paperbark swamp and extensive grasslands and woodland habitats. The park itself contains extensive active and passive recreation areas and it is estimated that over 10 million people visit the area each year.

Adult host-seeking mosquitoes were collected using dry ice baited Encephalitis Vector Surveillance light traps (Rohe and Fall 1979) at ten trap sites on four occasions between 19 January 2006 and 28 March 2006. Aquatic habitats were sampled using a 300 mL dipper for the presence of larvae. Adult and larval specimens were identified to species using Russell (1993).

RESULTS

A total of six mosquito species was recorded as larvae (L) and eight as adults (A): *Aedes alboannulatus* (Macquart) (L, A), *Aedes notoscriptus* (Skuse) (L, A), *Aedes vigilax* (Skuse) (A), *Anopheles annulipes* Walker s.l. (L, A), *Coquillettidia linealis* (Skuse) (A), *Culex annulirostris* Skuse (L, A), *Culex australicus* Dobrotworsky & Drummond (L, A), *Culex quinquefasciatus* Say (L, A). Very few larvae of any species were collected from the ponds with the most commonly collected larvae, *Ae. alboannulatus*, limited to small areas of temporary ground pools created after rainfall (Figure 1). Adult mosquito populations were low with less than 20 mosquitoes collected per trap night. The most abundant species collected as adults was *Ae. notoscriptus* (Figure 2) that made up 94.5% of all adult mosquitoes collected.

DISCUSSION

With the exception of *Cx. australicus*, which is generally thought to be a bird-biting mosquito (Dobrotworsky 1965), all other species are known human biters and may potentially be involved in the transmission of arboviruses with RRV and BFV isolated from field collected mosquitoes elsewhere in

Figure 1. An example of the ephemeral habitats (foreground) in Centennial Park from which larvae of *Aedes albopictus* were collected. Very few larvae were collected from the permanent ponds (background) in this study. (Photograph C.E. Webb, Department of Medical Entomology)



Figure 2. *Aedes notoscriptus* was the most abundant mosquito collected in Centennial Park. (Photograph S.L. Doggett, Department of Medical Entomology)



Australia (Russell 1993, Russell 1995). Although the most abundant mosquito, *Ae. notoscriptus*, has been identified as a vector of RRV and BFV (Doggett and Russell 1997, Watson and Kay 1998), populations were considered very low and the public health risks considered minimal.

Compared to the mean abundance of mosquitoes in other regions of metropolitan Sydney that may exceed 1000 mosquitoes per trap night (Webb and Russell 1999, Webb *et al.* 2001, 2004), the overall abundance of mosquitoes in this study was very low and unlikely to represent a serious nuisance-biting threat. The abundance was primarily due to unfavourable conditions within the ponds where there was relatively sparse aquatic vegetation and steep edges, which did not provide refuge for larvae from disturbance by wave action or the abundant fish and macro-invertebrate predators.

While the current pest risk posed by mosquitoes in the park is low, future changes to the management of water bodies may influence the production of mosquitoes. The most critical feature of the wetlands is the macrophyte zones along the margins of the larger ponds. There is limited information available on the associations between specific vegetation types and the suitability for mosquito production. However, invasive species such as Cumbungi (*Typha* spp.) and Native Reed (*Phragmites* spp.) may choke wetland systems and create refuge for mosquito larvae, while dead plant material may increase the organic content of the water and, increase the suitability of the habitat for mosquito species such as *Cx. annulirostris* and *Cx. quinquefasciatus* (Russell 1999). The build up of sediments, as well as pond bank erosion or collapse, may also make conditions more suitable for mosquitoes. However, it is difficult to predict if these changes, should they occur, will result in a dramatic increase in actual or potential nuisance impacts.

There are no records of previous mosquito surveys being specifically undertaken within Centennial Park or the surrounding areas. This short survey should not be considered a definitive study of the local mosquito fauna but it does suggest that the extensive waterways within the park do not represent locally significant pest mosquito habitats. However, while the results of this investigation indicate that mosquitoes are unlikely to pose a serious nuisance biting or public health risk within Centennial Park, mosquitoes will be most active during the warmer months and visitors and staff may experience some minor nuisance biting at dawn and dusk - the use of personal insect repellents and /or protective clothing is advisable at these times.

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