

Mixed-species migratory wagtail (Aves: Motacillidae) roosts in urban Singapore

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Abstract. The migration ecology of landbirds that use the East-Asian Australasian Flyway is generally poorly understood. Singapore is an important node along this flyway for many landbirds, including wagtails with five species recorded in the country. Four of these species have been observed roosting communally in two urban carparks since 2017. These roosts are dominated by grey wagtails numbering in the hundreds, while the remaining three species rarely exceeded more than 10 individuals. The roosts are in urban areas of high disturbance, and their continued use of such environments shed light on the wintering behaviour of migratory wagtails.

Key words. Wagtails, migratory landbird, Singapore, urban roost

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INTRODUCTION

Harsh and resource-deficient northern winters trigger a wide variety of birds breeding at higher latitudes to migrate annually towards warmer regions with comparatively more resources. These birds travel broadly along major flyways, with the East-Asian Australasian Flyway (EAAF) being an important migratory route (Galbraith, 2011). It is the world's most species-rich flyway, with almost 400 species of migratory landbirds recorded annually. However, significant knowledge gaps still exist for many of these birds (Yong et al., 2021).

Wagtails (Family Motacillidae) are a major group of migratory passerines with several species wintering in Southeast Asia. In Singapore, five species of wagtails have been recorded, the citrine wagtail (*Motacilla citreola*), eastern yellow wagtail (*Motacilla tschutschensis*), white wagtail (*Motacilla alba*), grey wagtail (*Motacilla cinerea*) and forest wagtail (*Dendronanthus indicus*) (NSS Bird Group, 2021). The eastern yellow wagtail and citrine wagtail share a preference for open habitats, with the former being a common winter visitor and passage migrant while the latter is a very rare winter visitor (Lim, 2009). The forest wagtail is regularly recorded in wooded areas, while both the grey and white wagtail are uncommonly observed in both open country and wooded areas, typically near water (Lim, 2009).

Beginning in 2017, local birdwatchers were alerted to the unusual phenomenon of hundreds of these migratory wagtails roosting communally in ornamental palms planted in the carpark of a public housing estate. The phenomenon even received attention in the national media (Tan, 2017). Subsequently, a second roost site was discovered, with both sites featuring a similar roosting habitat comprising ornamental palms planted in the carparks of public housing estates. In this article, we describe the roosting sites and dynamics of both these mixed wagtail roosts discovered amidst Singapore's public housing estates.

OBSERVATIONS

The first of these wagtail roosts, located at Yishun, was first noted on 23 September 2017 (01°25'51.6"N, 103°50'02.4"E). The wagtails were observed roosting along a row of royal palms (*Roystonea regia*) planted at an open-air carpark (Fig. 1).

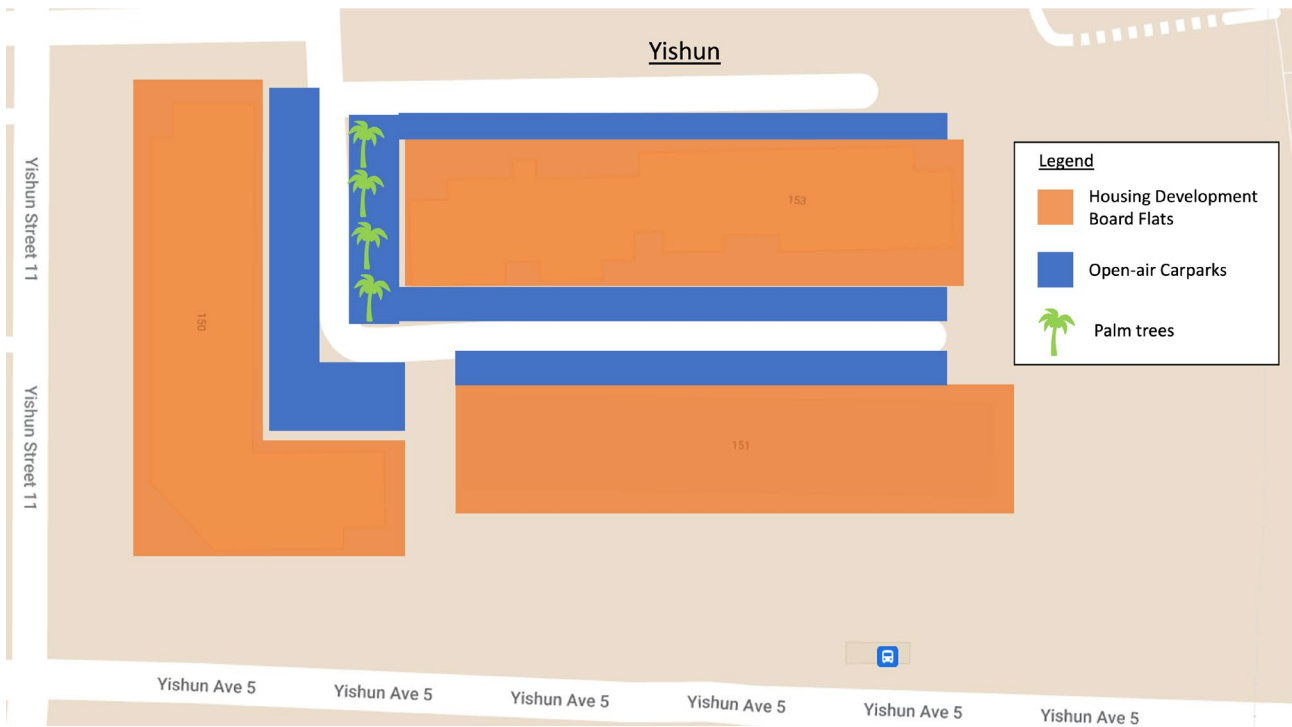


Fig. 1. The wagtail roost at Yishun, featuring royal palms in an open-air carpark surrounded by public housing blocks. (Base map adapted from Google, n.d.)

A second roost site was then discovered in another housing estate in Sembawang (01°27'07.2"N, 103°49'04.8"E) about two weeks later. This site is about three kilometres from the site at Yishun. The wagtails here roosted in a row of Alexandra palms (*Archontophoenix alexandrae*), a species of ornamental palm, that was planted next to a multi-storey carpark (Fig. 2).

The roost at Yishun was visited regularly from 2017 to 2021, with at least 66 visits made mostly in September and October on a weekly to fortnightly basis. Visits were also made sporadically in January. These visits were made by various birdwatchers and records were primarily gleaned from the eBird platform (Sullivan et al., 2009). However, the roost at Sembawang was visited only up till 2018, due to the absence of roosting wagtails at the site after 2018. Arising from these visits, more information on the wagtails' numbers, roosting habits and behaviour became available.

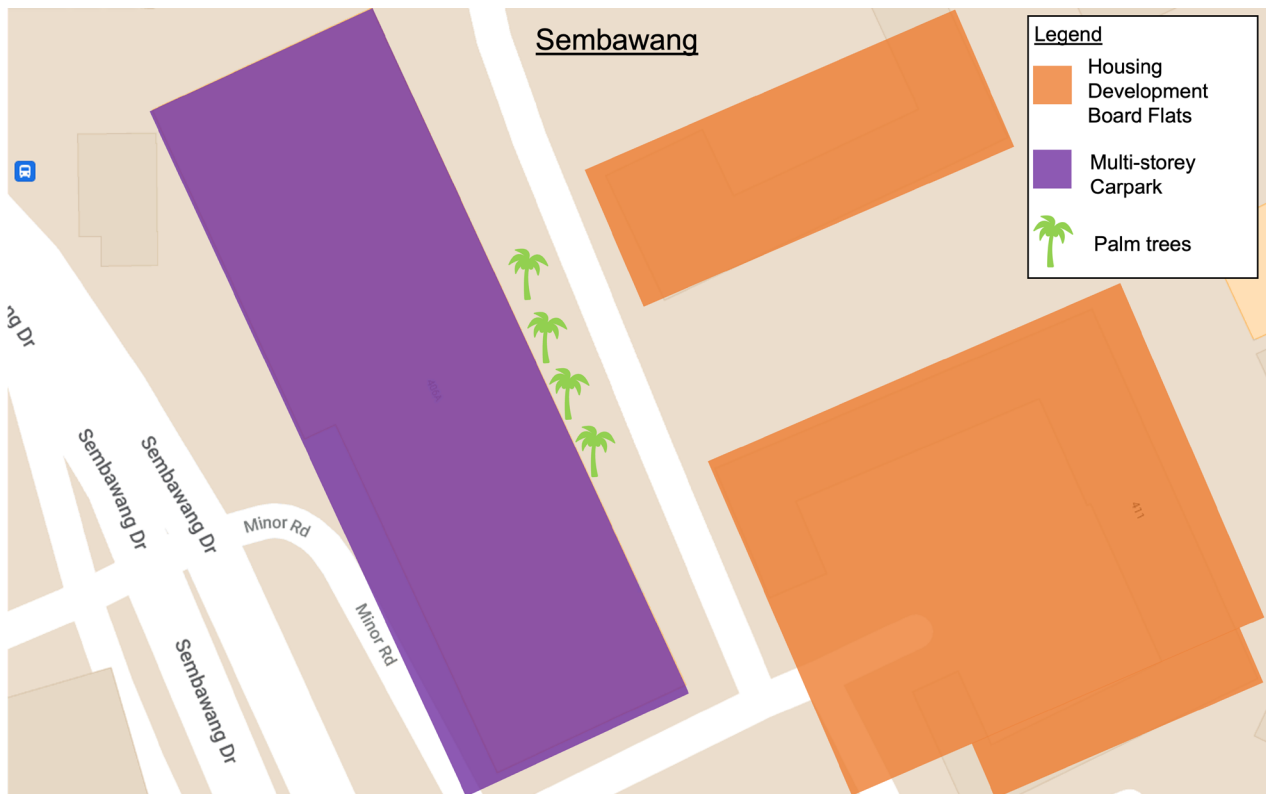


Fig. 2. The wagtail roost at Sembawang, featuring a row of Alexandra palms adjacent to a multi-storey carpark. (Base map adapted from Google, n.d.)

Of the five species of wagtails recorded in Singapore, the grey wagtail, eastern yellow wagtail, white wagtail and forest wagtail were all recorded using both roost sites. The citrine wagtail, which is the rarest wagtail in Singapore with less than five records, was not recorded. Both roost sites hosted all four species of wagtail species, with the roost at Yishun consistently hosting a greater number of birds compared to the one at Sembawang. The grey wagtail was the dominant species at both roost sites, with daily counts ranging from 50 to 300. These numbers appeared to peak in January where average counts of between 200–350 birds were made on several occasions. For instance, high counts of 350 were observed at the Yishun roost on 5 January 2018 (Kennewell, 2018) and again on 13 January 2018 (Fadzrun, 2018a). The earliest arrival date of grey wagtails at either roost site was estimated to be during the last two weeks of August, based on a list submitted on 31 August 2018 when 200 were seen at Yishun, in addition to two forest wagtails (Fadzrun, 2018b).

Very few white and forest wagtails were recorded at these roost sites. They were usually seen singly or in pairs, with high counts for either species rarely exceeding 10 individuals (Fig. 3). One notable exception was the observation of 22 white wagtails at the Yishun roost on 1 April 2019 (Kennewell, 2019). The eastern yellow wagtail, despite being the most frequently recorded wagtail in Singapore, was also infrequently encountered at both roosts. On the few occasions that they were seen, they were usually observed singly, with a maximum count of four on 13 January 2018 at Yishun (Fadzrun, 2018a).



Fig. 3. A lone white wagtail of the *leucopsis* subspecies observed at the Yishun roost site. (Photograph by: Benjamin Lee)

At both sites, the wagtails were observed flying into the site from around 1800 hours, roughly an hour before sunset. They would engage in a pre-roost gathering by first circling in the sky before descending onto the rooftops and television antennas of the nearby housing blocks in Yishun (Fig. 4) or the open roof deck of the multi-storey carpark (Sembawang), although some would also fly directly into the palms. During such gatherings, feeding activity was minimal. Most individuals were either observed to be perching or preening. Between 1845 and 1900 hours, the wagtails would proceed to fly down into the palm trees. Eight trees were used at Yishun, of which five trees supported a greater number of wagtails, while only four trees were used at Sembawang. In the process of settling in, the wagtails would utter their “chirping” calls, and many would flit from frond to frond until they arrived at a final roosting spot (Fig. 5). By 1930 hours, the birds would have settled into the roost for the night. The wagtails were observed to leave the roost sites very early in the morning, with birds observed to be leaving the Yishun roost at first light between 0545 and 0630 hours in September 2018 and September 2020 (M. Khoo, in litt. 2020). No information on first departure timing is available for the Sembawang roost.



Fig. 3. Grey wagtails flying in and gathering on the rooftop of a nearby public housing block at the Yishun roost site. (Photograph by: Benjamin Lee)

DISCUSSION

Wagtails are known to be communal roosters and there are multiple reports on the roost dynamics of urban white wagtail roosts in the Northern Hemisphere (Zahavi, 1971; Fleming, 1981; Raine & Cachia, 2010; Smiddy & Halloran, 2015). However, documentation of mixed-species wagtail roosts in their wintering range is limited. One example is Broom et al. (1976), which documented white wagtails sharing a roost with yellow wagtails at a sewage purification plant in Reading, the United Kingdom during the winter. Another example is a communal roost of grey and white wagtails that was found at the Mangalore University campus in India in 2019 (Rodrigues, 2019). Closer to Singapore, several large urban wagtail roosts are known from Thailand, including roosts at Bueng Borapet (McClure, 1974), a large white wagtail roost around Chiang Mai hosting up to 4000 birds, and another in Pattani hosting up to 3000 birds, of which most are eastern yellow wagtails (A. Jearwattananok, in litt, 2021). Further south along the Malay Peninsula, several large roosts comprising up to 2000 forest wagtails at Cheras, Kuala Lumpur, and 3000 eastern yellow wagtails at an unspecified location have been documented (Wells, 2007). In comparison to these observations, the most obvious difference is that apart from sites in India, grey wagtails are typically not listed as the dominant wagtail species in any of these roosts. In fact, Wells (2007) even noted specifically that grey wagtails are not known to roost communally on their wintering grounds. Our observations in Singapore indicate that grey wagtails do roost communally, though the factors associated with them being the dominant wagtail species at both these roost sites remain unknown.

Some aspects of the roosting behaviour of the wagtails at these roost sites are consistent with existing literature. Many of these wagtails appear to arrive in waves, consistent with what was observed at white wagtail roosts in the United Kingdom (Broom et al., 1976, Fleming, 1981). Some of these waves also circled overhead repeatedly prior to landing on the rooftops of surrounding structures, as documented by Fleming (1981). However, there are also peculiarities, such as the strong preference towards using ornamental palms. Given that individual palm fronds are large, compound and arranged at the top of the trunk, they provide little protection for the wagtails from the elements and nocturnal predators. Besides that, these palms are also situated adjacent to the carparks serving these housing estates. Consequently, when the wagtails return to these sites at dusk, that is also the time when the area experiences the highest levels of human activity. This is unusual in the context of migratory landbirds in the region, as one of the only other examples of a landbird migrant that exhibits similar roosting habits is the barn swallow (*Hirundo rustica*), which has large urban roosts across many parts of Southeast Asia including Malaysia and Singapore (Wells, 2007, Lim, 2009).



Fig. 4: Grey wagtails finding a suitable roosting position on the royal palms at the Yishun roost site. (Photograph by: Benjamin Lee)

Above all, the biggest mystery of these wagtail roosts is where the birds occupying these roosts are coming from. In Singapore, grey wagtails are uncommonly encountered feeding singly in a variety of habitats including urban stormwater canals and along riparian streams (pers. obs.). Consequently, one theory to explain how a single roost can support hundreds of these birds is that many of them may be flying in from the southern areas of West Malaysia to these roost sites, with several observers noting that at least some of these birds appeared to be flying in from a northerly direction. Another possibility is that these roosts support aggregations of birds that disperse widely to foraging sites that may be a considerable distance away. Broom et al. (1976) noted that the white wagtails in their study fed at sites up to 15 km from their documented roost site.

In summary, mixed-species wagtail roosts have been present in parts of Singapore's urban landscape for some years now, and there likely are more of such roost sites that are currently undetected. Even so, the dynamics of these roosts remain largely a mystery with many unanswered questions. Some of these questions include (1) why the Yishun roost remained active while the Sembawang roost stopped being used even though the local habitat did not change, and (2) what factors determine the dominant wagtail species at a roost site. Continued research, both locally at the roost sites, as well as in other parts of Southeast Asia, will hopefully provide further insight into such behaviour.

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