

Deciphering the breeding ecology of White-bellied Noddy (*Numenius phaeopus rogachevae*) in the East Asia-Australia Flyway



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Numenius phaeopus (Crogachev breeding range spent their non-breeding season in the northern Sumatra, Singapore, East Asia and Northwest Australia and mainly stopped over along China's coasts during migration. None of our birds bred in the exclusive breeding range of the *phaeopus* subspecies. Previous studies had indicated that *rogachevae* subspecies breeds along the coast of the Celebes Islands and the eastern seaboard of the East Africa. We found that *rogachevae* subspecies breeds along the EAAF and the eastern seaboard of the East Africa. The *phaeopus* subspecies breeds along the EAAF and the eastern seaboard of the East Africa.

1. Introduction

Seventeen subspecies of White-bellied Noddy (*Numenius phaeopus*) have been described in the world (de Hondt et al., 2014). According to the IOC World Bird List, the White-bellied Noddy is divided into two species: White-bellied Noddy (*Numenius hudsonicus*) and East Asian White-bellied Noddy (*N. phaeopus*) (Gill et al., 2021), which is distributed geographically in (Tate et al.,

2019). Subspecies *ruventris* of the White-bellied Noddy breeds in the East Asia and the East Africa (Gill et al., 2021). Subspecies *hudsonicus* of the White-bellied Noddy breeds in the East Africa and the East Asia (Gill et al., 2021), and also breeds in the East Africa (Gill et al., 2010). Five subspecies of East Asia

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Whi b e (*N. phaeopus*) a e e g l ed (Gi e a . , 2021). The b eedi g a d b eedi g di ib i f f h e e b eci e a e k (B e a . , 2014 ; Bi d i f e I e a i a a d Na e S e e , 2015 ; Ca - e i e a . , 2019 ; ee Fig. 1). *N. p. islandicus* b eed i Ice a d a d h e B i j h I e , (a i G e e a d a d Fa e I a d) a d e d b eedi g ea i We Af i ca ; *N. p. phaeopus* b eed i he egi f N h E e We e S i b e i a a d e d b eedi g ea Af i ca ; *N. p. alboaxillaris* b eed i he egi We e Ka akh a S h e e S i b e i a a d e d b eedi g ea h e i a d a d c a f h e We I dia O ce a ; *N. p. variegatus* b eed i he a g e f ce a Ea e S i b e i a a d e d b eedi g ea h e c a f S h A i a , S h e a A i a a d A a i a . The ece d e c i b e d b eci e , *N. p. rogachevae* (T k i ch , 2008) , b eed i Ce a S i b e - i a . The b eedi g i e a e i ce a (Fig. 1 ; T k i ch , 2008 ; La e a . , 2012 ; B e a . , 2014). I h a b e e ec a e d h a h e *rogachevae* h i b e i g a e a g h e Ce a A i a F a (T k i ch , 2008) a d e d h e b eedi g ea i We e I dia a d Ea e Af i ca (S k e e a d Ma , 2020 ; Gi e a . , 2021) , b h e e i i a a c k f e i d e e .

I h e Ea A i a - A a a i a F a (E A A F) , b h . *phaeopus* a d *variegatus* h a e b e e i d e e e d a d h a h e i a i b eedi g g d a e c a e d i h e e e a d e a e egi e eci e . *N. p. phaeopus* a i d i i b e d f h e c a f Ba g a d e h (Ri e , 1982) a d S i La k a (Phi i , 1975) . The b eedi g *variegatus* Whi b e i d e d i b e d a g h e c a f Ba g a d e h (Ri e , 1982) e b i d c e a i a i i e d S i La k a ; Phi i , 1975) M a i a a I a d (S i e a . , 1997) a d M i c e i a (Ba e , 1951) i h e Ce a P a c i f i c . A f e *variegatus* h i b e e d b eedi g ea i h e M a a P e i a , W a a c e a egi

a d S a I a d , h i e *variegatus* h i b e e d b eedi g ea i ea e I e i a , h e G a d a c a a I a d a d h e F i d a I - a d f h e S a c h i e a g i h e S h P a c i f i c , N e G i e a , a d A a i a (B i h , 2006 ; G a d e a . , 2016) .

S e d i e h a e c i d e e d h a *N. p. variegatus* i h e b eci e f h e E a i a Whi b e i S h e a A i a a d A a i a (B e a . , 2014 ; d e H a d C a , 2014 ;

de c i i f he h gica fea e a e c i e i h he .
rogachevae: he h a c k i g he e b a c k a d f . *roga-*
chevae a e e i e e d a k h a h a f . *variegatus*, a d h e d a k b a
 h e a i a fea h e f . *rogachevae* a e i d e h a h e f h e .
phaeopus (T l i c h , 2008). S e i d i d a e h i b i , e d h e i e e
 d i a e a g e c h a a c e i c b e e e . *variegatus* a d *phaeopus* e e
 a a c c e d i I d e i a (C a , 1983), M a a P e i a (R b i
 a d C h a e , 1936), T h a i a d (J g e e , 1949) a d B e (M a c K i
 a d P h i i , 1993). I a d d i i f i e d e f d h a b e e d i g
 h i b e i N h e A a i a h e d a a i a i i h e
 c f e b a c k a d f e i e e d a k g i e e
 d a k , a d h e a e d h g h J a a d i g i g a i (K a g e a . ,
 2000). T h e e f G a h a (2000) a h g g e h a h e
 E a i a W h i b e a i g h g h J a a a d e h i b i i g h e i e e
 d i a e a g e c h a a c e i c e e i r e f N h e A a i a .
 B h b e e d i g a g e a d b e e d i g a g e f *variegatus* W h i b e

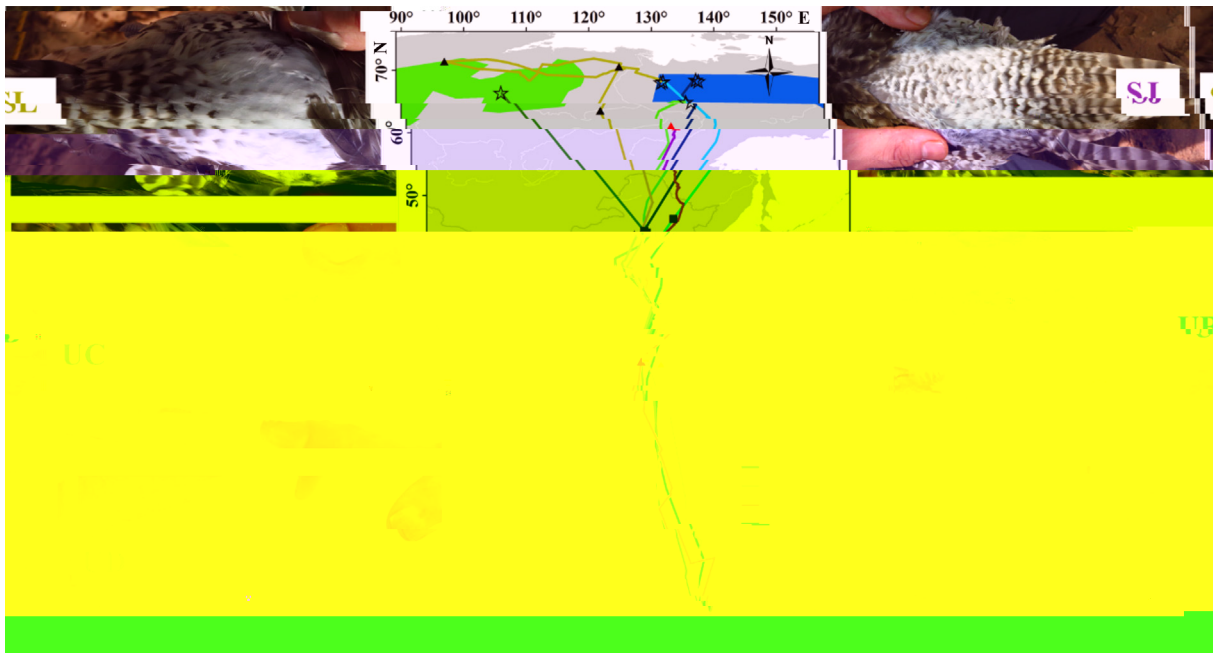


Fig. 2. Migration routes of the seabirds in the North Pacific. The green track (SL, UC and UE) has been identified as the migration route of *variegatus* and *rogachevae* species, while the blue track (SJ, UB and UE) has been identified as the migration route of *variegatus* species. The red track (UE) has been identified as the migration route of *rogachevae* species. The yellow track (UE) has been identified as the migration route of *variegatus* species. Red arrows indicate the direction of migration. The map is based on data from Kuang et al. (2020).

Fig. 2. 130.71° E, 61.09° N, center of the migration route of *variegatus* and *rogachevae*. The green track (SL, UC and UE) has been identified as the migration route of *variegatus* and *rogachevae* species, while the blue track (SJ, UB and UE) has been identified as the migration route of *variegatus* species. The red track (UE) has been identified as the migration route of *rogachevae* species. The yellow track (UE) has been identified as the migration route of *variegatus* species. Red arrows indicate the direction of migration. The map is based on data from Kuang et al. (2020).

4. Discussion

This study identified the migration routes of the seabirds in the North Pacific. The green track (SL, UC and UE) has been identified as the migration route of *variegatus* and *rogachevae* species, while the blue track (SJ, UB and UE) has been identified as the migration route of *variegatus* species. The red track (UE) has been identified as the migration route of *rogachevae* species. The yellow track (UE) has been identified as the migration route of *variegatus* species. Red arrows indicate the direction of migration. The map is based on data from Kuang et al. (2020).

The migration routes of the seabirds in the North Pacific are complex and involve multiple species. The green track (SL, UC and UE) has been identified as the migration route of *variegatus* and *rogachevae* species, while the blue track (SJ, UB and UE) has been identified as the migration route of *variegatus* species. The red track (UE) has been identified as the migration route of *rogachevae* species. The yellow track (UE) has been identified as the migration route of *variegatus* species. Red arrows indicate the direction of migration. The map is based on data from Kuang et al. (2020).

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