Short Communication

Notes on the Blue-winged Teal (*Spatula discors*) and the influence of solar irradiance in a wetland from Boyacá State, Colombia

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Abstract - The Blue-winged Teal (*Spatula discors*) is a migratory species that has been observed in El Salitre wetland near Paipa (5° 46'48.47"N, 73°07'1.49"W), Boyacá State, Colombia. The number of individuals observed swimming in the open water and near the bank was counted from 6:00-8:00 am, 10:00-12:00 pm, and 4:00-6:00 pm. The amount of solar irradiance was recorded as a daily mean from 25% (mean 148.5 watts/m^2) to 100% (mean 594 watts/m^2) from a nearby weather station. The greatest number of ducks (mean = 62.57) was observed from 4:00 to 6:00 pm. Overall, the number of ducks was greater during low solar irradiance conditions (25%). In contrast, a lower number of ducks were observed at higher irradiance levels (75 and 100%). El Salitre wetland is an important site for the conservation of the Blue-winged Teal as well as other aquatic bird species.

Key words: migratory, duck, conservation, population, count.

Riassunto - Note sull'alzavola azzurra (Spatula discors) e sull'influenza dell'irraggiamento solare in una zona umida dello Stato di Boyacá, Colombia.

L'alzavola azzurra (*Spatula discors*) è una specie migratrice che è stata osservata nella zona umida di El Salitre, vicino a Paipa (5° 46'48.47"N, 73°07'1.49"W), Stato di Boyacá, Colombia. Il numero di individui osservati nuotare in acque libere e vicino alla riva è stato contato dalle 6:00 alle 8:00 del mattino, dalle 10:00 alle 12:00 del pomeriggio e dalle 16:00 alle 18:00 del pomeriggio. La quantità di irraggiamento solare è stata registrata come media giornaliera dal 25% (media 148,5 watt/m^2) al 100% (media 594 watt/m^2) da una stazione meteorologica vicina. Il maggior numero di anatre (media = 62,57) è stato osservato tra le 16:00 e le 18:00. Complessivamente, il numero di anatre è stato maggiore durante le condizioni di basso irraggiamento solare (25%). Al contrario, un numero inferiore di anatre è stato osservato a livelli di irraggiamento più elevati (75 e 100%). La zona umida di El Salitre è un sito importante per la conservazione dell'alzavola azzurra e di altre specie di uccelli acquatici.

Parole chiave: anatra migratrice, conservazione, popolazione, conteggio.

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Received for publication: 19 April 2024
Accepted for publication: 13 June 2025

The Blue-winged Teal (*Spatula discors*) is a migratory species (Janke *et al*., 2019). It migrates from Canada, where it nests, to the Gulf Coast in the United States (Hilty & Brown, 2009; Cox *et al*., 2023). *S. discors* also migrates to Central America, the Caribbean, and Northern South America, Uruguay, and Argentina (Hilty & Brown, 2009; Aguilar *et al*., 2020; Holmes & Hodgson, 2023). It inhabits wetlands, swamps, lakes, and lagoons in freshwater and brackish environments (Hilty & Brown, 2009; Holmes & Hodgson, 2023). The Blue-winged Teal is a gregarious species living in large flocks with other aquatic bird species (Hilty & Brown, 2009). It is one of the most abundant and widely distributed duck species in Colombia.

A Blue-winged Teal population was observed in El Salitre wetland near Paipa (5°46'48.47"N, 73°07' 1.49"W), Boyacá State, Colombia (Fig. 1a). The annual mean precipitation of the study site was 1168 mm, and the annual mean temperature was 12.9°C (Ramírez, 2024). The mean solar irradiation per hour (watts/m^2) was obtained from a nearby weather station. The number of individuals observed swimming in the open water and near the bank was counted from 6:00-8:00 am, 10:00-12:00 pm, and 4:00-6:00 pm. The amount of solar irradiance was recorded as: i) 100% full solar - mean 594 w/m^2; ii) 75% solar exposure – mean 445.5 w/m^2; iii) 50% solar exposure -mean 297 w/m^2, and iv) 25% solar exposure – mean 148.5 w/m^2. The number of ducks exposed to each solar irradiance was recorded three times daily for 7 days from 15 to 21 December 2021. A one-way analysis of variance and the Tukey test were conducted to determine significant differences between observation hours and the number of ducks. The greatest number of ducks (mean = 62.57) were observed from 4:00 to 6:00 pm (Figs. 1 and 2) during the 7 days of study followed by the morning hours (mean = 14.14) (6:00-8:00 am) and midday (mean = 1) (Fig. 2). Aguilar *et al*. (2020) reported that *S. discors* was one of the dominant species in Cuba's coastal wetlands. Similarly, in the current study, it was the dominant species in the El Salitre wetland.

The greatest number of ducks recorded during the morning (6:00-8:00 am) was 19 at 25% irradiance (Fig. 3a). The greatest number of ducks observed during midday (10:00-12:00 pm) was 5 at 75% irradiance (Fig. 3b). The

Fig. 1 – El Salitre wetland viewed from a nearby mountain. a) Note that the wetland is surrounded by paddocks covered with grass and a few trees; b) the number of ducks observed from 4:00-6:00 pm, note the high number of individuals; c) closer view; d) close-up of the duck from Guaymaral wetland, Cundinamarca State, Colombia. / La zona umida di El Salitre vista da una montagna vicina. a) Si noti che la zona umida è circondata da recinti coperti di erba e da alcuni alberi; b) il numero di anatre osservate dalle 16:00 alle 18:00, si noti l'elevato numero di individui; c) vista più ravvicinata; d) primo piano dell'anatra della zona umida di Guaymaral, Stato di Cundinamarca, Colombia.

greatest number of ducks recorded during the afternoon (4:00-6:00 pm) was 109 at 25% irradiance (Fig. 3c). Overall, the number of ducks was higher during low irradiance conditions (25%). In contrast, a lower number of ducks were observed at higher irradiance levels (75 and 100%) (Figs. 3b and c). Similarly, Robbins (1981) reported that birds reduce their activity during midday hours. In the current study, the blue-winged teal could be heard hiding within the vegetation during midday, avoiding the high irradiance conditions. However, an exception to this rule occurred at 75% and 100% irradiance during days 1, 3, 5, 6, and 7 in the afternoon (4:00-6:00 pm) when more than 30 ducks were observed swimming in the open water (Fig. 3c).

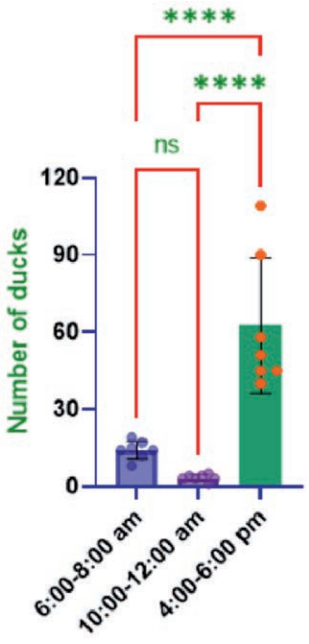
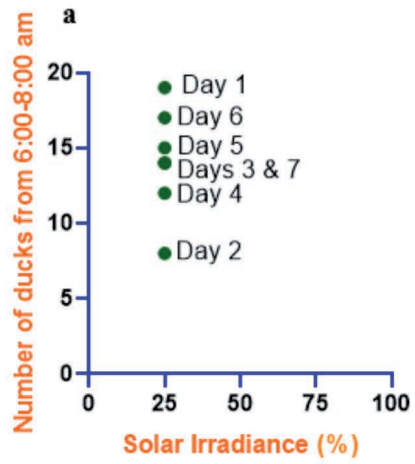
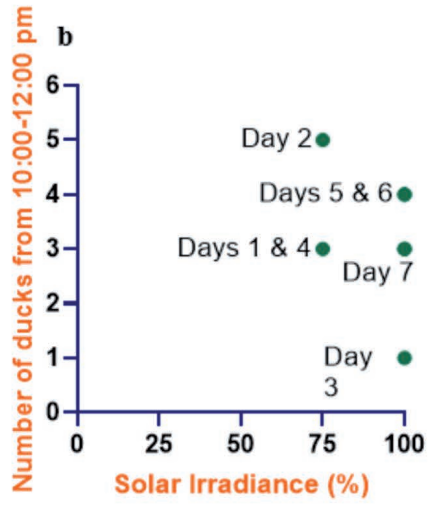


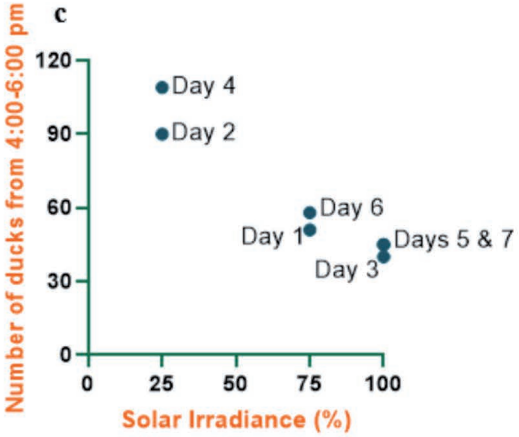
Fig. 2 – The mean number of ducks recorded three times daily during 7 days in the El Salitre wetland. ****One-way analysis of variance ≤0.0001 and Tukey 0.05 significance; ns, non-significant. / Numero medio di anatre registrato tre volte al giorno durante 7 giorni nella zona umida di El Salitre. ****Analisi della varianza a una via ≤0,0001 e significatività Tukey 0,05; ns, non significativo.



25% irradiance (6:00-8:00 am)



100% irradiance (10:00-12:00 pm)



100% irradiance (4:00-6:00 pm)

Fig. 3 – The number of ducks is influenced by the percent solar irradiance during the morning, midday, and afternoon for 7 days. a) The number of ducks counted from 6:00-8:00 am. Note that the solar irradiance was low (25% - mean 148.5 w/m^2); b) the number of ducks counted from 10:00-12:00 pm at 75% (mean 445.5 w/m^2) and 100% (mean 594 w/m^2) irradiances; c) the number of ducks counted from 4:00-6:00 pm at 25%, 75% and 100% solar irradiances. / Il numero di anatre è influenzato dalla percentuale di irraggiamento solare durante la mattina, il mezzogiorno e il pomeriggio per 7 giorni. a) Il numero di anatre contate dalle 6:00 alle 8:00 del mattino. Si noti che l'irraggiamento solare era basso (25% - media 148,5 w/m2); b) il numero di anatre contate dalle 10:00 alle 12:00 con irraggiamento del 75% (media 445,5 w/m2) e del 100% (media 594 w/m2); c) il numero di anatre contate dalle 16:00 alle 18:00 con irraggiamento solare del 25%, 75% e 100.

The current study revealed the importance of solar irradiance on the activity of this bird species. El Salitre wetland is an important site for the conservation of the Blue-winged Teal as well as other aquatic bird species. However, this wetland ecosystem has dramatically reduced its original size as a result of urbanization and grazing grounds for cattle and sheep over the past decades. The native vegetation has been removed over the years, and the wetland is surrounded by paddocks with grass. This wetland has been forgotten as it has occurred in Bogotá´s urban wetlands (Ramírez & Fennell, 2014). Thus, it is relevant to establish urgent conservation measures due to the abundance of *S. discors* and other less abundant species, such as the endangered Tutema (*Porphyriops melanops bogotensis* Chapman, 1914) (Ramírez, 2024). This wetland requires more investigation efforts; perhaps ecotourism initiatives in this wetland could increase the awareness and relevance of its biodiversity. Perhaps an education-based initiative for undergraduate students could be as useful as the one proposed for Guaymaral, Santa María del Lago, and Cordoba wetlands in Bogotá, Colombia (Ramírez & Santana 2019). This initiative aimed to study the key lessons learned by teaching ecotourism to undergraduate students, characterize wetland biodiversity, study wetland environmental problems, and identify ecotourism educational components.

ACKNOWLEDGMENTS

Thanks to L. Marien for her valuable help.

CONFLICT OF INTEREST

The author has no competing interests to declare.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This is an observational study, and no ethical approval is required.

AVAILABILITY OF DATA AND MATERIAL

Not applicable.

FUNDING

No funding was received to assist with the preparation of this manuscript.

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