Letters

White colour and a double roof may not sufficiently cool sunlit nestboxes for Common Swifts

High temperatures can be harmful to eggs and chicks. Swift Conservation and the RSPB therefore discourage the placement of nestboxes for Common Swifts *Apus apus* on south-facing walls (Swift Conservation 2018; RSPB 2023). It has recently been shown that caution may also be warranted for built-in nestboxes in east- and west-facing walls exposed to direct sunlight (Schröder *et al.* 2025). At the same time, it has been suggested that sunlit aspects may nevertheless be acceptable provided that nestboxes are of sufficient thickness and are either painted white or fitted with a double roof (Newell 2015). This suggestion is, as far as I know, not underpinned by systematic measurements of internal temperatures or by comparative data on breeding success during hot summers.

To examine the relative effectiveness of such mitigation measures, I compared the maximum temperatures in four versions of sunlit external Zeist-style nestboxes between 1st May and 31st August 2025. The boxes were positioned on a rooftop on the east elevation of my house in Harderwijk, the Netherlands. Two boxes were constructed from stained brown 12-mm multiplex, one with a single roof (BS) and one with a double roof (roof separation 20 mm, supported by spacers; BD). Two additional boxes were painted white, again with either a single roof (WS) or a double roof (WD). A fifth box, also brown with a single roof, was positioned beneath eaves (BSE) and was exposed to direct sunlight only from sunrise to 11.00 hrs each day. Occupation of the boxes was prevented by blocking the entrances with a fly screen. Temperature recordings and the evaluation of these records have been carried out in the same way as described in Schröder *et al.* (2025).

The spring and summer of 2025 were warm and sunny. Air temperatures exceeded 30°C on several days, with a maximum of 34°C on 1st July. Maximum internal temperatures of 47–49°C were recorded in the unshaded brown boxes (BS, BD). In contrast, temperatures in white boxes (WS, WD) and in the shaded brown box placed under the eaves (BSE) remained at or below 41–42°C. Periods with temperatures exceeding 40°C lasted between one and eight hours, depending on box type. The maximum temperature in the brown single-roof box was, on average, 5.8°C higher than that in white boxes (t-test, SD=2.2; n=123; t-value=27.8; P<0.01). Fitting a double roof reduced maximum temperature in brown boxes by 2.6°C (t-test; SD=1.2; n=123; t-value=24.4; P<0.01), whereas no measurable effect of a double roof was detected in white boxes. However, shading proved more effective than either modification alone: sheltering a brown box from direct

Table 1. The effects of nestbox type on the (mean) maximum internal temperature and the number of days with temperatures above 25°C, 30°C, 35°C, 40°C or 45°C between 1st May and 31st August 2025, in relation to the ambient external temperature (EXT).

		type of nestbox*					
		BS	**BD**	**WS**	**WD**	**BSE**	**EXT**
mean maximum temperature (°C) **		31.1 e	28.5 d	25.3 c	25.3 c	24.2 b	21.4 a
maximum temperature (°C)		49.2	47.0	41.4	42.2	37.9	34.0
number of days with temperature above:	>25°C	99	85	60	60	46	17
	>30°C	73	51	17	20	12	3
	>35°C	35	19	6	6	2	0
	>40°C	11	5	1	1	0	0
	>45°C	2	1	0	0	0	0

* BS: brown nestbox with single roof; BD: brown nestbox with double roof; WS: white nestbox with single roof; WD: white nestbox with double roof; BSE: brown nestbox with single roof under eaves; EXT: external temperature in Harderwijk.

** Temperatures followed by different letters differ significantly (P<0.01); values sharing the same letter do not differ significantly.

sunlight reduced temperatures more strongly (t-test, SD=1.7; n=123; t-value=18.7; P<0.01) than either painting it white or fitting a double roof. The maximum temperature in the shaded brown box beneath the eaves was, on average, 2.8°C higher than ambient external temperature but always remained below 40°C (table 1). The magnitude of the effects of colour and insulation aligns closely with studies of nestboxes in Australia and North America (Griffiths *et al.* 2017; Ellis & Rhind 2021; Honey *et al.* 2021; Pauser 2021; Horacek *et al.* 2022).

These results demonstrate that painting nestboxes white or providing a double roof significantly reduces internal temperatures compared with single-roof brown boxes in full sun. However, neither measure reduced temperatures to the levels recorded in the shaded box. In other words, while colour and roof design mitigate heat gain, avoidance of prolonged direct solar exposure remains the most effective means of limiting peak temperatures.

Regression analyses suggest that on sunny days internal temperatures may rise, even in white boxes, to mean values of 43°C and 49°C when external temperatures reach 35°C and 40°C, respectively. Unusual increases in temperatures can cause juvenile Swifts to leave the nest prematurely to escape the heat, often resulting in a fatal fall to the ground below (Lack & Lack 2018). An increase in mortality of Common Swift nestlings is no longer restricted to intrinsically hot parts of Europe (e.g. SEOBirdLife 2021, Expatinfo 2022, ElCabecos 2025) but has become demonstrably more common in northern regions (e.g. Nieuwsblad 2022; VRT 2025).

When selecting nest sites, Swifts are unable to assess whether cavities will become excessively hot later in the season, and they typically remain faithful to a chosen site. The placement of nestboxes that are increasingly liable to overheat as extreme weather becomes more frequent may therefore lead to a reduction in reproductive output across an individual's lifespan.

Where nestboxes are placed in full sun – and shading cannot be achieved – mitigation should be applied. A white finish, adequate material thickness and/or a double roof all reduce heat gain and are preferable to unmodified dark boxes (see Swift Conservation 2025). Careful assessment of site-specific solar exposure – including the influence of eaves and adjacent buildings – is essential.

In summary, white colour and double-roof construction lessen (or delay) the risk of overheating in sunlit nestboxes for Common Swifts but do not eliminate it. Shading provides the greatest reduction in peak temperatures and should be prioritised where possible.

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