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Does birdwatching disturb birds? An assessment model with bee-eaters (*Merops apiaster*)

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Birdwatching appear to be a resultant tourism in Spain. However, the impact of birdwatching on birds is still not clear. Here we report the results of a disturbance assessment of birdwatching. The study was carried out on a nesting colony of bee-eaters located in Desembocadura del Guadalhorce Nature Park (Málaga) during April and May 2006. We recorded the time used by bee-eaters in their normal activities and in surveillance of the colony while one observer was watching the colony at different distances. Differences in activity-surveillance time were tested between watching distances.

The sampling included 135 observation spots. Time employed by bee-eaters in surveillance increased progressively as watching distance decreased (Spearman's $\rho = -0,94$; $p < 0,05$), while time employed in activity decreased (Spearman's $\rho = 0,97$; $p < 0,01$). A Kruskal-Wallis test showed significant differences in activity time ($p < 0,01$) and surveillance time ($p < 0,001$) between watching distances.

No significant differences in surveillance-activity time were found at 150 meters (control) watching distance (U-Mann test, $p = 0,9594$). We neither found differences at 100 m (U-Mann test, $p = 0,5848$) nor 75 m (U-Mann test, $p = 0,7297$); but at 50 and 20 m The U-Mann test showed significant differences between surveillance-activity time ($p < 0,05$ and $p < 0,01$ respectively).

For bee-eaters a critical watching distance was found between 75 and 50 m. The inclusion of more watchers increased this distance. So, for birding with groups, keeping a safe watching distance is critical to avoid bird disturbance.

