

Ornithological Observations



An electronic journal published by BirdLife South Africa and the Animal Demography Unit at the University of Cape Town



Ornithological Observations accepts papers containing faunistic information about birds. This includes descriptions of distribution, behaviour, breeding, foraging, food, movement, measurements, habitat and plumage. It will also consider for publication a variety of other interesting or relevant ornithological material: reports of projects and conferences, annotated checklists for a site or region, specialist bibliographies, and any other interesting or relevant material.

Editor: Arnold van der Westhuizen

SHADOW BOXING BY BIRDS – A LITERATURE STUDY AND NEW DATA FROM SOUTHERN AFRICA

Joël Roerig

Recommended citation format:

Roerig J 2013. Shadow boxing by birds – a literature study and new data from southern Africa. *Ornithological Observations* Vol 4: 39-68.

URL: <http://oo.adu.org.za/content.php?id=83>

Published online: 04 June 2013

- ISSN 2219-0341 -



SHADOW BOXING BY BIRDS – A LITERATURE STUDY AND NEW DATA FROM SOUTHERN AFRICA

Joël Roerig*

* Corresponding author: roerig@gmail.com

Abstract

Avian shadow boxing can be described as birds attacking, fighting, calling, pecking, displaying or flying at their reflections in mirrors or windows in an attempt to defend their territory against a perceived intruder. For the first time, this study summarizes the literature on this topic; it lists 78 species recorded shadow boxing worldwide (Appendix A) and provides an extensive list of relevant references. It also presents new data from observations and an online survey in Southern Africa. Part 1 describes birds' various reactions to reflective surfaces; it explains avian shadow boxing and provides a historic overview of accounts in America, Europe and Australia; it then discusses shadow boxing in relation to territoriality, harm to birds, damage to property, gregarious species, dominance rank and female birds. Part 2 reviews the literature on avian shadow boxing in Southern Africa; a detailed account of a male and female Collared Sunbird *Hedychia collaris* interacting with their reflection in South Africa is also given. Part 3 presents and discusses the results of an online survey conducted in October 2012, yielding 190 new records of 74 Southern African bird species shadow boxing (Appendix B) of which 65 were previously unrecorded. Links to illustrative YouTube-videos are included at relevant points in the discussion. In conclusion this study discusses the benefit of further research.

1. SHADOW BOXING

Various bird species respond differently to their reflection. The only bird to date that has been shown to recognize itself in a mirror is the Eurasian Magpie *Pica pica*. Previously only apes, dolphins and elephants (and humans) "passed" the mirror test, pioneered in the 1970s by the American psychologist Gordon G. Gallup (Prior, Schwarz, Güntürkün 2008). Other corvids, like the Large-billed Crow *Corvus macrorhynchos* (Kusayama et al. 2000) and the New Caledonian Crow *Corvus moneduloides* (Medina et al. 2011) failed to recognize themselves, instead mostly displaying aggressive behaviour. The New Caledonian Crows did, however, make use of the mirror to find food, much like Grey Parrots *Psittacus erithacus* (Pepperberg et al. 1995). Mirrors have also been shown to "maintain responsiveness in temporarily isolated individuals of highly social species" like a captive Kea *Nestor notabilis* (Diamond, Bond 1989). Some species, like the Zebra Finch *Taeniopygia guttata*, showed preference for the company of their mirror image over visual access to a conspecific (Ryan 1978).

The aggressive response of an animal to its mirror image suggests that the animal perceives the image as a stranger and the response may be interpreted as territorial defence (Epstein, Koerner 1986). This behaviour has been described in many animals, ranging from fish like the Three-spined Stickleback *Gasterosteus aculeatus* (Tinbergen 1951) to mammals like sea lions and various monkey species (Epstein, Koerner 1986). In birds the behaviour is particularly prominent during the breeding season, but also occurs at other times of the year (The Royal Society for the Protection of Birds 2012). The terms shadow fighting (SB 1902) and shadow boxing (Dickey 1916) have been introduced for birds attacking, fighting, calling, pecking, displaying or flying at their reflections in mirrors or windows. The



Fig 1 – A male Bennett's Woodpecker *Campethera bennettii* attacks the windscreen of a vehicle in Satara, Kruger National Park, South Africa.
Photo by Duncan Butchart.

latter term was also used by the Southern African ornithologist Jack Skead and is adopted in this study.

The first traceable description of avian shadow boxing was penned by an unknown writer in the 24 May 1879 edition of the Daily Times of Watertown, New York in the United States of America. It was an account of an American Robin *Turdus migratorius*, which "alights on the window-ledge, taps vigorously on the pane, then flies up and down very rapidly about three or four times". The bird attracted a lot of attention and confusion: "One laughingly says, it must be an evil spirit in bird form. Others are inclined to regard it as an 'ominous bird'. One man, after watching it for some time, remarked that it saw

its shadow in the window and mistook it for a lost mate." People also worried about the bird's well-being after it "has gone quite daft with sorrow, and will exhaust itself with its wild beatings and flutterings" (Allen 1879).

The newspaper account was quoted by Joel Asaph Allen, one of the arch fathers of American ornithology. He added his own observations of an American Yellow Warbler *Setophaga aestival* which "takes little notice of people standing quietly before the window, and will often strike the pane within six inches of the observer's face" (Allen 1879). The behaviour puzzled Allen. "In other respects he seems a perfectly sane bird. [...] Whether he mistakes his own reflection in the window for a rival, or what the charm is, is not obvious." Pirmine M Koumly noted that a shadow boxing Summer Tanager *Piranga rubra* in Kansas was not interested in entering the building when he opened a window. He concluded that the bird "is domiciled near by, and that his vicious attacks on his image in the glass were meant for an imaginary foe, who might endanger his little household" (Koumly 1893). The persistence of shadow boxing birds has puzzled observers for long. For two months "there did not seem to be an hour" that an Eastern Bluebird *Sialia sialis* was not "assaulting the window", wrote John Burroughs in one of his essays. The famous American naturalist-author was not impressed and concluded that "it shows how shallow a bird's wit is when new problems or conditions confront it" (Burroughs 1894).

In Europe a "crazy Blackbird" *Turdus merula* and an "equally infatuated Chaffinch" *Fringilla coelebs* were the first birds described shadow boxing (Moffat 1903). For an explanation the author quoted 18th century naturalist Gilbert White, who wrote that "such a jealousy prevails between the male birds that they can hardly bear to be



produce. A one-idea bird, however, is something of a novelty. One of the windows of a house in Clinton Street is at present haunted by such a bird in the shape of a Robin. On the morning of May 21st it made its *début* from the window-sill. From the first this has been its mode of procedure. It alights on the window-ledge, taps vigorously on the pane, then flies up and down very rapidly about three or four times. Then it pauses a moment, steps over to the next pane, and repeats the operation. It has never been observed to tap or fly upon the third pane. After tapping or flapping industriously for half an hour or so, it descends to the ground or garden near by, makes a short repast of a bug or worm, returns again to the window-ledge and goes through with the same process. It begins its operations early in the morning, and continues until the shadows of evening begin to fall. Nothing so far seems to have seriously interrupted its movements. It flies away when the white shade is drawn down, but returns again, walks back and forward across the ledge, and peers in at the narrow, uncovered space below the bottom of the shade. It never taps or flutters against the window when the shade is drawn. It simply looks about, flies away, and returns again, until it finds the shade raised. It then repeats its beatings and fluttering as before. If, however, the outside blinds are closed, it appears quite frantic. It flies at them, and if it can gain a foothold anywhere, it thrusts its beak between the shutters and pecks violently at the window until tired out, then it retires and waits until they are opened again. It does not seem to be especially shy

Fig 2 – The first description of shadow boxing quoted by American ornithologist Joel Asaph Allen from an 1879 newspaper account.

together in the same hedge or field" (White 1789). Around the same time, Australians reported shadow boxing in a "quite gay, though a trifle ragged" Willie Wagtail *Rhipidura leucophrys* (Barnard 1902) and a pair of Superb Fairywrens *Malurus cyaneus* (Fletcher 1904). A Magpie-lark *Grallina cyanoleuca* (Ford 1903) that "eventually knocked out the pane of glass" is the first shadow boxing bird to be described damaging property.

Dickey coined the term shadow boxing when he described the "freakish and amusing manifestation [of] the shadow-boxing of the Anthony Towhee" (Dickey 1916). This subspecies of the California

Towhee *Melospiza crissalis senicula*, was observed trying to "kill that supposed rival, with all the ire and intolerance of a rutting moose". Dickey also recorded the behaviour for a 'California Linnet' (House Finch *Carpodacus mexicanus*) and 'Western Mockers' (a locally accepted subspecies of Northern Mockingbird *Mimus polyglottos leucopterus*). An often cited study "Is the Poor Bird Demented? Another case of Shadow Boxing" concludes that a California Towhee "wasn't ever mented to meet such a situation as it found itself in here". The authors are the first to use shadow boxing data to conclude that "it is now certain that several species of resident birds here in California keep, and defend to some extent, their territories throughout the year and for several years" (Ritter and Benson 1934). Various others attribute shadow boxing outside the breeding season to occupation of territory throughout the year (e.g. Brackbill 1969).

Ever since the first case of shadow boxing was described (Allen 1879), concern for the bird's physical health has been raised. An Australian author feared that a Willie Wagtail died of starvation due to its shadow boxing antics "as he waxed thinner and thinner daily, and never went away to get a decent meal" (SB 1902) and Dickey also worried about birds being "tricked into this [...] waste of time and strength" combatting their "Phantom Rival of the Pane" (Dickey 1916). A second danger is predation. A female Northern Cardinal was killed against a window by a Loggerhead Shrike *Lanius ludovicianus* (Yeatman 1936), a "butcher bird" closely related to the Lesser Grey Shrike *Lanius minor* that spends the austral summer in southern Africa. Besides starvation and predation, the impact of smacking into windows is sometimes deemed harmful. In a funny short story the Australian poet CJ Dennis describes how a Superb Fairywren – known as Bombastes – dies after obsessively fighting at the windows of a house in a forest (Dennis 1935). "We found him one morning below a window of the study, a pathetic little bundle of



brown and brilliant sapphire, a ruby drop of blood coming from the base of his bill telling how the end had come." In England a Common Starling *Sturnus vulgaris* was found dead on a window sill in the morning after a day of shadow boxing. "I believe that it is not uncommon for birds to fight their own reflections, but I fancy it is seldom that the battle is fought to the death," writes the observer (Gough 1936). Leading window-collision researcher Daniel Klem does not consider shadow boxing as a deadly hazard and has no records of any fatalities as a result of birds fighting their reflection. "Bloody and dishevelled yes, but not otherwise harmed," he states. However, according to Klem more than 1 billion birds die flying at full speed into glass each year in the United States alone (Klem 2006). The Cornell Lab of Ornithology in the United States agrees that as a result of shadow boxing "the bird may exhaust himself, but it usually doesn't result in fatal injury" (The Cornell Lab of Ornithology 2012).

Observers of shadow boxing sometimes worry about the damage the behaviour causes, like in the case of the window breaking Magpie-lark (Ford 1903). Larger, stronger species do more damage. "Obsessive" shadow boxing of the Australian kingfisher-like Laughing Kookaburra *Dacelo novaeguineae* is reported to frequently cause broken windows (Temby 2004) and in Africa Southern Ground-Hornbills *Bucorvus leadbeateri* notoriously destroy windows (Mabula Ground Hornbill Conservation Project 2012) and even vehicles if the bodywork is very reflective (Greve 2008). The constant ticking of shadow boxing birds and dirty marks on the glass annoys some people (e.g. Temby 2004). Shadow boxing can only be prevented by removing the reflection (The Royal Society for the Protection of Birds 2012, The Cornell Lab of Ornithology 2012). One of the ways to do this is to put transparent cling foil against the outside of a window (Vogelbescherming 2011).



Fig 3 – While the male watches, a female Great Sparrow *Passer motitensis* attacks a car mirror in Spitzkoppe, Namibia. Photo by Karin Wiesler.

Gregarious birds also perform shadow boxing, like the American Bush-Tit *Psaltriparus minimus* (Robertson 1935). Some animals are alternately territorial and aggressive, and non-aggressive and social, according to the season (Lorenz 1966), which explains the mirror fighting of the bush-tits and other seasonally gregarious species like Northern Cardinals (Laskey 1944), which are often described shadow boxing (Yeatman 1936, Reed 1938, Sutton 1947). Exception is the Smooth-billed Ani *Crotophaga ani* of Cuba which, like babblers or wood-hoopoes, always lives in noisy groups. "Although they recognize the other members of the colony, they are not acquainted with themselves," explains the researcher who observed Anis shadow boxing (Davis 1940).



Little research has been dedicated to the question why some birds shadow box, while other members of the same species never interact with their reflections or respond completely differently. For example, for the Dark-eyed Junco *Junco hyemalis* a mirror has been described to have a quieting effect (Andrews 1966), while others describe the same species performing a "full head-on charge" of a car's side-view mirror (LaBarbera 2012). Censky and Ficken suggest that the likelihood of an individual bird shadow boxing depends on its "dominance rank". They concluded that Black-capped Chickadees *Poecile atricapillus* "that were more successful in winning contests were more likely to threaten the mirror, although threats were not confined to the most dominant birds as some males of mid-rank threatened the mirror" (Censky, Ficken 1982) – a pecking order in the most literal sense.

Female birds have occasionally been recorded shadow boxing. Most accounts mention females fighting reflections together with a male, like in the Superb Fairywren (Fletcher 1904) and the American Bush-Tit (Robertson 1935). While the male Northern Cardinal is sometimes observed shadow boxing (Yeatman 1936), the female of this species has been described as the main aggressor, often failing to seduce the male into participation (Reed 1938, Sutton 1947). An example of a female Northern Cardinal fighting her reflection in a car mirror can be seen here: <http://www.youtube.com/watch?v=l3y9KOnUUSI> (Williams 2011). Females of several sunbird species are active shadow boxers (e.g. Skead 1967) and an online survey resulted in accounts of eight other bird species in Southern Africa where the female performs an active role (Appendix B). Shadow boxing can be seen as instinctive territorial defence (Epstein, Koerner 1986) and females of many bird species assist the male in this, especially by trying to drive away other females (Howard 1920). In a study of the Northern Double-collared Sunbird *Cinnyris reichenowi* and the

Orange-tufted Sunbird *Cinnyris bouvieri* in the Cameroon Mountains it was found that 14.6% of 1396 intraspecific aggressive events consisted of female–female aggressive contact (Riegert et al. 2011). Both males and females of the Palestine Sunbird *Cinnyris osea* were shown to occupy and guard their territory in a suburb of Tel Aviv in Israel throughout the year (Zilberman R, Moav B, Yom-tov Y 2001). In this YouTube-video a female Purple-rumped Sunbird *Leptocoma zeylonica* is seen (<http://www.youtube.com/watch?v=iwLGK4haF9M>) shadowing boxing (Sawant 2012), while the male of the same species is reported showing the same behaviour (Salgado 2011).

A good indication of which species are prone to attack their reflection can be deduced from the blog of the Bird Ecology Study Group (BESGroup) in Singapore, which since 2006 encourages (Asian) bird enthusiasts to submit observations of birds fighting reflections. To date contributors have reported 3 species of sunbird (and 1 flowerpecker), 2 hornbills, 2 woodpeckers (including a flameback), 2 wagtails and 2 bulbuls and a shrike shadow boxing (Wee 2013). The results are similar to those of the online survey in Southern Africa (Table 1) that this study reports on in Part 3.

Appendix A lists all 78 bird species reported shadow boxing that the author has found in literature, internet blogs and forums. Video sharing website YouTube is a great source for some remarkable examples of avian shadow boxing, like footage of

- European Herring Gull *Larus argentatus* (Helming 2010) <http://www.youtube.com/watch?v=Po-mHQdDAZE>
- a Great Tit *Parus major* (driekeervanhoof 2010), <http://www.youtube.com/watch?v=ROu9syjJEMA>
- a Dunnock *Prunella modularis* (matrixjohn1 2012) <http://www.youtube.com/watch?v=OVovswfvWKE> in The Netherlands and



- an amazing display at a window of Sandhill Cranes *Grus canadensis* in Alaska (aknina51 2010)
<http://www.youtube.com/watch?v=iEvRKfoZQnA>

2. Southern Africa

In ornithology and bird watching circles the region Southern Africa is generally defined as the area south of the Kunene and the Zambezi rivers (Hockey et al. 2005). In this area ornithologist CJ (Jack) Skead (Craig 2007) has recorded shadow boxing for six sunbird species (Skead 1953, 1954, 1962, 1967) and the Cape Wagtail *Motacilla capensis* (Skead 1954). This wagtail "kept at it from daybreak until dark" in the winter of 1950. The bird attacked mirrors, windows and the "shiny chromium hub-cap of a motor-car". The behaviour was "amusing at the time but on our return we found every window white-washed from top to bottom". The bird was found to be in very bad condition, "presumably as a result of neglecting to feed".

According to Skead males and females of the Amethyst Sunbird *Chalcomitra amethystine* are often seen shadow boxing while "warbling quietly to themselves and swaying from side to side" (Skead 1953). For the Greater Double-collared Sunbird *Cinnyris afer* it is also a "frequent habit of males and females" and Skead described a female "pecking a window while a male was nearby", as described in Northern Cardinals (Reed 1938, Sutton 1947). Males of the Greater Double-collared Sunbird are apparently less ferocious and "sit against the glass and warble quietly while gazing at their reflections" (Skead 1954). The Collared Sunbird *Hedydipna collaris* "becomes a great shadow boxer on window-panes [...] where opportunity occurs, such as when riverside or seaside cottages are built into the dune- or river-forest bush" (Skead 1962). The Olive Sunbird *Cyanomitra olivacea* "indulges in shadow-boxing at window-panes, sometimes stunning itself with the force of its blows against

the panes" (Skead 1967). Scarlet-chested Sunbirds *Chalcomitra senegalensis* also fight their reflections in windows and females of the Variable Sunbird *Cinnyris venustus* perform "shadow-boxing at window-panes for half-an-hour or more and on successive days, going from window-pane to window-pane" (Skead 1967).

Besides reports of Southern Ground-Hornbills breaking windows and vehicles (Greve 2008, Mabula Ground Hornbill Conservation Project 2012) not many accounts of shadow boxing exist in the Southern African region. On the Raptor's View Wildlife Estate in Hoedspruit the Solomon family recorded "window bashing" by Southern Red-billed Hornbill *Tockus rufirostris*, Southern Yellow-billed Hornbill *Tockus leucomelas*, Chinspot Batis *Batis molitor*, Natal Spurfowl *Pternistis natalensis*, White-crested Helmet-Shrike *Prionops plumatus* and Kurrichane Thrush *Turdus libonyanus* (Solomon, Solomon 2012). An example of a Southern Yellow-billed Hornbill shadow boxing can be seen here: <http://www.youtube.com/watch?v=nDbyJVXO1GU> (Hayman 2011).

In the period from 7 December 2011 until 31 October 2012 a pair of Collared Sunbirds was observed shadow boxing at a window of a house in Raptor's View Wildlife Estate in Hoedspruit in the Limpopo province of South Africa (24°21'51.55"S, 30°56'44.14"E). The house is situated along the Sand Spruit, a fairly wide river bed which is dry for most of the year and supports typical riverine vegetation including *Schotia brachypetala*, *Philenoptera violacea*, *Combretum hereroense*, *Combretum mossambicense*, *Euclea divinorum*, *Diospyros mespiliformis*, *Cordia ovalis* and various *Gymnosporia* species. This habitat can be described as "river-forest bush", mentioned by Skead as an area where the Collared Sunbird becomes "a great shadow boxer" (Skead 1962).



Fig 4 – A Mountain Wagtail *Motacilla clara* shadow boxing near Malelane, South Africa. Photo by Mark Tittley.

The pair was only observed at one particular window, presumably because this is the only window where the birds can sit or hop in a bush and see their own reflection, but birds are also known to "habitually attack only a particular window" (The Royal Society for the Protection of Birds 2012). The only other bird species that was occasionally recorded at this window showing a mild interest in its reflection was a male Spectacled Weaver *Ploceus ocularis*. The sunbirds would not fly inside if the window was open, which is consistent with existing literature (e.g. Koumly 1893). The birds were also not distracted if a person stood close to the window inside the house, consistent with many accounts including birds being

unperturbed by a cat (Burrell 1908) or a stuffed bear (Hoffer et al. 2012) in front of the window.

Most of the time the shadow boxing took place in the morning, but the behaviour was recorded throughout the day. The length of the shadow boxing episodes would typically be 10 to 20 minutes, but varied from 1 minute up to an hour. The shadow boxing did not take place every day, but usually several times in a week, often on several consecutive days. Most of the time there would be one shadow boxing episode per day, but several times the pair would return for a second time. No occurrences of three visits per day have been recorded. In the period of observations no other Collared Sunbirds were seen around the house, which supports Skead's observation that there never seems to be more than one pair present in one particular territory (Skead 1962). Collared Sunbirds are believed to pair for life and occupy a territory throughout the year (Skead 1962). That is common for more sunbird species (Zilberman R, Moav B, Yom-tov Y 2001), presumably the ones that do not rely on seasonally flowering plants like Aloes or Proteas. The Hoedspruit pair would almost always be together while shadow boxing, the male usually being more vocal but the female often more active. In all instances that only one of the birds was present in the bush, it was the female.

The shadow boxing usually consisted of hopping around in the bush opposite the window, especially by the female. The pair could also sit for long periods in the shrub, looking at their reflection, hopping a bit and sometimes calling incessantly (mainly the male). Hovering into the window would also go on for many minutes, also mostly by the female. Occasionally there would be more dedicated pecking attacks at the window, mostly by the male, although the female was also observed pecking at the window occasionally. An example can be



watched here: <https://www.youtube.com/watch?v=yOWAx89sL5s> (Roerig 2012).

Detailed notes reveal an often repeated pattern, like on 30 September 2012: "Female sits on vertical stalk and seems nervous and keen to fly into window. She keeps looking around. When the male arrives a lot of calling and hopping follows and the male has a few half-hearted goes at the window. He hangs around for a bit and she gets the courage to hover into the window properly. The male disappears, but the female stays behind – anxiously waiting for a repeat." Footage from this day can be seen here: <http://www.youtube.com/watch?v=DK7hk4AauBM> (Roerig 2013). Similar observations have been made for Northern Cardinals (Reed 1938, Sutton 1947) and the Greater Double-collared Sunbird (Skead 1954).

From these observations the female appears to be the most demanding sex, but according to Skead the gender roles are reversed during the breeding season when the male haunts the female and her "back-and-forth flights [are] constantly interrupted and jostled by his vigorous chasing of her at speed" during the nest building process (Skead 1962). However, during shadow boxing, it is the female that takes the lead. Like on 14 October 2012: "The female jumps around looking around and at the window while the male is absent. When the male arrives she calls at him briefly and starts to attack. The male might make a short dash at the window and call once or twice, but it always seems 'half-hearted'." Footage of this day can be seen here: <http://www.youtube.com/watch?v=5Vo55jn1Em8> (Roerig 2013). And on 25 October 2012: "06:30. I notice them because I hear the male calling (chi-ree). But it is the female that is attacking the window. The male sits on a thick stalk preening himself with no interest in the reflection. The male calls every five seconds or

so. She is silent. After he flies off she hops around a bit and leaves as well."

3. Online survey

On 22 October 2012 the author sent the following e-mail to the sabirdnet e-mail list (812 members on 21 January 2013) and posted a similar message in the Facebook group of BirdLife South Africa (1453 members on 25 October 2012): "I am doing some amateur research into Southern African birds that perform shadow boxing into or in front of glass windows. The character of this behaviour can vary from a lot of hopping, fluttering and flying at a window to brazen attacks of the glass. This is a request for all who read this to send me (privately to my e-mail address) examples of Southern African birds that you have witnessed shadow boxing. I hope to create a more or less complete list of Southern African species that bounce around in front of windows as part of an article I am trying to piece together for Ornithological Observations (<http://oo.adu.org.za/>). Please note species and if possible date and location. Specific examples of female birds shadow boxing will also be highly appreciated!"

The number of replies was fairly high, especially after reposting the request a few times. In a couple of weeks 82 people contributed 190 records of 74 Southern African bird species shadow boxing (Appendix B) of which 65 species were previously unrecorded. The observations included 6 species of sunbirds and of hornbills, 5 species of weavers, 4 sparrows and bulbuls (including greenbulbs and Terrestrial Brownbul *Phyllastrephu terrestris*) and 3 woodpeckers, wagtails and thrushes (Table 1). Three species (Olive, Variable and Scarlet-chested Sunbird) mentioned by Skead were not reported. Two species (Chin-spot Batis *Batis molitor* and Natal Spur-fowl *Pternistis natalensis*) observed by Solomon were not reported. That brings the total bird species that have been recorded shadow boxing



in Southern Africa up to 79, with 9 species of sunbirds topping the list. Species most often recorded in the online survey were Crested Barbet *Trachyphonus vaillantii*, Cape Sparrow *Passer melanurus* (15 times), Collared Sunbird (11) and Cape Wagtail (9). See Table 2 for an overview of the most reported birds and Appendix B for the full results of the online survey, including comments by contributors.

Table 1 – Number of species of bird groups reported shadow boxing in Southern Africa; *Includes records from Skead (1967); **Includes Yellow-bellied Greenbul *Chlorocichla flaviventris* and Terrestrial Brownbul *Phyllastrephus terrestris*; ***Includes Bokmakierie *Telophorus zeylonus*.

9	Sunbirds*
6	Hornbills
5	Weavers
4	Sparrows
	Bulbuls**
3	Woodpeckers
	Wagtails
	Thrushes
2	Babblers
	Bush-Shrikes***
	Barbets
	Batises
	Flycatchers
	Apalises

Table 2 – Number of times bird species were reported shadow boxing in the October 2012 online survey (≥3). Full results are listed in Appendix B.

Table 2		
15	Crested Barbet	<i>Trachyphonus vaillantii</i>
	Cape Sparrow	<i>Passer melanurus</i>
11	Collared Sunbird	<i>Hedydipna collaris</i>
9	Cape Wagtail	<i>Motacilla capensis</i>
7	Groundscraper Thrush	<i>Psophocichla</i>
	Pin-tailed Whydah	<i>Vidua macroura</i>
	Southern Ground Hornbill	<i>Bucorvus leadbeateri</i>
6	Southern Yellow-billed Hornbill	<i>Tockus leucomelas</i>
5	Dark-capped Bulbul	<i>Pycnonotus tricolor</i>
4	Arrow-marked Babbler	<i>Turdoides jardineii</i>
	Bokmakierie	<i>Telophorus zeylonus</i>
	Cape Batis	<i>Batis capensis</i>
	House Sparrow	<i>Passer domesticus</i>
	Southern Red-billed Hornbill	<i>Tockus rufirostris</i>
3	Bennett's Woodpecker	<i>Campethera bennettii</i>
	Cape Robin-Chat	<i>Cossypha caffra</i>
	Crowned Hornbill	<i>Tockus alboterminatus</i>
	Greater Double-collared Sunbird	<i>Cinnyris afer</i>
	Helmeted Guineafowl	<i>Numida meleagris</i>
	White-bellied Sunbird	<i>Cinnyris talatala</i>
	Yellow-bellied Greenbul	<i>Chlorocichla flaviventris</i>

Absent groups included raptors, larks, pipits and cisticolas. Waders and ocean birds also did not feature, but their exposure to manmade reflective surfaces is relatively small and one observer did note shadow boxing-like behaviour at a mirrored window at Lambert's Bay Island in Kelp Gull *Larus dominicanus*, African Penguin *Spheniscus*



demersus, Cape Cormorant *Phalacrocorax capensis* and Cape Gannet *Morus capensis*. Perhaps most significant was the absence on the list of shadow boxing birds of common urban species like doves, mousebirds, canaries, firefinches, waxbills, turacos, white-eyes and the Common Myna *Acridotheres tristis*, generally all species with less strictly defined territories. A strange absentee was the Karoo Thrush *Turdus smithi*, given the many records of shadow boxing *Turdus* species worldwide (e.g. Allen 1879, Moffat 1903) and two other Southern African *Turdus* species recorded in the survey (Appendix B).

Interestingly, the Common Myna has been reported shadow boxing outside Southern Africa (Hindwood 1941). Other species that occur in Southern Africa, but have only been reported shadow boxing outside the region are Common Chaffinch *Fringila coelebs* (Moffat 1903, Pitt 1944), Indian Peafowl *Pavo cristatus* (Hindwood 1941, Pitt 1944), Common Starling (Gough 1936) and Grey Wagtail *Motacilla cinerea* (Pitt 1944, Wee 2013).

The only migrant species reported in the online survey were a Woodland Kingfisher *Halcyon senegalensis* and an African Paradise-Flycatcher *Terpsiphone viridis*, both breeding migrants that are known for their vigorous territorial defence. Shadow boxing was observed in every month of the year by observers that provided additional information in the online survey. In addition some people mentioned that the behaviour occurred "year round", "summer and winter" or "all the time". From November until July shadow boxing was recorded 1 to 3 times for each month. Around the breeding period shadow boxing was mentioned more often, 6 times in August, 4 times in September and 11 times in October.

A number of species were reported to come back to the same spot to perform shadow boxing over multiple years. A Pin-tailed Whydah *Vidua macroura* was observed attacking its reflection "for years" causing "little pock marks at some windows". A Dark-capped Bulbul *Pycnonotus tricolor* in Gauteng was reported making "a nuisance of himself each spring by daily coming to peck at the glass for about four weeks". A Knysna Woodpecker *Campethera notata* at the Canon Rocks Caravan Park in the Eastern Cape is a rather famous recidivist "going on for at least three years, attacking car mirrors of many campers". A White-bellied Sunbird *Cinnyris talatala* in Gauteng "spends every day a portion of the early morning shadow boxing with his reflection in the glass sliding door", which "has been going on for several years". A Dusky Sunbird *Cinnyrus fuscus* in Namibia "attacks a car mirror near a flowering bush [...] for at least four years". A male Cape Sparrow *Passer melanurus* in Gauteng was observed attacking a bedroom window "for at least 20 years", suggesting successive dominant males performing the same ritual at the same site. Cape Sparrows have a life expectancy of 1.54 years (Dean 1978) and the oldest Cape Sparrow ever reported to ringing project SAFRING was 10 years and 8 months (Oschadleus 2003).

Additional comments by the observers in the online survey also capture the wide range of behaviour that can be considered shadow boxing. Pecking or tapping, attacking reflections, hovering, fluttering or flying are mentioned most often. Other recorded behaviour includes a Crested Barbet "making love with its own image in my bakkie's side mirror", a female Collared Sunbird "exhibiting intruder threat posture", various window breaking escapades of Southern Ground-Hornbills, a House Sparrow *Passer domesticus* "dancing in front of a double story building window, second floor", a Crowned Hornbill *Tockus alboterminatus* and a Green Wood-Hoopoe *Phoeniculus purpureus* "offering food", a Greater Double-collared



Sunbird "singing at his reflection in window" (similar in Skead 1954), a Helmeted Guineafowl *Numida meleagris* "charging and kicking its reflection in the sliding door", a Southern Boubou *Laniarius ferrugineus* "jumping up and down at the window" and a female Black Cuckooshrike *Campephaga flava* "banging and calling and getting exhausted but not giving up".

Female bird species that are reported shadow boxing are Cape Sparrow (no male), Collared Sunbird (less aggression and force than male), Groundscraper Thrush *Psophocichla litsitsirupa* (with male), Great Sparrow *Passer motitensis* (with male, female real aggressor), Southern Boubou (with male), Black Cuckooshrike (no male), Common Ostrich *Struthio camelus* (no male) and Grey Tit Parus *afer* (with male). Several gregarious bird species were reported shadow boxing, including Arrow-markd Babbler *Turdoides jardineii* (4 times), Southern Pied Babbler *Turdoides bicolor* and Green Wood-Hoopoe.

Reactions to shadow boxing tend to vary from amused and entertained to annoyed and worried. A Crested Barbet was reported pecking so hard "I wonder if it's going to break the kitchen window" and a Cape Robin-Chat *Cossypha caffra* "scratched the glass on the right rear view mirror, not to mention the mess they left on the door". A Collared Sunbird was suspected "trying to peck itself to death in our car wing mirrors and windows" and a Pin-tailed Whydah was believed to fight "itself to exhaustion and death [...] on this rather hot day".

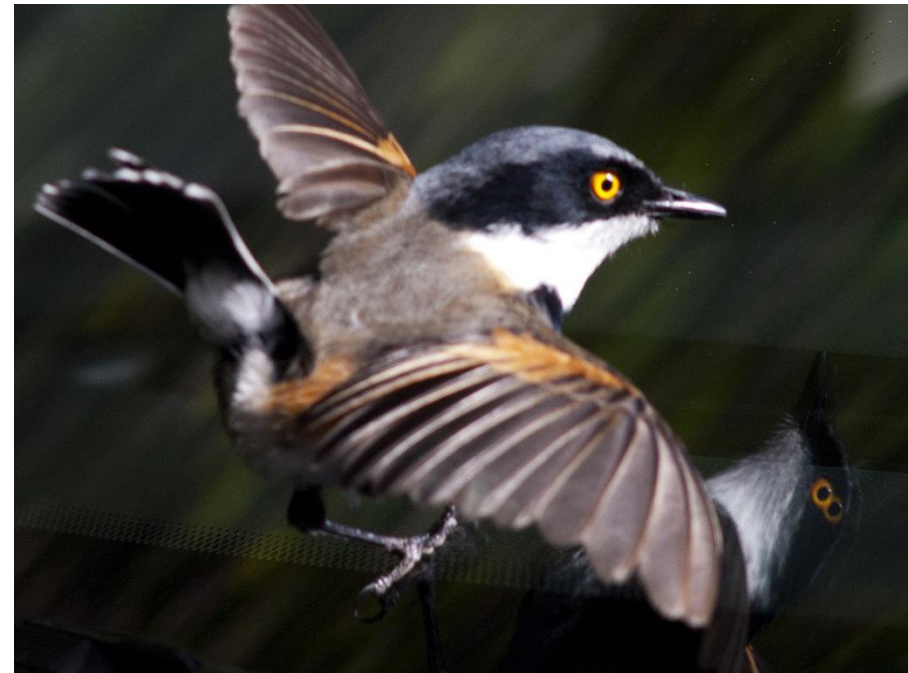


Fig 5 – A Cape Batis *Batis capensis* shadow boxing. Photo by Lisle Gwynn.

Further study

This study lists 79 species that have previously been recorded shadow boxing (Appendix A), which can be defined as birds interacting with their reflection in an attempt to defend their territory against a perceived intruder. It adds a further 64 species reported shadow boxing in an October 2012 online survey (Appendix B), making the total of species known to show this behaviour 143. This list is far from complete and additional scanning of online sources and further surveys in Southern Africa and the rest of the world will likely yield many more accounts. Although recording shadow boxing in itself might not interest most modern ornithologists, the author of this study believes that careful analysis of existing and future cases



of avian shadow boxing can add to knowledge about territorial behaviour of many bird species, including the length of the period of territorial defence, the role that females play and site fidelity.

- oo0oo -

Acknowledgements

The author would like to thank Arnold van der Westhuizen, editor of Ornithological Observations, for his support, encouragement and scanning of numerous journal pages. He also would like to thank Duncan Butchart, Mark Tittley, Karin Wiesler and Lisle Gwynn for the use of their photos. Lastly, he would like to thank all the contributors to the online survey: Garth Aiston, Tony Archer, Magda Badenhorst Begeman, Corina Bakker-Van der Laan, Dave Bishop, Andy Branfield, Roelof van der Breggen, Chris Brewster, Duncan Butchart, Marna Buys, Beverley Carstens, Scott Chalmers, Brian Culver, Lisl van Deventer, John Drowley, Jane Denner Spowart, Marilyn Dunster Mehl, Claire Laura Eksteen, Austringer Ever, Joan Faiola, Leonie Fouché, Ursula Franke, Gertie Griffith, Lisle Gwynn, Adrian Haagner, Thomas Hohls, Jo-anne Hounsom, Janice Isom, Sally King, Hazel Kirkbride, Bo van der Lecq, Margaret Maciver, Karel Marais, Roy McGrath, Tyrone Brent Mckendry, Duncan McKenzie, Richard Mckibbin, Philippa Meldrum, Michiel Moll, Jill Mortimer, Stephen Mostert, Seth Musker, Doug Newman, Justin Rhys Nicolau, Anton van Niekerk, Jan Niemandt, Gisela Ortner, Andrew Pickles, Jaco Pit, Tony Rebelo, Hugh Retief, Morné de la Rey, Dave Rimmer, Jane Robertson, Neels Roos, Jenny Sharland, Marina Snyman, Sue Snyman, Richard van der Spuy, Tiana Stanton, Lia Steen, Trish Strachan, Trevor Thompson, Darryl Tiran, Mark Tittley, Peter Turner, Dylan Vasapolli, Hennie Visser, Amanda Walden, Xeen Wallington, Vincent Ward, Sue Welman, Arnold van der Westhuizen, Heide Wetmore, Dennis White, Karin Wiesler, Tim Wickins, Bev Williams,

Crystelle Wilson, Gerald Wingate, Veronique Wolfaardt, Celeste Wookey and Ken Worsley.

References

aknina51 2010. Window Cranes. Kachemak Crane Watch. Available from: <http://www.youtube.com/watch?v=iEvRKfoZQnA> (Accessed on 18/1/2013).

Allen JA (ed) 1879. Odd Behavior of a Robin and a Yellow Warbler. Bulletin of the Nuttall Ornithological Club 4: 178-182.

Andrews E 1966. Slate-Colored Junco Response to Mirror. Bird-Banding 37: 206.

Barnard ED 1902. Drought in Queensland. The Emu I: 146-147.

Bent AC 1949. Eastern Bluebird. Bent AC (ed). Life Histories of North American Thrushes, Kinglets, and Their Allies: 233-260.

Bent AC 1968. Eastern Cardinal. Austin jr OL (ed). Life histories of North American cardinals, grosbeaks, buntings, towhees, finches, sparrows and allies: 1-15.

Bent AC 1968. Eastern Purple Finch. Austin jr OL (ed). Life histories of North American cardinals, grosbeaks, buntings, towhees, finches, sparrows and allies: 264-278.

Brackbill H 1969. A Carolina Wren shadow-boxing. The Wilson Bulletin 81: 470.

Britton KG 1944. A Deluded Sparrow. Nature 153: 559-560.



- Brown H 1937.** Aggressive display of birds before a looking-glass. *British Birds* 31: 137-138.
- Burrell H 1908.** Malurus fighting its shadow. *The Emu* VIII: 95.
- Burroughs J 1894.** Glimpses of Wildlife. In: *Riverby*. Houghton, Mifflin and Company, Boston and New York: 191-193.
- Censky EJ, Ficken MS 1982.** Responses of Black-capped Chickadees to mirrors. *The Wilson Bulletin* 94: 590-594.
- Cleland JB 1909.** Malurus fighting its shadow. *The Emu* VIII: 151.
- Craig A 2007.** Jack Skead, 1912–2006. *Ostrich: Journal of African Ornithology* 78: 5-6.
- Davis DE 1940.** Social nesting habits of the Smooth-billed Ani. *The Auk* 57: 179-218.
- Dean WRJ 1978.** Life expectancy of the Cape Sparrow. *Ostrich: Journal of African Ornithology* 49: 16.
- Dennis CJ 1935.** The Besting of Bombastes. *The Singing Garden*.
- Diamond J, Bond AB 1989.** Lasting responsiveness of a kea (*Nestor notabilis*) towards its mirror image. *Avicultural Magazine* 89: 92-94
- Dickey DR 1916.** The Shadow-Boxing of Pipilo. *The Condor* 18: 93-99.
- Dickinson jr JC 1968.** Rufous-sided Towhee. *Austin jr OL* (ed). *Life histories of North American cardinals, grosbeaks, buntings, towhees, finches, sparrows and allies*: 562-579
- driekeervanhoof 2010.** koolmeesje vliegt steeds tegen raam. Available from: <http://www.youtube.com/watch?v=ROu9syjJEMA> (Accessed on 18/1/2013).
- Epstein R, Koerner J 1986.** The Self-Concept and other Daemons. In: Suls J, Greenwald A (eds). *Psychological Perspectives on the Self*, Vol. 3. Lawrence Erlbaum, Hillsdale, NJ: 27–53.
- Fletcher JA 1904.** Bird notes from Wilmot, Tasmania. Part III. *The Emu* IV: 17.
- Forbush EH 1929.** *Birds of Massachusetts and Other New England States; Land birds from sparrows to thrushes*. Norwood Press, Norwood, Massachusetts: 80.
- Ford FBC 1903.** Clermont (Q.) Notes. *The Emu* III: 125-126.
- Gill F, Donsker D (eds) 2012.** *IOC World Bird Names* (v 3.2). Available from: <http://www.worldbirdnames.org> (Accessed on 18/1/2013).
- Gough K 1936.** Starling and reflection. *Irish Naturalists' Journal* 6: 75.
- Greve M 2008.** Panel beating. Originally posted on SABirdnet. Available from: <http://globalbirdtrekkers.org/content/view/91/38/> (Accessed on 18/1/2013).



Hardaker T 2012. Southern African Bird List - Version 02 - 15 April 2012. Available from: <http://www.zestforbirds.co.za/salist.zip> (Accessed on 18/1/2013).

Hayman D 2011. Hornbill reflection. Dundoozed. Available from <http://www.youtube.com/watch?v=nDbyJVXO1GU> (Accessed on 18/1/2013).

Helming T 2010. ' Roodborstje' tikt tegen het raam..... Available from: <http://www.youtube.com/watch?v=Po-mHQdDAZE> (Accessed on 18/1/2013).

Hindwood KA 1941. Birds and their reflections. Basset Hull AF, Iredale T (eds). Proceedings of the Royal Zoological Society of New South Wales: 20-29.

Hockey PAR, Dean WRJ, Ryan PG (eds) 2005. Roberts – Birds of Southern Africa, 7th edition. The Trustees of the John Voelcker Bird Book Fund, Cape Town.

Hoffer L, McGraw S, Burton C, Monika F 2012. Comments in: Bergin M. What is a Titmouse? Available from: <http://10000birds.com/titmouse.htm> (Accessed on 21/1/2013).

Howard HE 1920. Territory in Bird Life. E. P. Dutton, New York: 109-118.

Koumly PM 1893. Behavior of a Summer Tanager. The Auk 10: 367-368.

Kusayama T, Bischof HJ, Watanabe S 2000. Responses to mirror-image stimulation in jungle crows (*Corvus macrorhynchos*). Animal Cognition 3: 61-64.

Klem D 2006. Glass A Deadly Conservation Issue for Birds. Bird Observer 34: 73-81.

LaBarbera K 2012. Juncos do not understand mirrors. Available from: <http://toughlittlebirds.com/2012/04/21/juncos-do-not-understand-mirrors/> (Accessed on 27/10/2012).

Laskey AR 1944. A Study of the Cardinal in Tennessee. The Wilson Bulletin 56: 27-44.

Lorenz K 1966. On aggression. Harcourt, Brace, & World, New York: 210.

Mabula Ground Hornbill Conservation Project 2012. Window Breaking. Available from http://www.mabulagroundhornbillconservationproject.org.za/index_files/WindowBreaking.html (Accessed on 22/10/2012).

Mail Online 2007. Hey good looking! What's that in the 'wing' mirror? Available from: <http://www.dailymail.co.uk/news/article-437400/Hey-good-looking-Whats-wing-mirror.html> (Accessed on 21/1/2013).

matrixjohn1 2012. Heggenmus houdt spiegelgevecht. Available from: <http://www.youtube.com/watch?v=OVsvfwWKE> (Accessed on 18/1/2013).



matterne 2012. Staartmees. Vroege Vogels. Available from: http://vroegevogels.vara.nl/Categorieen.1003.0.html?&view=single_t_hread&cat_uid=3&conf_uid=7&thread_uid=34807 (Accessed on 18/1/2013).

Medina FS, Taylor AH, Hunt GR, Gray RD 2011. New Caledonian crows' responses to mirrors. *Animal Behaviour* 82: 981-993.

Moffat CB 1903. The spring rivalry of birds: some views on the limit to multiplication. *The Irish Naturalist* 12: 152-166.

Oschadleus HD 2003. Report on the 2001-2002 ringing year. *Afring News* 32: 22.

Pattison M 2012. Comments in: Bergin M. What is a Titmouse? Available from: <http://10000birds.com/titmouse.htm> (Accessed on 21/1/2013).

Pepperberg IM, Garcia SE, Jackson EC, Marconi S 1995. Mirror use by African grey parrots (*Psittacus erithacus*). *Journal of Comparative Psychology* 109: 189–195.

Pitt F 1944. Observations on Bird Behaviour. *Nature* 154: 801.

Prior H, Schwarz A, Güntürkün O 2008. Mirror-induced behavior in the magpie (*Pica pica*): Evidence of self-recognition. *PLoS Biology* 6(8): e202. doi:10.1371/journal.pbio.0060202.

Reed WR 1938. A female Cardinal fights her reflection. *The Migrant* 9: 17-18.

Riebert J, Fainova D, Antczak M, Sedlacek O, Horak D, Reif J, Pesata M 2011. Food niche differentiation in two syntopic sunbird species: a case study from the Cameroon Mountains. *Journal of Ornithology* 152: 819-825.

Ritter WE, Benson SB 1934. Is the poor bird demented? Another case of 'shadow boxing'. *The Auk* 51: 169-179.

Robertson JM 1935. Bush-tits 'Shadow-boxing'. *Condor* 37: 257-258.

Roerig J 2012. Collared Sunbird shadow boxing 26 July 2012. Available from: <https://www.youtube.com/watch?v=yOWAx89sL5s> (Accessed on 20/1/2013).

Roerig J 2013. Collared Sunbird shadow boxing 30 September 2012. Available from <http://www.youtube.com/watch?v=DK7hk4AauBM> (Accessed on 20/1/2013).

Roerig J 2013. Collared Sunbird shadow boxing 14 October 2012. Available from: <http://www.youtube.com/watch?v=5Vo55jn1Em8> (Accessed on 20/1/2013).

Ryan MJ 1978. Mirror image versus conspecific stimulation in adult male Zebra Finches. *The Wilson Bulletin* 90: 295-297.

Salgado A 2011. Purple-rumped Sunbird. Available from: <http://gallcissa.blogspot.com/2011/09/purple-rumped-sunbird.html> (Accessed on 18/1/2013).



Sawant S 2012. Curious Sunbird. Nanded2007. Available from: <http://www.youtube.com/watch?v=iwLGK4haF9M> (Accessed on 18/1/2013).

SB 1902. A fighting flycatcher. The Emu II: 28.

Skead CJ 1953. A study of the Black Sunbird *Chalcomitra amethystina amethystina* (Shaw). Ostrich: Journal of African Ornithology 24: 159-166.

Skead CJ 1954. A study of the Larger Double-collared Sunbird *Cinnyris afra afra* (Linnaeus). Ostrich: Journal of African Ornithology 25: 76-88.

Skead CJ 1954. A study of the Cape Wagtail *Motacilla capensis*. Ibis: the International Journal of Avian Science 96: 91-103.

Skead CJ 1962. A study of the Collared Sunbird *Anthreptes collaris* (Vieillot). Ostrich: Journal of African Ornithology 33: 38-40.

Skead CJ 1967. The Sunbirds of Southern Africa : Also the Sugarbirds, The White-Eyes and the Spotted Creeper. A. A. Balkema, Cape Town.

Solomon D, Solomon S 2012 (eds) 2012. The window bashers of 254 Martial Eagle. The Raptor; Raptor's View Wildlife Estate News May 2012: topic 5.

Stan 2006. Shadow boxing. The Hummingbird forum. Available from: <http://www.network54.com/Forum/439743/thread/1159631082/1159792718/shadow+boxing> (Accessed on 21/1/2013).

Stephenson EM, Stewart C 1944. Observations on Bird Behaviour. Nature 154: 801.

Stiteler S 2011. Angry birds hitting your windows. Available from: <http://10000birds.com/angry-birds-hitting-your-windows.htm> (Accessed on 21/1/2013).

Stull WD 1968. Spizella passerina. Austin jr OL (ed). Life histories of North American cardinals, grosbeaks, buntings, towhees, finches, sparrows and allies: 1166-1184

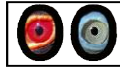
Sutton GM 1947. A female Cardinal and her reflection. Bird-Banding 18: 151-154.

Temby ID 2004. Urban wildlife issues in Australia. In: Shaw WW, Harris LK, VanDruff L (eds). Proceedings 4th International Urban Wildlife Symposium. University of Arizona, Tucson, USA: 26-34.

The Cornell Lab of Ornithology 2012. How to avoid window collisions. Available from http://www.birds.cornell.edu/AllAboutBirds/faq/master_folder/attracting/challenges/window_collisions (Accessed on 18/10/2012).

The Royal Society for the Protection of Birds 2012. Birds attacking windows. Available from http://www.rspb.org.uk/advice/watchingbirds/behaviour/birds_and_windows/attacking.aspx (Accessed on 18/10/2012).

Tinbergen N 1951. The study of instinct. Oxford University Press, London.



Tyler WM 1949. Eastern Robin. Bent AC (ed). Life Histories of North American Thrushes, Kinglets, and Their Allies: 14-45

Vogelbescherming Nederland 2011. Vogels die tegen het raam vliegen. Available from <http://www.vogelbescherming.nl/tuinvogel/tuinvogelweb/q/overzicht/weblog/bericht/2179> (Accessed on 20/1/2013).

Yeatman H 1936. Cardinal Chronicals. The Migrant 7: 22-23.

Wee YC 2013. Tag 'collision-reflection'. Bird Ecology Study Group Blog. Available from: <http://www.besgroup.org/category/glass-reflection/> (Accessed on 18/1/2013).

White G 1789. The natural history and antiquities of Selborne, in the county of Southampton. B. White and Son, London: 146.

Williams S 2011. Female Cardinal Fights Her Reflection. Available from: <http://www.youtube.com/watch?v=l3y9KOnUUSI> (Accessed on 18/1/2013).

Zilberman R, Moav B, Yom-tov Y 2001. Territoriality and mate Guarding in the Orange-tufted Sunbird. Israel Journal of Zoology 47: 275-286.



Appendix A – Species reported to display shadow boxing behaviour, listed in order of first accounts. Species in **red** occur in Southern Africa. For species in **green** females have been reported shadow boxing. All sources are listed in the references

#	Species	Sex	Location	Reporter	Year
1	American Robin <i>Turdus migratorius</i>		New York, United States	Allen JA	1879
			United States	Forbush EH	1929
			United States	Ritter WE, Benson SB	1934
		M	Tennessee, United States	Ganier AF	1936
2	American Yellow Warbler <i>Setophaga aestival</i>	M	Massachusetts, USA	Allen JA	1879
			United States		1937
3	Summer Tanager <i>Piranga rubra</i>		Kansas, United States	Koumly PM	1893
4	Eastern Bluebird <i>Sialia sialis</i>	M	New York, United States	Burroughs J	1894
5	Willie Wagtail <i>Rhipidura leucophrys</i>	M	Queensland, Australia	Barnard ED	1902
		M		SB	1902
6	Common Blackbird <i>Turdus merula</i>	M	Leinster, Ireland	Moffat CB	1903
		M	United Kingdom	Brown G	1937
		M	United Kingdom	Pitt F	1944
			Victoria, Australia	Morrison C	1940
7	Common Chaffinch <i>Fringila coelebs</i>	M	Leinster, Ireland	Moffat CB	1903
		M	United Kingdom	Pitt F	1944
			United Kingdom	Smythe RH	1962
8	Magpie-lark <i>Grallina cyanoleuca</i>		Queensland, Australia	Ford FBC	1903
		M	New South Wales, Australia	Hindwood KA	1941
			Queensland, Australia	Sinclair A	1941
		M	New South Wales, Australia	Roberts N	1941
9	Superb Fairywren <i>Malurus cyaneus</i>	P	Tasmania, Australia	Fletcher JA	1904
		P	New South Wales, Australia	Burrell H	1908
		P	South Australia, Australia	Cleland JB	1909
		M	Australia	Dennis CJ	1935
		M	New South Wales, Australia	Higgins R	1941
		M	New South Wales, Australia	Nott ME	1941



			P	New South Wales, Australia	Hindwood KA	1941
10	California Towhee	<i>Melospiza crissalis</i>	M	California, United States	Dickey DR	1916
			M	California, United States	Ritter WE, Benson SB	1934
				California, United States	Dickey DR	1916
11	House Finch	<i>Carpodacus mexicanus</i>		California, United States	Dickey DR	1916
12	Northern Mockingbird	<i>Mimus polyglottos</i>		California, United States	Dickey DR	1916
			M	Tennessee, United States	Ganier AF	1936
				New South Wales, Australia		1940
13	Indian Peafowl	<i>Pavo cristatus</i>		United States		1925
			M	United Kingdom	Pitt F	1944
14	Rockwarbler	<i>Origma solitaria</i>	F	New South Wales, Australia	Schleicher R	1927
15	Wilson's Bird-of-paradise	<i>Cicinnurus respublica</i>		London, England	Winterbottom JM	1928
16	Chipping Sparrow	<i>Spizella passerina</i>	M	United States	Forbush EH	1929
17	Northern Cardinal	<i>Cardinalis cardinalis</i>		United States	Ritter WE, Benson SB	1934
			M	Tennessee, United States	Yeatman H	1936
			F	Tennessee, United States	Reed WR	1938
			F	New York, United States	Sutton GM	1947
			P	United States	Bent AC	1968
			F	United States	Williams S	2011
18	American Bush-Tit	<i>Psaltriparus minimus</i>	P	California, United States	Robertson JM	1935
19	Common Starling	<i>Sturnus vulgaris</i>		Connacht, Ireland	Gough K	1936
20	White Wagtail	<i>Motacilla alba</i>	M	United Kingdom	Brown G	1937
21	European Robin	<i>Erithacus rubecula</i>	M	United Kingdom	Brown G	1937
			M	United Kingdom	Pitt F	1944
22	Smooth-billed Ani	<i>Crotophaga ani</i>		Cienfuegos, Cuba	Davis DE	1940
23	Grey Shrikethrush	<i>Colluricincla harmonica</i>		New South Wales, Australia	Lippmann M	1941
24	Common Myna	<i>Acridotheres tristis</i>		New South Wales, Australia	Iredale T	1941
25	Pied Butcherbird	<i>Cracticus nigrogularis</i>		Queensland, Australia	Chisholm AH	1941
26	Rufous Whistler	<i>Pachycephala rufiventris</i>		Queensland, Australia	Chisholm AH	1941
27	Grey Butcherbird	<i>Cracticus torquatus</i>		New South Wales, Australia	Hindwood KA	1941
28	Superb Lyrebird	<i>Menura novaehollandiae</i>		Victoria, Australia	Campbell AG	1941



29	House Sparrow	<i>Passer domesticus</i>	M		Britton KG	1944
			M		Stephenson, Stewart	1944
			M	United Kingdom	Pitt F	1944
30	White-throated Dipper	<i>Cinclus Cinclus</i>	M	United Kingdom	Pitt F	1944
31	Grey Wagtail	<i>Motacilla cinerea</i>	M	United Kingdom	Pitt F	1944
				West Bengal, India	Pradhan GM	2010
32	Amethyst Sunbird	<i>Chalcomitra amethystina</i>	P	Eastern Cape, South Africa	CJ Skead	1953
33	Greater Double-collared Sunbird	<i>Cinnyris afer</i>	P	Eastern Cape, South Africa	CJ Skead	1954
34	Cape Wagtail	<i>Motacilla capensis</i>	M	Eastern Cape, South Africa	CJ Skead	1954
35	Dunnock	<i>Prunella modularis</i>		United Kingdom	Smythe RH	1962
				The Netherlands	matrixjohn1	2012
36	Collared Sunbird	<i>Hedydipna collaris</i>		Eastern Cape, South Africa	CJ Skead	1962
37	Variable Sunbird	<i>Cinnyris venustus</i>	F	Zimbabwe	CJ Skead	1967
38	Olive Sunbird	<i>Cyanomitra olivacea</i>		South Africa	CJ Skead	1967
39	Scarlet-chested Sunbird	<i>Chalcomitra senegalensis</i>		South Africa	CJ Skead	1967
40	Purple Finch	<i>Haemorhous purpureus</i>		Maryland, United States	Bent AC	1968
41	Eastern Towhee	<i>Pipilo erythrophthalmus</i>		Massachusetts, USA	Dickinson jr JC	1968
42	Sooty Grouse	<i>Dendragapus fuliginosus</i>	F	Canada	Stirling I	1968
43	Carolina Wren	<i>Thryothorus ludovicianus</i>		Maryland, United States	Brackbill H	1969
44	Black-capped Chickadee	<i>Poecile atricapillus</i>		Wisconsin, United States	Censky EJ, Ficken MS	1982
45	Kea	<i>Nestor notabilis</i>	M	California, United States	Diamond J, Bond A	1989
46	African Grey Parrot	<i>Psittacus erithacus</i>		Arizona, United States	Pepperberg IM et al	1995
47	Large-billed Crow	<i>Corvus macrorhynchos</i>		Japan	Kusayama T et al	2000
48	Laughing Kookaburra	<i>Dacelo novaeguineae</i>		Australia	Temby ID	2004
49	Ruby-Throated Hummingbird	<i>Archilochus colubris</i>	M	Tennessee, United States	Stan	2006
50	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	P	Singapore	Tatham P	2006
51	Yellow-vented Bulbul	<i>Pycnonotus goiavier</i>		Singapore	Lee J	2006
				Singapore	Wee YC	2006
				Malaysia	O'Neill D	2007
52	Scarlet-backed Flowerpecker	<i>Dicaeum cruentatum</i>	M	Singapore	Ng A	2006



53	Rhinoceros Hornbill	<i>Buceros rhinoceros</i>		Singapore	Wee YC	2006
54	Myrtle Warbler	<i>Setophaga coronata</i>		Alabama, United States	Mail Online	2007
55	Long-tailed Shrike	<i>Lanius schach</i>		Singapore	Weng Kwong JC	2007
56	Oriental Pied Hornbill	<i>Anthracoceros albirostris</i>		Singapore	Teo A	2007
57	Black-naped Oriole	<i>Oriolus chinensis</i>		Singapore	Wong A	2007
58	Ruby-cheeked Sunbird	<i>Anthreptes singalensis</i>	M	Singapore	Wong Chor Mun S	2007
59	Olive-backed Sunbird	<i>Cinnyris jugularis</i>	M	Malaysia	Hale R	2009
60	Common Flameback	<i>Dinopium javanense</i>	M	Singapore	Koh M	2009
			F	Singapore	Tsang KC	2011
61	Crimson Sunbird	<i>Aethopyga siparaja</i>	M	Singapore	Jane	2010
			M	Sungei Buloh, Singapore	Cho J	2011
62	Great Tit	<i>Parus major</i>		The Netherlands	driekeervanhoof	2010
63	European Herring Gull	<i>Larus argentatus</i>		The Netherlands	Helming T	2010
64	Sandhill Crane	<i>Grus canadensis</i>		Alaska, United States	aknina51	2010
65	Indigo Bunting	<i>Passerina cyanea</i>		United States	Stitele Sr	2011
66	New Caledonian Crow	<i>Corvus moneduloides</i>		New Zealand	Medina FS et al	2011
67	Purple-rumped Sunbird	<i>Leptocoma zeylonica</i>	M	Western Province, Sri Lanka	Salgado A	2011
			F	India	Sawant S	2012
68	Southern Yellow-billed Hornbill	<i>Tockus leucomelas</i>		Mpumalanga, South Africa	Hayman D	2011
				Limpopo, South Africa	Solomon D, Solomon S	2012
69	Dark-eyed Junco	<i>Junco hyemalis</i>	M	California, United States	LaBarbera K	2012
70	Banded Woodpecker	<i>Chrysophlegma miniaceum</i>	M	Singapore	Amar-Singh HSS	2012
71	Blue Tit	<i>Parus caeruleus</i>		Essex, United Kingdom	Pattison M	2012
72	Tufted Titmouse	<i>Baeolophus bicolor</i>		United States	Hoffer L et al.	2012
73	Long-tailed Tit	<i>Aegithalos caudatus</i>		The Netherlands	matterne	2012
74	Southern Red-billed Hornbill	<i>Tockus rufirostris</i>		Limpopo, South Africa	Solomon D, Solomon S	2012
75	Chinspot Batis	<i>Batis molitor</i>		Limpopo, South Africa	Solomon D, Solomon S	2012
76	Natal Spurfowl	<i>Pternistis natalensis</i>		Limpopo, South Africa	Solomon D, Solomon S	2012
77	White-crested Helmet-Shrike	<i>Prionops plumatus</i>		Limpopo, South Africa	Solomon D, Solomon S	2012
78	Kurrichane Thrush	<i>Turdus libonyanus</i>		Limpopo, South Africa	Solomon D, Solomon S	2012



Appendix B – Results of the October 2012 online survey of shadow boxing bird species in Southern Africa. For species in **green** females have been reported shadow boxing. Records in the white rows were reported via e-mail, records in the **blue rows** were reported via Facebook.

x	#	Species	Sex	Location	Reporter	Comments
15	1	Crested Barbet <i>Trachyphonus vaillantii</i>			Tony Archer	At times
					John Drowley	Aggressive pecking at window on nesting log inspection in garden
				Pretoria GP	Philippa Meldrum	
					Justin Rhys Nicolau	
				Edenvale GP	Magda Badenhorst Begeman	Windscreen
				Pretoria GP	Jan Niemandt	September; For about a week
					Roelof van der Breggen	At a garden mirror
				Kruger National Park	Thomas Hohls	
					Beverley Carstens	It pecks so hard it I wonder if it's going to break the kitchen window
					Gisela Ortner	
				Randburg GP	Jane Robertson	Attacks window of house in Robindale
					Richard van der Spuy	Making love' with its own image in my bakkie's side mirror
				Bracken GP	Dylan Vasapolli	Flying at, and pecking window (tinted)
				Bryanston GP	Xeena Wallington	Comes most afternoons and pecks very hard at my window
					Richard Mckibbin	
	2	Cape Sparrow <i>Passer melanurus</i>	M	Bryanston GP	Doug Newman	October; Hovering at car windscreen around 16h45
			F	Parktown North GP	Sue Snyman	October; Fluttering and flying
					Tony Archer	All the time
			M		Vincent Ward	
				Johannesburg GP	Janice Isom	
			M	Johannesburg GP	Sue Welman	October; Attacks our car mirrors incessantly from dawn to dusk for more than a month
				Somerset West WC	Jill Mortimer	
					Margaret Maciver	
					Justin Rhys Nicolau	



						Magda Badenhorst Begeman	Various locations
						Roelof van der Breggen	At a garden mirror
				M	Randburg GP	Jane Robertson	Attacked reflection in next-door neighbour's bedroom window in Robindale; at least 20 years
						Bev Williams	Feather in beak, flutters against west facing window several times; several times a day in am
					Midlands KZN	Crystelle Wilson	One-way glass in the bathroom windows
					Rooifontein NC	Brian Culver	
11	3	Collared Sunbird	<i>Hedydipna collaris</i>	P	Victoria Falls Zimbabwe	Darryl Tiran	October; Female too but less aggression and force. Female also exhibits intruder threat posture
				M		Justin Rhys Nicolau	Enter through a small open gap in the window and have a go at the rearview mirror
						Jo-anne Hounsom	Some Collared Sunbirds that will sometimes have a stand-off with the window
					KZN	Andrew Pickles	Common at lounge window
						Garth Aiston	
						Roelof van der Breggen	Car mirror
				P	Nelspruit MP	Duncan Butchart	Almost every day, winter and summer, studio window
				M	Nature's Valley WC	Tony Rebelo	May; Car mirror
					Nelspruit MP	Trevor Thompson	
					Kruger National Park	Jenny Sharland	Trying to peck itself to death in our car wing mirrors and windows; had to cover
						Richard Mckibbin	
9	4	Cape Wagtail	<i>Motacilla capensis</i>			Stephen Mostert	Attacking car side mirror; mentioned as just 'wagtail'
					Somerset West WC	Jill Mortimer	
						Justin Rhys Nicolau	
						Joan Faiola	Seen often
					WC	Merilyn Dunster Mehl	Car side mirror
					Brits NW	Morné de la Rey	
					Potchefstroom NW	Adrian Haagner	



						Richard van der Spuy	Shadow boxing with itself - car wheel hubcap and sliding door
					Midlands KZN	Crystelle Wilson	One-way glass in the bathroom windows
7	5	Groundscraper Thrush	<i>Psophocichla litsitsirupa</i>		Honeydew GP	Bo van der Lecq	Attacking residence and car windows and mirrors
						Joan Faiola	Seen often
				P	Lapalala LIM	Marina Snyman	Pair of Groundscraper Thrushes boxing the window, taking turns to "box" their reflection
					Kathu NC	Austringer Ever	Car side mirrors
					Segwati Ranch NW	Lia Steen	
						Gisela Ortner	
					Botswana	Chris Brewster	Pecking windows briefly
	6	Pin-tailed Whydah	<i>Vidua macroura</i>	M	Franschhoek WC	Sue Snyman	October; Flying at and boxing
				M		Arnold van der Westhuizen	Car mirrors. Especially in breeding season
				M	Somerset West WC	Jill Mortimer	Almost every day
					Barrydale WC	Jane Dennler Spowart	On a window
					Pretoria GP	Jaco Pit	Constant tick-tick sound; attacking reflection in kitchen window; went on for hours for days
					Durbanville WC	Karel Marais	Window of bakkie; on this rather hot day I believe the bird fought itself to exhaustion and death
						Heide Wetmore	For years; some of my windows have little pock marks
	7	Southern Ground Hornbill	<i>Bucorvus leadbeateri</i>		Ithala KZN	Duncan McKenzie	Attack and break his glass sliding door of his house
					Dlinza KZN	Jan Niemandt	A guide told us about incident in parking area
					Jolivet KZN	Trish Strachan	One weekend 50ish windows trashed
					Kruger National Park	Thomas Hohls	Blew himself up, but didn't have a go
					Ongoye KZN	Gisela Ortner	So enthusiastic about their image in car window, do some damage to vehicles
					Ongoye KZN	Jenny Sharland	Famous incident reported on sabirdnet
						Richard Mckibbin	



6	8	Southern Yellow-billed Hornbill	<i>Tockus leucomelas</i>		Afsaal KNP	Corina Bakker-Van der Laan	Shop window
					Namibia	Anton van Niekerk	Tapping their reflections in vehicle mirrors
				M		Roelof van der Breggen	While feeding female on the nest
					Kruger	Thomas Hohls	
					Kruger	Beverley Carstens	Pecking at the window of the car and also pulling at the windscreen wipers.
					Khama Rhino Botswana	Celeste Wookey	Sits on the windscreen wipers of cars and pecks at the windscreen
5	9	Dark-capped Bulbul	<i>Pycnonotus tricolor</i>			Marina Snyman	On door handles and windows
					Kruger	Thomas Hohls	
					Port Alfred EC	Jane Robertson	Car side mirror attacks
					Kensington GP	Dennis White	Makes a nuisance of himself each spring by daily coming to peck at the glass for about four weeks
						Richard Mckibbin	
4	10	Arrow-marked Babbler	<i>Turdoides jardineii</i>		Sondela LIM	Tyrone Brent Mckendry	August; Car mirror
						Ken Worsley	
					Timbavati MP	Jan Niemandt	May; For three days; attack side mirrors and car windows
					Botswana	Chris Brewster	Pecking windows commonly
	11	Bokmakierie	<i>Telophorus zeylonus</i>		Bezuidenhout Valley GP	Magda Badenhorst Begeman	Car side mirror; hours
					Brits NW	Morné de la Rey	
					Springs GP	Tim Wickins	Window of conference room
					Midlands KZN	Crystelle Wilson	One-way glass in the bathroom windows
	12	Cape Batis	<i>Batis capensis</i>		Monks Cowl KZN	Veronique Wolfaardt	April
				M	Fernkloof WC	Lisle Gwynn	September
						Tiana Stanton	March; Car mirrors and windows
					Midlands KZN	Crystelle Wilson	One-way glass in the bathroom windows
	13	House Sparrow	<i>Passer domesticus</i>			Tony Archer	All the time
				M		Vincent Ward	
						Justin Rhys Nicolau	
				M	Pretoria GP	Austringer Ever	Dancing in front of a double story building window, second floor



	14	Southern Red-billed Hornbill	<i>Tockus rufirostris</i>			Justin Rhys Nicolau	
					Kruger National Park	Thomas Hohls	
					Kruger National Park	Beverley Carstens	Pecking at the window of the car and also pulling at the windscreen wipers
					Botswana	Chris Brewster	Pecking windows commonly
3	15	Bennett's Woodpecker	<i>Campethera bennettii</i>			Justin Rhys Nicolau	
				M	Satara KNP	Duncan Butchart	November; Going crazy at its reflection in my car windscreen
					Pretoriuskop KNP	Lia Steen	Bennett's Woodpecker and Woodland Kingfisher simultaneous
	16	Cape Robin-Chat	<i>Cossypha caffra</i>		Brits NW	Morné de la Rey	
					West Coast NP WC	Thomas Hohls	August; Scratched the glass on the right rear view mirror, not to mention the mess they left on the door
					Florida GP	Lia Steen	
	17	Crowned Hornbill	<i>Tockus alboterminatus</i>		Kloof KZN	Sally King	Offering food
					Krantzkloof KZN	Dave Bishop	Bashing on my windows
					Dlinza KZN	Mark Tittley	October
	18	Greater Double-collared Sunbird	<i>Cinnyris afer</i>			Garth Aiston	
				M	KZN	Trish Strachan	
					Keurboomsrivier WC	Lia Steen	Singing at his reflection in window
	19	Helmeted Guineafowl	<i>Numida meleagris</i>		Drakensberg KZN	Amanda Walden	Charging and kicking its reflection in the sliding door
					Drakensberg KZN	Marna Buys	Reflecting side of car attack
					Gordon's Bay WC	Dave Rimmer	Pecking at the windows at the basement
	20	White-bellied Sunbird	<i>Cinnyris talatala</i>	M	Randburg GP	Andy Branfield	Year round; Every day for several years in the early morning shadow boxing at glass sliding door
					Pretoria GP	Adrian Haagner	
						Roelof van der Breggen	At a garden mirror
	21	Yellow-bellied Greenbul	<i>Chlorocichla flaviventris</i>	M	Victoria Falls Zimbabwe	Darryl Tiran	Usually throughout the year with a peak during October
						Ken Worsley	
					Sirheni KNP	Neels Roos	Against glass of a narrow window of one of the huts



2	22	African Pied Wagtail	<i>Motacilla aguimp</i>		Richard's Bay KZN	Adrian Haagner	
					Shimuwini KNP	Neels Roos	Against glass panel of an aluminium sliding door of a hut
	23	African Red-eyed Bulbul	<i>Pycnonotus nigricans</i>		Potchefstroom NW	Adrian Haagner	
							Roelof van der Breggen
	24	Amethyst Sunbird	<i>Chalcomitra amethystina</i>		Potchefstroom NW	Adrian Haagner	
							Roelof van der Breggen
	25	Bar-throated Apalis	<i>Apalis thoracica</i>		Nelspruit MP	Trevor Thompson	
							Port Alfred EC
	26	Black-headed Oriole	<i>Oriolus larvatus</i>			Marina Snyman	On door handles and windows
							Gisela Ortner
	27	Great Sparrow	<i>Passer motitensis</i>	F	Spitzkoppe Namibia	Karin Wiesler	December; Car mirror; male was interested, female real aggressor; approachable
							Nossob NC
	28	Kurrichane Thrush	<i>Turdus libonyana</i>			Ken Worsley	
							Nelspruit MP
	29	Mountain Wagtail	<i>Motacilla clara</i>		Malelane MP	Mark Tittley	October; Shadow boxing on the mirror of a safari vehicle. Judging by marks going on for a while. Tailless.
							Serenity Eco Lodge MP
	30	Red-winged Starling	<i>Onychognathus morio</i>		Somerset West WC	Jill Mortimer	
							M
	31	Southern Boubou	<i>Laniarius ferrugineus</i>	P	KZN	Trish Strachan	August/September; Jumping up and down at the window; at it all day, both male and female
	32	Southern Grey-headed Sparrow	<i>Passer diffusus</i>			Garth Aiston	



	33	Southern Masked Weaver	<i>Ploceus velatus</i>			Arnold van der Westhuizen	Attacking chrome hub caps on older cars
				M	Faerie Glen GP	Amanda Walden	Very aggressive attack
	34	Terrestrial Brownbul	<i>Phyllastrephus terrestris</i>		Victoria Falls Zimbabwe	Darryl Tiran	October; Usually throughout the year with a peak during the past month
						Ken Worsley	
	35	Yellow Bishop	<i>Euplectes capensis</i>			Margaret Maciver	
				M	Durbanville WC	Roy McGrath	Gently tapping on window in the morning
1	36	African Grey Hornbill	<i>Tockus nasutus</i>		Wonderboom GP	Lisl van Deventer	Car front window
	37	African Hoopoe	<i>Upupa africana</i>		Wellington WC	Michiel Moll	October; Raising crest after pecking at window; at least four different (ground-story) windows
	38	African Paradise Flycatcher	<i>Terpsiphone viridis</i>			Justin Rhys Nicolau	
	39	African Penguin	<i>Spheniscus demersus</i>		Lambert's Bay Island WC	Vincent Ward	Mirrored window: interacted/investigated their reflection but peacefully
	40	African Wood Owl	<i>Strix woodfordii</i>	M	Victoria Falls Zimbabwe	Darryl Tiran	October; Usually throughout the year with a peak during the past month
	41	Bearded Woodpecker	<i>Dendropicus namaquus</i>		Shingwedzi LIM	Corina Bakker-Van der Laan	Car Mirror
	42	Black Cuckooshrike	<i>Campephaga flava</i>	F	Eastern Cape	Gertie Griffith	July/August; Wendy Perks in Tiptol mag; banging and calling and getting exhausted but not giving up
	43	Black-collared Barbet	<i>Lybius torquatus</i>		Brits NW	Morné de la Rey	
	44	Bronzy Sunbird	<i>Nectarinia kilimensis</i>	M	Caprivi Namibia	Gerald Wingate	February; Scurrying frantically along the length of the long open bathroom mirror while calling
	45	Cape Cormorant	<i>Phalacrocorax capensis</i>		Lambert's Bay Island WC	Vincent Ward	Mirrored window: interacted/investigated their reflection but peacefully
	46	Cape Gannet	<i>Morus capensis</i>		Lambert's Bay Island WC	Vincent Ward	Mirrored window: drawn to it and tried to interact with it
	47	Southern Fiscal	<i>Lanius collaris</i>			Justin Rhys Nicolau	
	48	Common Ostrich	<i>Struthio camelus</i>	F	Doomkop	Claire Laura Eksteen	Pecking at her reflection in the chalet windows relentlessly. She also laid an egg for us
	49	Crimson-breasted Shrike	<i>Laniarius atrococcineus</i>		Botswana	Chris Brewster	Pecking windows briefly
	50	Damara Red-billed Hornbill	<i>Tockus damarensis</i>			Justin Rhys Nicolau	
	51	Dark-backed Weaver	<i>Ploceus bicolor</i>		St Lucia KZN	Michiel Moll	June; Attacking himself in the wing mirror of our car



52	Dusky Sunbird	<i>Cinnyrus fuscus</i>	M	Swakopmund Namibia	Ursula Franke	Jan/Feb; For at least four years. Attacks car mirror near flowering bush. Clac clac with beak and loud calling
53	Egyptian Goose	<i>Alopochen aegyptiaca</i>		Bellville WC	Karel Marais	Pecking at itself in a window at Bellville Library, apparently it was puffed up
54	Golden-breasted Bunting	<i>Emberiza flaviventris</i>		North of Pretoria GP	Peter Turner	Attacking car mirror
55	Green Wood Hoopoe	<i>Phoeniculus purpureus</i>		Eastern Cape	Gertie Griffith	Wendy Perks in Tiptol mag; peck at reflection in middle of window; sometimes brings food
56	Grey Go-away-bird	<i>Corythaixoides concolor</i>			Hennie Visser	5-7 birds eat food provided during winter and there always one fights image in the window
57	Grey Tit	<i>Parus afer</i>	P	St Helena Bay WC	Gerald Wingate	August; Male scolded his reflection in side mirror; pecked at his reflection in the windscreen from wiper
58	Herero Chat	<i>Namibornis herero</i>		Spitzkoppe Namibia	Morné de la Rey	Some-one told me they have seen Hereo chat in the mirror of a car at Spitzkoppe
59	Holub's Golden Weaver	<i>Ploceus xanthops</i>		Nelspruit MP	Trevor Thompson	
60	Kelp Gull	<i>Larus dominicanus</i>		Lambert's Bay Island WC	Vincent Ward	Mirrored window: violently attack their reflection
61	Knysna Woodpecker	<i>Campethera notata</i>		Cannon Rocks EC	Hugh Retief	Going on for at least three years, attacking car mirrors of many campers.
62	Long-billed Crombec	<i>Sylvietta rufescens</i>		Geelbek. WC	Seth Musker	April; car side mirror; wagtails also prone to this behaviour
63	Olive Thrush	<i>Turdus olivaceus</i>		Kloof KZN	Hazel Kirkbride	November/December; Set off beam; banged pretty hard on the glass; Ignored distractions
64	Orange-breasted Bushshrike	<i>Chlorophoneus sulfureopectus</i>		Kruger	Lisl van Deventer	Car side mirror
65	Pied Crow	<i>Corvus albus</i>		Ndumo KZN	Austringer Ever	At sliding glass doors of management offices
66	Southern Brown-throated Weaver	<i>Ploceus xanthopterus</i>		Drotsky Botswana	Jan Niemandt	August
67	Southern Pied Babbler	<i>Turdoides bicolor</i>			Ken Worsley	
68	Spectacled Weaver	<i>Ploceus ocularis</i>		KZN	Andrew Pickles	Common at lounge window
69	Spotted Flycatcher	<i>Muscicapa striata</i>		Augrabies NC	Adrian Haagner	December; Car mirrors, chrome nudge bar and windows - stopped only after car was removed
70	White-crested Helmetshrike	<i>Prionops plumatus</i>		Marloth Park MP	Corina Bakker-Van der Laan	Pecking at our car mirror and windows



71	Woodland Kingfisher	<i>Halcyon senegalensis</i>		Pretoriuskop KNP	Lia Steen	Bennett's Woodpecker and Woodland Kingfisher simultaneous
72	Yellow-billed Kite	<i>Milvus aegyptius</i>		KZN	Andrew Pickles	Fly at the window from the fence a few meters away repeatedly for a few hours at a time
73	Yellow-breasted Apalis	<i>Apalis flavida</i>		Nelspruit MP	Trevor Thompson	
74	Common Scimitarbill	<i>Rhinopomastus cyanomelas</i>		Rooifontein NC	Brian Culver	Admiring itself in my side mirror