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Source: Ardea, 96(2) : 283-285

Published By: Netherlands Ornithologists' Union

URL: https://doi.org/10.5253/078.096.0214

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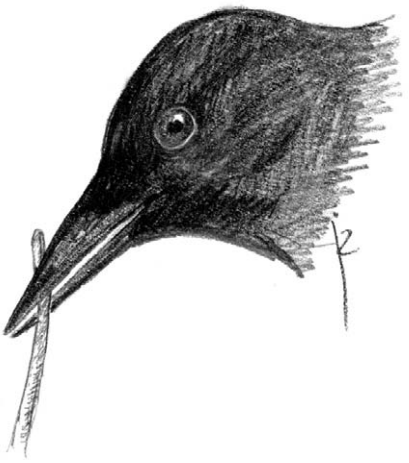
Grass-stem tool use in New Caledonian Crows *Corvus moneduloides*

Jolyon Troscianko[1], Lucas A. Bluff[2] & Christian Rutz[2,*]



Troscianko J., Bluff L.A. & Rutz C. 2008. Grass-stem tool use in New Caledonian Crows *Corvus moneduloides*. Ardea 96(2): 283–285.

We report an observation of a wild New Caledonian Crow *Corvus moneduloides* manufacturing two tools from dry grass stems, and using them to extract lizards from the crevices of a fencepost. We recovered one of the tools and were able to examine the raw material from which tools had been manufactured. This confirms our earlier observations with animal-borne video cameras, where we inferred use of this hitherto undocumented tool material from frame-by-frame analysis of video footage.

Key words: animal-borne imaging, comparative cognition, *Corvus moneduloides*, culture, New Caledonian Crow, tool use, video-tracking

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New Caledonian Crows *Corvus moneduloides* use tools for extractive foraging, with a behavioural diversity and sophistication that is unparalleled among birds (Hunt & Gray 2006, Bluff *et al*. 2007). They manufacture tools from a variety of raw materials, including leaves of *Pandanus* spp. trees, leaf petioles of *Aleurites moluccana*, stems of vines, bamboo and palms, and twigs from a range of other species (Hunt & Gray 2006). It is possible that different tool types, with their different physical properties (e.g. flexibility, presence of 'hooks'), serve distinct foraging functions, but this idea remains to be tested.

Using animal-borne video cameras, we recently documented a hitherto unknown mode of tool use (tool use in loose substrate on the ground) and a novel tool material – dry, grass-like stems (Rutz *et al.* 2007). Two tools, manufactured and used by two different adult males (ID-codes 'CC1' and 'EK1'; see scene 2 of movie S2, and scenes 2 and 3 of movie S3 in Rutz *et al.* 2007), were recognizably different from any previously reported tool types. From our frame-by-frame analysis of the video footage, we concluded that these tools were dry grass stems, but as we had recorded crow foraging behaviour remotely, we were unable to recover the tools or to examine raw materials. Here, we report an independent observation of a wild New Caledonian Crow ('HC3') manufacturing two tools from dry grass stems (tools *A* and *B* in Fig. 1), and using them to forage for lizards hidden within the crevices of a fencepost.

The observation was made on 6 November 2007, under unusually favourable conditions, some 50 m from our field base in Gouaro-Déva, New Caledonia (21.60°S, 165.40°E). We provide a detailed summary of our observation with timings and reference to eight sample photos in Figure 1. Two members of the field team – one equipped with binoculars, the other with a digital camera and 400 mm lens – were able to approach the crow and observe it from *c*. 20 m for just over two

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Figure 1. A wild New Caledonian Crow (ID-code is 'HC3'; 6 November 2007) using two dry grass stems as tools for foraging on a wooden fencepost. 12:15:48 – First photo of crow taken on the fencepost; the bird has no tool in its beak. 12:15:53 – HC3 moves to another part of the fence; still no tool. 12:16:09 – HC3 moves to the top of one fencepost with a grass-stem tool (tool *A*) and proceeds to probe with this tool for *c*. 5 seconds (**A** to **C**) before placing it on the surface of the post (from where it falls to the ground; tool *A* could not be recovered as it had fallen amongst other pieces of dry grass); HC3 appears to look down into the crevice. 12:16:23 – HC3 has moved from the fencepost to an adjacent (*c*. 30 cm) horizontal fence section (**D**), where it is within reach of a large bundle of dry grass stems. 12:16:31 – HC3 manufactures tool *B* by breaking off a long section of a dry grass stem and shortening it (the missing section can be identified by comparing (**D**) and (**E**)). 12:16:33 – HC3 returns to the top of the fencepost and resumes probing into the crevice with tool *B* (**E**). 12:16:39 – HC3 looks down into the crevice, with tool *B* still inserted; it then resumes probing with tool *B* (**F**). 12:16:43 – HC3 leaves tool *B* in the crevice and picks up the first lizard with its beak (**G**), holding it in the beak for *c*. 30 seconds before swallowing it head-first. 12:17:28 – HC3 resumes probing into the crevice with tool *B*. 12:17:45 – HC3 catches a second lizard, and draws the lizard and tool *B* together out of the crevice (**H**). 12:17:54 – HC3 places tool *B* (which is now shorter and without node; see Fig. 2) and the second lizard on the surface of the post and disentangles them by using its left foot to secure the tool and its beak to restrain the lizard. 12:17:58 – HC3 swallows the second lizard head-first and flies off, leaving tool *B* on the post (tool later recovered; see Fig. 2).

minutes, during which time 45 photos were taken. Such sustained, close-up observation of tool use by wild crows is rare, without the use of either a hide at a baited site, or remote telemetry (see Rutz *et al.* 2007). The bird, an adult male, had been trapped on 15 December 2006, when it was marked with wingtags, rings and a tail-mounted video-tag; the latter was shed prior to the present observation.

Both tools used by this bird exhibited 'nodal' segmentation (for tool *A*, see Fig. 1C; for tool *B*, see Fig. 1F). The recovery of tool *B* (Fig. 2) and examination of the raw material *in situ* allowed us to identify the tool material unambiguously as dry grass stems, confirming our earlier observation with animal-borne cameras (Rutz *et al.* 2007). We note, however, that both tools used on this occasion were stiffer than those recorded during video-tracking, which had been manufactured by birds on the ground.

The present observation was made within the study area of our earlier video-tracking work (Rutz *et al.* 2007), so we currently do not know how widespread the use of this tool type is. Tool use in New Caledonian Crows appears to vary regionally

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Figure 2. Grass-stem tool (tool *B*), which was collected from the fence post shown in Fig. 1, after it had been used by a New Caledonian Crow to extract two lizards. The 'node' of this grass-stem tool (see Fig. 1F) was broken off between the extractions of the first and second lizard.

across the island (Hunt & Gray 2003), and it has been suggested that aspects of this species' tool technology are under the influence of cultural transmission. Documenting regional variation in behaviours can provide important information on (material) cultures in non-human species (Whiten *et al.* 1999), and our report adds to the growing catalogue of tool materials and techniques employed by New Caledonian Crows (Hunt & Gray 2006).

A quantitative 'ethnographic' survey of this species' tool-oriented behaviour cannot rely on rare chance observations, such as the one described here. Considering the difficulty of observing the natural foraging of wild crows (Rutz *et al.* 2007), we suggest that rapid progress could be made with animal-borne video cameras (Bluff & Rutz 2008). By deploying video-tags on a large number of crows throughout New Caledonia, we intend to investigate further the foraging function of different tool types, as well as within- and between-individual variation in tool behaviour.

We thank N. Barré (Société Calédonienne d'Ornithologie, New Caledonia) and S. Blancher (Domaine Provincial de Gouaro-Déva, Province Sud, New Caledonia) for logistical support in New Caledonia. Fieldwork was carried out with permissions from the Centre de Recherches sur la Biologie des Populations d'Oiseaux (France) and the Direction des Resources Naturelles (Province Sud, New Caledonia). We received financial support from the BBSRC (grant BB/C517392/1 to Alex Kacelnik; PhD studentship to J.T.) and the Rhodes Trust (L.A.B.); C.R. is a Junior Research Fellow at Linacre College, Oxford.

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SAMENVATTING

Beschreven wordt hoe een Nieuw-Caledonische Kraai *Corvus moneduloides* twee werktuigen maakt van droge grashalmen, waarna deze gebruikt worden om hagedissen uit spleten van een hekpaal te jagen. Een van de gereedschappen werd teruggevonden zodat het gebruikte materiaal precies kon worden bekeken. De waarneming bevestigt eerdere vermoedens van de auteurs, die tevoren minicamera's op wildlevende kraaien hadden bevestigd, dat droge grashalmen als gereedschap door de kraaien worden gebruikt. (JP)

Corresponding editor: Jouke Prop
Received 25 April 2008; accepted 15 June 2008

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