

**Tool use by Nigeria-Cameroon chimpanzees for driver ant
predation in Kom-Wum Forest Reserve, North-West Region
Cameroon**

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Supplementary material

Table S1. Number of individual tools recorded per site, tool dimensions, tool modification, and plant type per category (dirty & not dirt), used per season (wet & dry).

| Tool ID | Tools per site | Length (cm) | Proximal diameter | Middle diameter (mm) | Distal Diameter (mm) | Average diameter (mm) | Wear | Plant type | Tool type | Season |
|---------|----------------|-------------|-------------------|----------------------|----------------------|-----------------------|-------|------------|-----------|--------|
| 1 | 13 | 66 | 15.1 | 15.3 | 14.9 | 15.1 | Blunt | Wood | Dirty | Wet |
| 2 | | 81 | 14.2 | 12.7 | 10.9 | 12.6 | Blunt | Wood | Dirty | Wet |
| 3 | | 100 | 8.5 | 10 | 7.3 | 8.6 | Blunt | Herb | Not dirty | Wet |
| 4 | | 155 | 12.4 | 12.7 | 12.6 | 12.6 | Fray | Herb | Dirty | Wet |
| 5 | | 97 | 10 | 10 | 8.5 | 9.5 | Blunt | Wood | Not dirty | Wet |
| 6 | | 117 | 10.7 | 10.4 | 13.5 | 11.5 | Blunt | Wood | Dirty | Wet |
| 7 | | 73 | 14.1 | 13.7 | 12.8 | 13.5 | Blunt | Wood | Dirty | Wet |
| 8 | | 111 | 6.3 | 5.1 | 9.4 | 6.9 | Sharp | Herb | Not dirty | Wet |
| 9 | | 117 | 12.7 | 12.8 | 12 | 12.5 | Blunt | Wood | Dirty | Wet |
| 10 | | 85 | 7 | 6 | 12.6 | 8.5 | Sharp | Wood | Not dirty | Wet |

| | | | | | | | | | | |
|----|---|-----|------|------|------|------|-------|------|-------|-----|
| 11 | | 86 | 14.4 | 13.9 | 13 | 13.7 | Sharp | Wood | Dirty | Wet |
| 12 | | 66 | 12.6 | 12.1 | 9.7 | 11.5 | Blunt | Wood | Dirty | Wet |
| 13 | | 39 | 15.8 | 15.7 | 12 | 14.5 | Sharp | Wood | Dirty | Wet |
| 14 | 6 | 155 | 11.3 | 10.7 | 10 | 10.7 | Blunt | Wood | Dirty | Wet |
| 15 | | 162 | 12.6 | 13.6 | 12 | 12.7 | Blunt | Wood | Dirty | Wet |
| 16 | | 129 | 13.4 | 12 | 9 | 11.5 | Blunt | Wood | Dirty | Wet |
| 17 | | 133 | 12.5 | 13 | 9 | 11.5 | Sharp | Wood | Dirty | Wet |
| 18 | | 148 | 12.1 | 10 | 6 | 9.4 | Sharp | Wood | Dirty | Wet |
| 19 | | 105 | 10.5 | 11 | 13.2 | 11.6 | Blunt | Wood | Dirty | Wet |
| 20 | 5 | 40 | 7 | 6 | 3 | 5.3 | Fray | Wood | Dirty | Wet |
| 21 | | 64 | 9.5 | 8.3 | 9.3 | 9 | Sharp | Wood | Dirty | Wet |
| 22 | | 49 | 12.9 | 10.3 | 7.6 | 10.3 | Blunt | Herb | Dirty | Wet |
| 23 | | 56 | 8.3 | 8.5 | 9.8 | 8.9 | Sharp | Wood | Dirty | Wet |
| 24 | | 64 | 9.3 | 7.3 | 8 | 8.2 | Blunt | Wood | Dirty | Wet |
| 25 | 6 | 42 | 17.2 | 11 | 8.8 | 12.3 | Sharp | Wood | Dirty | Wet |
| 26 | | 270 | 17.8 | 18.7 | 22 | 19.5 | Blunt | Wood | Dirty | Wet |

| | | | | | | | | | | |
|----|----|-----|------|------|------|------|-------|------|-------|-----|
| 27 | | 236 | 16.3 | 20.4 | 24.5 | 20.4 | Blunt | Wood | Dirty | Wet |
| 28 | | 243 | 13.4 | 18.5 | 23.5 | 18.5 | Blunt | Wood | Dirty | Wet |
| 29 | | 212 | 21.7 | 18.9 | 14.5 | 18.4 | Blunt | Wood | Dirty | Wet |
| 30 | | 143 | 11 | 8.7 | 4.5 | 8 | Blunt | Wood | Dirty | Wet |
| 31 | 6 | 156 | 5.1 | 9.4 | 10.4 | 8.3 | Sharp | Wood | Dirty | Wet |
| 32 | | 143 | 11 | 19.7 | 15.1 | 15.3 | Sharp | Wood | Dirty | Wet |
| 33 | | 153 | 14.2 | 9.2 | 5.5 | 9.6 | Sharp | Wood | Dirty | Wet |
| 34 | | 80 | 11.7 | 10.5 | 4.6 | 8.9 | Blunt | Wood | Dirty | Wet |
| 35 | | 40 | 8.3 | 9 | 9.3 | 8.9 | Blunt | Wood | Dirty | Wet |
| 36 | | 70 | 13 | 9.3 | 4.9 | 9.1 | Blunt | Wood | Dirty | Wet |
| 37 | 10 | 137 | 14.6 | 15.6 | 10.1 | 13.4 | Blunt | Wood | Dirty | Wet |
| 38 | | 172 | 18.2 | 16.2 | 15.2 | 16.5 | Blunt | Wood | Dirty | Wet |
| 39 | | 77 | 12 | 15 | 14 | 13.7 | Blunt | Wood | Dirty | Wet |
| 40 | | 45 | 10 | 14 | 13 | 12.3 | Sharp | Wood | Dirty | Wet |
| 41 | | 101 | 5.5 | 10 | 7 | 7.5 | Sharp | Wood | Dirty | Wet |
| 42 | | 154 | 7 | 11 | 7 | 8.3 | Fray | Wood | Dirty | Wet |

| | | | | | | | | | | |
|----|---|------|------|------|------|------|--------|------|-----------|-----|
| 43 | | 125 | 5 | 11 | 10 | 8.7 | Blunt | Wood | Dirty | Wet |
| 44 | | 138 | 6 | 12 | 14 | 10.7 | Blunt | Wood | Dirty | Wet |
| 45 | | 112 | 12 | 16 | 17 | 15 | Blunt | Wood | Dirty | Wet |
| 46 | | 70 | 2 | 4 | 9 | 5 | Blunt | Wood | Dirty | Wet |
| 47 | 8 | 42 | 6 | 6 | 9 | 7 | Blunt | Wood | Dirty | Wet |
| 48 | | 72 | 13.4 | 10.2 | 8.7 | 10.8 | Blunt | Wood | Dirty | Wet |
| 49 | | 72 | 4.5 | 7.1 | 11.7 | 7.8 | Blunt | Wood | Dirty | Wet |
| 50 | | 70.5 | 3.8 | 6.4 | 7.4 | 5.9 | Frayed | Wood | Dirty | Wet |
| 51 | | 60 | 7.7 | 8.7 | 8 | 8.2 | Blunt | Wood | Dirty | Wet |
| 52 | | 55 | 3 | 11 | 5 | 6.3 | Sharp | Wood | Dirty | Wet |
| 53 | | 80.3 | 1 | 9 | 15 | 8.3 | Blunt | Wood | Dirty | Wet |
| 54 | | 7.9 | 7.5 | 5.8 | 5.8 | 6.3 | Blunt | Wood | Dirty | Wet |
| 55 | 8 | 148 | 15 | 12.4 | 7.4 | 11.6 | Sharp | Wood | Not dirty | Wet |
| 56 | | 193 | 8.9 | 15.2 | 13.4 | 12.5 | Blunt | Wood | Not dirty | Wet |
| 57 | | 34 | 8.8 | 7.5 | 5.5 | 7.3 | Sharp | Wood | Not dirty | Wet |
| 58 | | 58 | 4.9 | 11 | 9.6 | 8.5 | Blunt | Wood | Not dirty | Wet |

| | | | | | | | | | | |
|----|---|-----|------|------|------|------|--------|------|-----------|-----|
| 59 | | 95 | 10.3 | 13.1 | 12 | 11.8 | Blunt | Wood | Not dirty | Wet |
| 60 | | 172 | 7.6 | 9.6 | 10.6 | 9.3 | Blunt | Wood | Not dirty | Wet |
| 61 | | 167 | 8.3 | 10.3 | 8.5 | 9.1 | Blunt | Wood | Not dirty | Wet |
| 62 | | 74 | 5.2 | 5.1 | 5 | 5.1 | Blunt | Wood | Not dirty | Wet |
| 63 | 7 | 125 | 1.8 | 6.8 | 8.1 | 5.6 | Blunt | Wood | Not dirty | Dry |
| 64 | | 113 | 3.3 | 2.3 | 1.3 | 2.3 | Frayed | Wood | Dirty | Dry |
| 65 | | 138 | 8.5 | 5.4 | 0.6 | 4.8 | Blunt | Wood | Not dirty | Dry |
| 66 | | 123 | 1.9 | 1.4 | 4.8 | 2.7 | Blunt | Wood | Not dirty | Dry |
| 67 | | 100 | 8.1 | 8.2 | 3 | 6.4 | Blunt | Wood | Not dirty | Dry |
| 68 | | 116 | 10.9 | 7.5 | 4.3 | 7.6 | Blunt | Wood | Dirty | Dry |
| 69 | | 154 | 3.9 | 4.3 | 2.5 | 3.6 | Sharp | Wood | Not dirty | Dry |
| 70 | 9 | 158 | 9.2 | 8.9 | 8 | 8.7 | Blunt | Wood | Not dirty | Dry |
| 71 | | 132 | 23.5 | 16.3 | 13.1 | 17.6 | Blunt | Wood | Not dirty | Dry |
| 72 | | 145 | 11.6 | 14.7 | 7.1 | 11.1 | Blunt | Wood | Not dirty | Dry |
| 73 | | 163 | 14.7 | 12.6 | 10.1 | 12.5 | Blunt | Wood | Not dirty | Dry |
| 74 | | 174 | 8.8 | 10.8 | 7 | 8.8 | Blunt | Wood | Not dirty | Dry |

| | | | | | | | | | | |
|----|---|-----|------|------|------|------|-------|------|-----------|-----|
| 75 | | 130 | 7.9 | 8.6 | 6.4 | 7.7 | Blunt | Wood | Not dirty | Dry |
| 76 | | 138 | 5.7 | 7.2 | 8.6 | 7.2 | Blunt | Wood | Not dirty | Dry |
| 77 | | 131 | 6.4 | 8.5 | 5.7 | 6.9 | Blunt | Wood | Not dirty | Dry |
| 78 | | 102 | 11.3 | 7.4 | 6.2 | 8.3 | Blunt | Wood | Not dirty | Dry |
| 79 | 3 | 197 | 17.7 | 14.6 | 10.7 | 14.3 | Blunt | Wood | Not dirty | Dry |
| 80 | | 168 | 14.5 | 14 | 8.3 | 12.2 | Blunt | Wood | Not dirty | Dry |
| 81 | | 100 | 9.4 | 9.5 | 9.2 | 9.4 | Blunt | Wood | Not dirty | Dry |
| 82 | 2 | 152 | 6.2 | 12.1 | 8.3 | 8.9 | Blunt | Wood | Not dirty | Dry |
| 83 | | 155 | 10.6 | 14.4 | 10.9 | 12 | Blunt | Wood | Not dirty | Dry |

Table S2. Comparison of the number of tool sites and number of tools recovered at KWFR with some chimpanzee populations.

| Parameters | | Driver ant predation tools | | | |
|-------------|--------------------|----------------------------|-----------------------|--------------------|--------------------|
| Study site | This study | GGNP | NNFR | N U L | SE |
| Ant species | <i>Dorylus sp.</i> | <i>Dorylus sp.</i> | <i>Camponotus sp.</i> | <i>Dorylus sp.</i> | <i>Dorylus sp.</i> |
| Sites (N) | 12 | 17 | 6 | 22 | 46 |
| Number (N) | 83 | 73 | 13 | 86 | 191 |

* GGN: Gashaka Gumti National Park (Fowler and Sommer, 2007), NNFR: Ngel Nyaki Forest Reserve (Dutton and Chapman, 2015), NUL: Northern Uele Landscape (Hicks *et al.*, 2019, 2020), SE: Seringbara (Koops *et al.*, 2015b).



Figure S1. Driver ant probing tools projecting from an ant mound in situ in KWFR, May 2018.



Figure S2. Principal investigator inspecting driver ant mound for the insects in KWFR, May 2018.



Figure S3. Driver ant tools projecting from under a tree in situ with signs of excavation of soil in KWFR, May 2018.



Figure S4. Driver ant tools site with signs of excavation of soil in KWFR, July 2018.



Figure S5. The principal investigator inspecting driver ant tools projecting from a mound in situ with signs of soil excavation in KWFR, May 2018.



Figure S6. Driver ant probes projecting from a nest in situ with the insects seen crawling on sticks in KWFR, May 2018.



Figure S7. Driver ant probes removed from a nest in situ with wear and dirt in KWFR, May 2018.



Figure S8. Driver ants crawling on a probe projecting from an ant nest under a tree in KWFR, May 2018.



Figure S9. Driver ant tools site consisting of tools with dirty ends(red) and those without(blue) (possible tool set) in KWFR.



Figure S10. Potential driver ant dip completely stripped off back with the insects seen crawling on it at an ant nest in KWFR, August 2018. The painful bites of the driver ants prevented us from taking the tools with our hands.



Figure S11. The principal investigator(right) and field assistant(left) measuring the length of a tool (2.70cm) used to prey on driver ant in KWFR, June 2018.



Figure S12. Drive ant swarm in KWFR, May 2018.



Figure S13. Termite mound in the KWFR, December 2019.



Figure S14. Termites workers in a mound pounded open by an assistant in the KWFR, May 2018.



Figure S15. Termite workers, soldier, nymph and reproductive queen from a termite in the KWFR, May 2018.