

1 Title: Death of the alpha: within-community lethal violence among
2 chimpanzees of the Mahale Mountains National Park¹

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18 Short title: Coalitional lethal violence in Mahale chimpanzees

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22

23 **Abstract**

24 Chimpanzees (*Pan troglodytes*) are capable of extreme violence. As with
25 humans, wild chimpanzees engage in inter-group, sometimes lethal, aggression,
26 which offers to the winners an opportunity to enlarge their territory, increase their
27 food availability and potentially attract more mates. In contrast, within-community
28 lethal violence among adult males is rare and, to date, only four cases (three observed
29 and one inferred) have been recorded despite decades of observation. In consequence,
30 the reasons for lethal violence between community members remain unclear. This
31 paucity of observations may be due to the importance of male-male coalitions during
32 inter-community encounters. Cooperation between males is also a key factor for the
33 defense or advancement of social rank within the group. While the previous reported
34 cases of within-community killing involved low ranked males, here we provide the
35 first report of the killing of an incumbent alpha male by a coalition of adult males
36 from the same community. We also report the first observed case of use of objects (a
37 stone and a branch) by chimpanzees as weapons to maim and kill a conspecific, which
38 potentially increases our understanding of the origins of weapon-use in humans.

39

40

41 **Introduction**

42 Chimpanzees (*Pan troglodytes*) are capable of extreme violence. Adult males pursue
43 an aggressive, collective, territoriality that contests inter-community dominance and
44 secures access to food resources (Crofoot and Wrangham 2010; Mitani, Watts, and
45 Amsler 2010; Wilson, Wallauer, and Pusey 2004). Isolated individuals in the
46 periphery of their home range risk becoming victims of violent, potentially lethal,
47 assaults by coalitional gangs of aggressors (typically adult males) from neighbouring
48 communities. When lethal violence occurs, deep bite wounds and broken limbs are
49 common, as are some more specific injuries: traumatic damage to the throat, removal
50 of some or all of the genitalia, and disfiguring of the face (Wrangham 2006). There
51 are now multiple reports from across the species' geographic range of such violence
52 (Newton-Fisher and Emery Thompson forthcoming).

53 In contrast, lethal violence among adult male chimpanzees of the same
54 community is very rare, and remains poorly understood (Newton-Fisher and Emery
55 Thompson forthcoming). Within communities, males depend upon one another during
56 inter-community encounters to mitigate threats posed by males from other
57 communities (Wrangham 1999). Furthermore, cooperation between males within
58 communities may be important for the defence or advancement of social rank (de
59 Waal 1982; Nishida and Hosaka 1996), and high social rank carries important
60 advantages for reproductive success (Boesch et al. 2006; Newton-Fisher et al. 2010;
61 Wroblewski et al. 2009).

62 Nevertheless, within-community coalitional (or gang) attacks have been
63 reported from both the wild and captivity (de Waal 1986; Fawcett and Muhumuza
64 2000; Goodall 1992; Mjungu 2010; Nishida 1996; Nishida and Hosaka 1996; Nishida

65 et al. 1995; Terio et al. 2011; Watts 2004), although only five cases of lethal violence
66 between adult males of the same community of wild chimpanzees have been
67 documented despite decades of detailed observation (*Sonso* community: Fawcett and
68 Muhumuza 2000; *Kasakela* community: Goodall 1992; *Mitumba* community: Mjunga
69 2010; Terio et al. 2011; *Mahale M-group*: Nishida 1996, 2011; *Ngogo* community:
70 Watts 2004). Of these, one was inferred from circumstantial evidence while three
71 were observed directly. In both the *Sonso* and *Ngogo* communities, the victim was a
72 low ranking, young adult male, while in Mahale's *M-group* and in Gombe's *Mitumba*
73 community, the victim was a deposed alpha male who was certainly (*M-group*) or
74 probably (*Mitumba*) low ranking at the time of the attack.

75 Here we provide the first report of lethal violence among wild chimpanzees in
76 which the victim was the incumbent alpha male and the first in which chimpanzee
77 aggressors used weapons (a stone and a branch), a finding that has important
78 implications for understanding of the abilities and proclivities of our hominine
79 ancestors.

80

81 **Materials and Methods**

82 The Mahale Mountains National Park is a 1,613 km² reserve located on the
83 eastern shore of lake Tanganyika (06° 15' S; 29° 55' E) in Tanzania, East Africa
84 (Nakamura 2012; Nishida 1990, 2011). This National Park is characterized by a
85 diversity of habitats, including semi-evergreen forest, montane savannah and bamboo
86 woodland (Nakamura 2012; Nishida and Uehara 1981). Here, the chimpanzee
87 community known as *M-group* has been studied intensively since 1975 (Nakamura
88 2012; Nishida 1990, 2011). At the time of the events reported here, group composition

89 was 10 adult males (≥ 16 years), 5 adolescent males (9-15 years), 2 juvenile males (5-
90 8 years), 4 infant males (0-4), 20 adult females (≥ 14 years), 10 adolescent females (7-
91 13 years), 5 juvenile females (3-6 years), 6 infant females (0-2 years).

92 As part of a broader study, aggressive interactions and grooming behaviours
93 were collected by SSKK from 8 adult males through long-day focal sessions
94 (Altmann 1974) between February and November 2011, giving a total of 397 hours of
95 observation.. Additionally, every 15 minutes, information on the identity of the adult
96 male partners within 10 m of the focal animal was recorded. Cases of between-male
97 aggression were also sampled *ad libitum* in order to calculate hierarchy linearity and
98 stability but these data were not used to estimate aggression rates. Male rank order
99 was determined using Elo-ratings derived from directed aggression (Albers and de
100 Vries 2001; Neumann et al. 2011) using R (v2.14) functions provided by Christof
101 Neumann (Neumann et al. 2011 & pers comm). Rank (in)stability was assessed using
102 the index S presented by Neumann *et al.* (2011) and implemented in the same R
103 functions. Values of S range between 0 and $2/\max(N_i)$ where N_i is the total number of
104 individuals present in consecutive days. Neumann *et al.* (2011) suggest S typically
105 ranges from 0 (stable) to 0.5 (unstable). Hierarchy linearity was calculated using
106 MatMan (ver. 1.1: de Vries, Netto and Hanegraaf 1993) through a matrix of the
107 outcome of all aggressive interactions (from both focal and *ad libitum* sampling).

108 In order to understand whether *PM* associated preferably with some male
109 partners, we used the *Dyadic association index* (DAI), which is calculated as follows:

$$110 \quad \text{DAI}_{ab} = \frac{\#ab}{\#a + \#b + \#ab}$$

111 Where $\#ab$ is the number of scan samples in which individual a was seen in
112 association ($< 10\text{m}$) with individual b, $\#a$ is the number of scan samples in which

113 individual a was not associated with b and #b is the number of scan samples in which
114 b was not associated with a (Nishida, 1968).

115 To investigate whether the alpha male adjusted his social interactions with
116 other adult males prior to his death, we used the Wilcoxon test to compare rates of
117 grooming and aggression of the months comprised between February-July 2011 with
118 those of the period August-September 2011.
119 Females were deemed cycling if they were seen with a sexual swelling during the
120 study period, and their reproductive status was assessed using a 3-point scale based on
121 the swelling size: I=no swelling; II= medium size; III=maximum swelling (Hasegawa
122 and Hiraiwa-Hasegawa, 1983).

123 The events reported here were witnessed by an experienced tourist guide
124 Mwiga M. Kaimbe (MMK), and the tourist chimpanzee trackers Matthias Nelson
125 (MN) and Hussein J. Mavumila (HJM). These witnesses each had between 5 and 10
126 years of experience with the chimpanzees of this community, and were able to
127 identify the group members individually. SSKK and SI interviewed each witness
128 independently within a week of the events and we have compiled their accounts. In
129 addition, we independently viewed a portion of these events on video taken by MMK
130 (the later part of the attack was not filmed).

131

132 **Results**

133 **Background information**

134 *PM* (*Pimu*, ‘*Pim*’ in Nishida, 2011; Inaba, 2009), alpha male of the M-group since
135 2007, after displacing *Alofu* (*AL*: Inaba, 2009), was killed by a coalition of four adult
136 males, from his own community on 2nd of October 2011. In addition to *AL* who had

137 been alpha male between 2003 and 2007 (Nishida 2011), in the group there were two
 138 former alpha males: *Fanana (FN)* who held the alpha status between 1997 and 2003,
 139 and *Kalunde (DE)* who was alpha male twice in the past, in 1991 and in 1996-1997
 140 (table 1: Nishida 2011).

141 A total of 150 directed aggressive interactions were collected between February and
 142 November 2011: 77 aggression before *PM*'s death and 72 after. In the two months
 143 prior to *PM*'s death, the adult male hierarchy was stable (stability index $S = 0.04$,
 144 where $0.00 = \text{stable}$), and the analysis of data on male-male aggressive interactions
 145 collected between May and September 2011 revealed a linear hierarchy ($h_1 = 0.54$; Kr
 146 $= 0.42$; $DC = 0.97$; $p = 0.05$). Table 1 shows the rank order of the male hierarchy prior
 147 to the killing of *PM*.

148

149

ID	Rank order	Years as alpha male	Age in 2011
PM	1	2007-2011	23
PR	2	-	20
AL	3	2003-2007	29
FN	4	1997-2003	33
OR	5	-	20
DE	6	1991, 1996-1997	48
CT	7	-	26
DW	8	-	23
BB	9	-	30
XM	10	-	16

150

151 Table 1. Rank order and age of the adult males of the M-group in the period when *PM*
 152 was killed.

153 A total of 103 grooming interactions between *PM* and the other males and 1405 scan
 154 samples were recorded. From these data it emerged that exchanged grooming bouts
 155 and associated more frequently with three males: *Bonobo (BB)*, *AL*, and *DE* (Table 2)
 156

ID PARTNER	Rate of grooming exchanged (min./hr observation)	DAI
<i>AL</i>	1.79	48.17
<i>BB</i>	1.33	59.19
<i>DW</i>	12.07	0.46
<i>OR</i>	42.13	1.16
<i>DE</i>	54.18	1.54
<i>XM</i>	0.17	4.02
<i>FN</i>	0.45	25.08
<i>PR</i>	8.02	0.43

157
 158 Table 2. Frequency of grooming exchanged and association index (DAI) between *PM*
 159 and the other male partners.

160
 161 Grooming between *PM* and the other males was not significantly different in these
 162 two months than in the preceding months (February-July: Wilcoxon: $z = -1.690$; $N =$
 163 8 ; $p = 0.091$) and *PM* did not significantly increase the frequency of aggression
 164 directed to the other males when comparing the two periods ($z = -1.859$; $N = 8$; $p =$
 165 0.063).

166
 167 *PM*'s death was preceded by a vicious fight between himself and the beta male
 168 *PR (Primus)*, which appears to have precipitated the attack.

169
 170 ***The first fight***

171 At around 10:00am, *PM* was in close association with two other adult males, *PR* and
172 low-ranking *CT* (*Carter*), part of a large party that was spread out with the other
173 males some distance away. Of the 10 adult males in *M-group*, only one, the 10th
174 ranked *XM* (*Christmas*), was not in the party. At 10:10, and again at 10:17, *PM*
175 charged at *PR* who, in both occasions, gave pant-grunt vocalisations (the stereotypical
176 vocalisation acknowledging subordinate status in chimpanzees; Nishida et al. 1999) to
177 *PM* and ran from him. At 10:44, *PM* and *PR* started grooming. They were joined at
178 10:46 by *VR* (*Vera*), an adult female with a new-born baby. *PM* started to groom her,
179 while *PR* continued to groom *PM*.

180 At 10:49, a second adult female (cycling but not swollen at that moment), *EF*
181 (*Effie*) approached the grooming cluster. At 10:51, during the grooming session *PM*
182 attacked *PR*, by biting his left hand. *PR* reacted by biting *PM* on his face. The two
183 males (*PM*, *PR*) started fighting – rolling, grappling with, and biting at one another –
184 while *VR* and *EF* tried to pull back *PR* and *PM*, respectively. During this fight, *EF* bit
185 *PM*, which gave the opportunity to *PR* to bite *PM* on the back. As a result of the fight,
186 both *PM* and *PR* received injuries that were obvious in the aftermath: *PM* had a big
187 cut to the right side of his head and his left hand, while *PR* had a similarly severe cut
188 on his left hand.

189 The fight lasted at least 35 seconds, after which, according to the witnesses,
190 *PR* broke away from *PM* and ran away towards the area where the other adult males
191 were located and loudly screamed for support from them. *MN* observed *PR* climbing
192 a tree near to four adult males: *AL*, *OR* (*Orion*), *DE* (*Kalunde*), and *DW* (*Darwin*). A
193 little farther away was the 4th ranked male *FN*. Once in the tree, *PR* was approached
194 by the low (9th) ranking adult male, *BB* (*Bonobo*). Three of these males had each held

195 alpha status in the past: *DE* (1991, 1996-1997), *FN* (1997-2003), *AL* (2003-2007)
196 (Nishida 2011). After *PR* climbed the tree, *AL* and *DE* charged at *PM*, and were
197 followed by *BB* and *OR*.

198

199 *Coalitional lethal violence*

200 By 11.00, *PR* had already left the party, and the gang attack on *PM* from the other
201 four males (*AL*, *DE*, *OR*, and *BB*) was underway. *PM* tried to run away, but soon these
202 four males surrounded him. *DW* and *FN* followed and attempted to support the alpha
203 male *PM* by directing threats to those attacking him, although to little effect. At 11:09,
204 *DE* was seen extending his arm towards *AL*, behaviour in chimpanzees that is
205 commonly associated with a request for support (Nishida et al. 1999). Apparently in
206 response, *AL* pushed *DW* and *FN* away, providing *DE* and the other two males, *OR*
207 and *BB*, with the opportunity to hit *PM*.

208 Soon after this, *FN* departed but *DW* continued, intermittently, to try to help
209 *PM*, in particular by attacking *DE*. Despite *DW*'s efforts, the other males kept
210 charging at and beating *PM*. Throughout, the attackers remained pilo-erect and in a
211 highly excited, aroused state. *PM* was periodically struck and bitten. *MN* observed *AL*
212 breaking a big piece of branch and using it to hold *PM*'s body down. *AL* was seen
213 grabbing *PM*'s hand and biting it. *DE* was also seen grabbing *PM*'s hand, and
214 dragging him. Moreover, apparently in order to prevent *PM* from running away, the
215 males bit his feet. *PM* may also have been seriously injured in his right arm, since he
216 failed to sit up and could only lean on his left arm (Fig. 1).

217 *Ca.* 45 min. after the start of the gang attack, an adult female (cycling but not
218 swollen at that moment), *NK* (*Nkombo*), who was in a nearby tree along with *CT*, was

219 heard screaming. Then, *NK* and *CT* came down and bit *OR*, apparently in order to
220 prevent him from hitting *PM*. Soon after, however, *AL* charged at them and they fled:
221 *NK* returning to the tree, probably wounded, while *CT* left the party.

222 HJM described how, at around 12:45, during a lull in the aggression and with
223 *PM* severely incapacitated, bleeding, beaten and unable to flee, *AL* performed
224 repeated undirected charging displays (a behaviour that male chimpanzees use to
225 exhibit their dominant position: Goodall 1986) for *ca.* 15 minutes. Afterwards, *OR*,
226 *BB*, *DE* and *AL* approached *PM*, who pant-grunted to *AL*. The four males attacked *PM*
227 again. It was at this time that *MN* saw *DE* striking *PM* on the back of the head with a
228 large stone held with both hands. Subsequently, *PM* tried to stand but he fell down.
229 This was the final attack, and *PM* was dead by 13:25.

230

231 *Post-mortem inspection and causes of death*

232 An examination of the wounds on *PM*'s body by SSKK & SI confirmed the witnesses'
233 account: there was a big hole on the nose and forehead (Fig. 2) caused by bites; the
234 hands and feet were full of wounds: on the heels, there were deep cuts (Fig. 3a), the
235 right index finger was almost severed (Fig. 3b) and on the left hand there was a large
236 gash, which might have come from the initial conflict with *PR*, going from the wrist
237 up to the palm. Furthermore, there were many lacerations on the mouth, on the back
238 (especially on the lower back, around the anus) and on the testicles. In contrast, the
239 attackers suffered few wounds: in addition to *PR*'s injury to his left hand sustained in
240 the first fight, *AL* had a cut on the back of his left knee.

241

242 **Discussion**

243 We report the first observation of coalitional, intra-community, lethal violence in
244 chimpanzees in which the victim was an incumbent alpha male. We also provide the
245 first report of weapon-use in intra-specific violence in chimpanzees, with the use of a
246 large stone to deliver what may well have been the killing blow.

247 This coalitional attack, if not the lethal violence, is probably best explained as
248 an opportunistic challenge for social dominance by *AL*, who was alpha male before
249 being displaced by *PM*. The fight between alpha male *PM* and beta male *PR*, which
250 resulted in obvious wounds for both, may have created a situation that the third-
251 ranked *AL* was able to exploit. This view is supported by the lack of any clear
252 indication that *PM*'s position as alpha male was under imminent threat prior to the
253 attack.

254 *PM* did, however, direct more aggression towards *PR* (0.21/hr) than any other
255 male (average rate: 0.06/hr) suggesting that *PR*, as beta male, represented a threat to
256 which *PM* had to respond. Intriguingly, three weeks before his death *PM* was forced
257 to seek refuge in a tree in the face of coalitional aggression by *DW* and *PR* that was
258 apparently provoked by screams from the fully swollen adult female *LD* (*Linda*),
259 whom *PM* was harassing (*sensu* Clutton-Brock and Packer 1995).

260 The fight between *PR* and *PM* reported here could be regarded as an attempt
261 by *PR* to seize alpha rank: from the result, they seemed fairly well matched; while *PR*
262 fled and we ascribed the 'win' to *PM*, it was not convincing. *PR* had not, however,
263 shown any prior indication of intent to challenge for alpha male, as has sometimes
264 been seen in this community (withholding pant-grunts, or increasing grooming
265 interactions before launching an attack: Inaba 2009), so his aggression may simply
266 have been retaliation to the violent attack by *PM*, rather than an explicit challenge for

267 social rank. After the fight, *PR* was not seen in the company of other chimpanzees for
268 almost a week, and may have been fearful of further aggression from *PM* if he was
269 unaware of the subsequent coalitional violence. His narrow loss to *PM*, along with the
270 costly nature of the fight to both participants, seems to have created an opportunity
271 that *AL* exploited. Following the attack, although the hierarchy was thrown into a
272 period of instability (for the month following, stability index $S = 0.14$), *AL* seized
273 alpha status and held this after *PR*'s return.

274 *DE*, slayer of *PM* and *AL*'s coalition partner in the attack, was in his late 40's
275 (~48 yrs) at the time of these observations. He has a long 'political' history in *M*-
276 *group*. He was twice alpha male himself, displacing *NT* (*Ntologi*) in 1991 and
277 replacing *NS* (*Nsaba*) who disappeared in 1996 (Nishida 1996, 2011). *DE* has
278 repeatedly shown 'allegiance fickleness', both in challenging and supporting the
279 current alpha male, through which he has been able to maintain a higher status for
280 himself in the community than would otherwise be the case (Nishida 2011). While it
281 may be no more than coincidence, when *DE* was alpha male he led two vicious, but
282 non-lethal, coalitional attacks on the adult male *JJ* (*Jilba*) and attempted to mount a
283 similar attack on the deposed *NT*, although this failed as *NT* escaped (Nishida 2011).
284 In the months prior to *PM*'s death, *DE* had been exchanging 73% of his grooming
285 with the three top-ranking males (*PM*, *PR*, *AL*) which was significantly higher than
286 the grooming exchanged with the other males (Mann-Whitney: $U = 21$; $N_1 = 3$; $N_2 =$
287 6 ; $p = 0.014$), while *PM* was *DE*'s main supporter against the other males (Kaburu
288 unpublished data). Given *DE*'s history, however, it is no surprise that he involved
289 himself with the attack on *PM* and supported *AL* against his erstwhile ally.

290 As with other accounts of within-community lethal violence, the attack on *PM*
291 by four adult males resembles inter-community attacks, notably in the intensity of the
292 violence and the use of overwhelming force. The Imbalance of Power hypothesis
293 (Bygott 1979; Manson and Wrangham 1991; Wrangham 1999) posits that with
294 sufficient numbers, which in chimpanzees seems to be four attackers to a single
295 victim (Newton-Fisher and Emery Thompson in press), costs to attackers are very low
296 and they are able to engage in intense violence with little risk to themselves. Lethal
297 violence in inter-community aggression is thought to yield benefits by slowly
298 reducing the relative coalitional power of neighbouring groups, thus increasing the
299 probability of winning future encounters (Boone 1991; Wrangham 1999, 2006), which
300 in turn may allow territorial expansion (Crofoot and Wrangham 2010; Mitani, Watts
301 and Amsler 2010).

302 The benefits of lethal violence within communities are less clear. Males in the
303 same community are rivals for reproductive opportunities, so tolerance for rivals
304 should be conditional on the fitness benefits that coalitional partners confer. When
305 threats from neighbouring communities are low, as may be the case at present for *M-*
306 *group* chimpanzees (although the disappearance of 15 individuals in 1995/6 remains
307 unexplained: Nishida 2011), there may be less constraint on the use of violence in
308 within-community aggression and the loss of an individual male may not be
309 particularly costly to those who remain.

310 In the incident we report here, the four attackers were able to exert intense and
311 ultimately lethal aggression despite the presence of allies for the victim. At least
312 initially, *PM* received support from two males, one of whom was a previous alpha
313 male and still outranked three of the attackers. Unlike in confrontations between

314 communities, the interests of males involved in within-community contests may
315 rarely coalesce entirely and defenders have to balance the benefits they might gain
316 from allying with a victim against the risk of becoming a new target for an aggressive
317 coalition's violence: a coalition of at least four adult males may therefore be a difficult
318 force to stop in such situations. It may be that the absolute size of the attacking
319 coalition is more important than the ratio of attackers to victim(s).

320 The escalation of violence beyond that necessary for *AL* to defeat *PM* remains
321 difficult to explain. The attackers, in particular *DE*, seemed intent on ensuring his
322 death: *PM* had pant-grunted to *AL*, thus acknowledging that he had lost, and he may
323 have died from his injuries in any event. Although some other accounts of lethal
324 violence suggest planning, or 'revenge' (e.g. the previous case from Mahale, the death
325 of *NT*: Nishida 2011), it may simply be that the pressures and fitness consequences of
326 aggressive territoriality have resulted in male chimpanzees being adapted to exploit
327 lethal violence whenever individual interests coalesce and they are able to achieve the
328 necessary imbalance of power. To facilitate this, they may possess a psychological
329 threshold related to the level of violence performed or the degree of wounding in the
330 victim, beyond which they cannot control the intensity of their aggressive behaviour
331 regardless of the behaviour of their victim (Watts 2004).

332 This episode also raises interesting questions regarding the evolution of
333 weapon-use in human conflicts. To date, there is little evidence regarding when
334 hominines started employing simple objects, such as stones and branches, as weapons
335 to kill or maim conspecifics although anatomical evidence suggests that the ability to
336 handle objects for throwing and clubbing might have evolved early (Young 2003).
337 While chimpanzees will incorporate objects into displays of dominance (Goodall

338 1986; McGrew 1992), and have been reported to use spear-like sticks for extractive
339 hunting of small mammals (Nakamura and Itoh 2008; Pruetz and Bertoni 2007),
340 they typically rely on their sharp teeth to inflict wounds in violence against other
341 chimpanzees (Wilson, Wallauer, and Pusey 2004; Wrangham 1999, 2006). The use of
342 a branch and a stone in the killing of *PM* demonstrate that chimpanzees have at least
343 rudimentary ability to use objects as weapons, although further observations are
344 needed to clarify to what extent this observation represents more than the
345 idiosyncratic behaviour of a particular adult male.

346 Nevertheless, the case reported raises the possibility that the use of objects as
347 weapons may be a shared trait for chimpanzees and humans, perhaps linked to a
348 general tendency to engage in lethal violence. Early hominines, with smaller and less
349 effective canines than extant chimpanzees, might have used similar weapons to a
350 greater extent than heretofore realised. If these hominines were also engaged in lethal
351 coalitional aggression, then the usefulness of weapons in such contexts may have
352 driven the development of deliberate crafting of such tools.

353

354

355

356

357 **Figure legends**

358 Fig. 1 *PM* (right hand side) is sitting, leaning on his left arm, surrounded by 5 males.

359 Individuals facing the cameras are *AL* (on the left) and *DE* (on the right). Males

360 turning with backs to the camera are from left to right: *BB*, *OR* and *DW* (Photo by

361 Jennifer Scott).

362

363 Fig. 2 *PM* severely injured in his face: He displays a big hole on the front and cut on

364 the right hand side of the face (Photo by Jennifer Scott).

365

366 Fig. 3 *PM* received a high number of injuries, among which, (a) his heels were bitten

367 in order to prevent him from running away and (b) his right index finger was almost

368 cut off (Photo by Stefano Kaburu).

369

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473 **Footnotes**

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