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Cover Page Footnote
Our studies were supported by a fellowship [to MPK] from the MacArthur Foundation, Chicago (USA), and conducted with permission from the Zimbabwe Department of National Parks & Wild Life Management, and "Touch-the-Wild" safari company. We thank these organizations for their support and assistance. This paper was reviewed by Gary Haynes.

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EDITORS' NOTE: For many years Dr. M. Philip Kahl had studied avian behavior, and only recently has he been devoting his time to observing elephants. We take this opportunity to welcome the utilization of his talents.

VISUAL AND TACTILE DISPLAYS IN AFRICAN ELEPHANTS, *LOXODONTA AFRICANA*: A PROGRESS REPORT (1991-1997)

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INTRODUCTION

Being highly social animals, elephants use a variety of methods to send messages to one another and to other animals (including humans) in their environment. Auditory, olfactory, visual, and tactile signals all appear to be important in the social life of elephants. Considerable recent research has focused on auditory communication — particularly infrasounds of elephants, e.g., Payne (1989, 1992), Payne *et al.* (1986), Langbauer *et al.* (1989, 1991), Poole (1988), Poole *et al.* (1988), and some on olfactory signals — mainly with captive elephants (e.g., Rasmussen, 1995; Rasmussen and Schulte, 1996; Rasmussen *et al.*, 1982, 1996; Wheeler *et al.*, 1982) — but fewer systematic studies have been carried out on their visual and tactile social signals (e.g., Douglas-Hamilton and Douglas-Hamilton, 1975; Moss, 1982, 1988, 1992; Poole, 1987; Poole and Moss, 1981). This is surprising, since these displays are conspicuous and easier to detect without the use of specialized equipment or techniques.

Visual and tactile signals of the African elephant are present in a surprisingly large variety. The aim of the current project is to compile an "ethogram" of the visual and tactile repertoire, with special reference to the *Loxodonta africana* population in northwestern Zimbabwe.

Field work in southern Africa began in May-August 1991 and continued during five consecutive seasons (June-September 1992; September 1993-February 1994; December 1994-March 1995; September-December 1995; and February-March 1997; cf. Fig. 1).

RESULTS

During six field-seasons, totaling 24 months, we have gathered approximately 700 rolls of 35 mm film (i.e., 20,000± color-slides), 226 hours of video-tape, and 1400± pages of written-notes on elephant behavior. Most of these data were gathered in Hwange National Park, Zimbabwe, and in the adjacent Hwange Estate; short-term observations were also made on elephants in Chobe National Park, Botswana, Kruger National Park, South Africa, and Addo elephant National Park, South Africa.

From our observations and filming — plus a growing familiarity with the published literature on elephant behavior — we have, to date, identified, named, and partially described a total of approximately 83 ritualized visual and tactile social displays (Table 1) in the African elephant. This tentative compilation will change as displays are added, eliminated, and combined.

Table 1. Possible visual and tactile displays in African elephants, *Loxodonta africana*, with abbreviations used in field notes in southern Africa.

Abbreviation	Meaning	Abbreviation	Meaning
AdvT	Advance-Toward	MP	Mating-Pandemonium
BackT	Back-Toward	MusW	Musth-Walk
BN	Bow-Neck	Paw	Pawing
Caress	Caress	PS	Periscope-Sniff
Chase	Chase	Pursuit	Pursuit
Consort	Consorting	Push	Pushing
CT	Chin-Tuck	PW	Parallel-Walk
DChg	Demonstration-Charge	Ram	Ramming
DFA	Distant-Frontal-Attitude	RChg	Real-Charge
DisF	Displacement-Feeding	RedAg	Redirected-Aggression
DisG	Displacement-Grooming	REF	Rapid-Ear-Flap
EF	Ear-Flap	Reject	Reject-Nurse
EFlat	Ear-Flatten	RetF	Retreat-From
EFld	Ear-Fold	RH	Reaching-High
EFS	Ear-Flap-Slide	RP	Rump-Present
ES	Ear-Spread	RunA	Run-Away
EstW	Estrous-Walk	Shep	Shepherding
EW	Ear-Wave	Slap	Slapping
ExW	Exaggerated-Walk	Spar	Sparring
FlopRun	Floppy-Run	ST	Standing-Tall
Freeze	Freeze	Sway	Swaying
FS	Foot-Swing	TEar, etc.	Touch-Ear/-Brow/etc.
FTrS	Forward-Trunk-Swish	TestD	Test-Dung
GChg	Group-Charge	TestGen	Test-Genitals
GD	Group-Defense	TestTG	Test-Temporal-Gland
GraspT	Grasp-Tail	TestU	Test-Urine
HdL	Head-Low	ThrD	Throw-Debris
HdN	Head-Nod	TrB	Trunk-Bounce
HdS	Head-Shake	TrC	Trunk-Curl
HdT	Head-Toss	TrE	Trunk-Extension
HdW	Head-Wag	TrS	Trunk-Sucking
IGC	Intense-Greeting-Ceremony	TrTM	Trunk-To-Mouth
KB	Kick-Back	TrTw	Trunk-Twining
KD	Kick-Dust	TR	Tail-Raising
Listen	Listening	TS	Tail-Swat
LookB	Look-Back	TTG	Touch-Temporal-Gland
Mark	Marking	TurnA	Turn-Away
M-M Chase	Male-Male Chase	TurnT	Turn-Toward
M-M Caress	Male-Male Caress	Tusk	Tusking
M-M Mount	Male-Male Mounting	UD	Urine-Dribble
M-M TestGen	Male-Male Test-Genitals	Wary	Wariness
Mount	Mounting		

Notes: Some of these displays were described in the literature; others are original.

Figure 1. One of the authors with a couple of "friendly" bulls [Kanando Pan, just outside Hwange National Park, Zimbabwe; 15 February 1995, photo by B. Armstrong]. Editors' note: readers are warned not to approach elephants closely (especially not on foot), for they are known to attack "without provocation".

Future plans: Now that the African field-portion of the study is complete, we will analyze the data, primarily from video-tapes. Starting in late 1999, we plan to begin a comparative study of the behavior of the Asian elephant in Sri Lanka.

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Our studies were supported by a fellowship [to MPK] from the MacArthur Foundation, Chicago (USA), and conducted with permission from the Zimbabwe Department of National Parks & Wild Life Management, and "Touch-the-Wild" safari company. We thank these organizations for their support and assistance. This paper was reviewed by Gary Haynes.

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