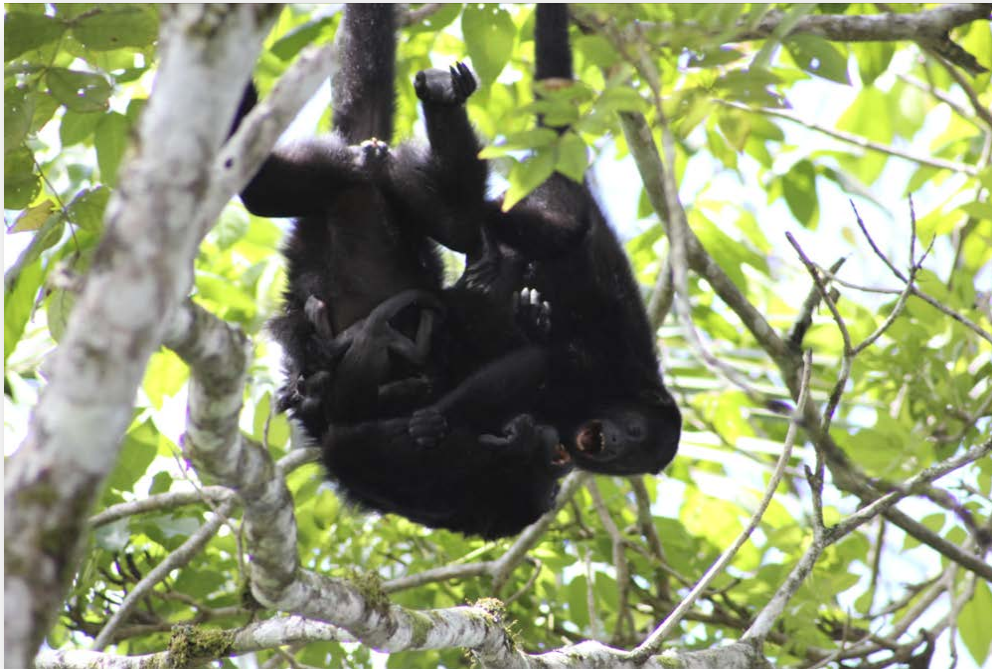


# An ethogram for the social behavior of adult *Alouatta palliata mexicana* and *A. pigra*

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Two adult black howler monkeys (*Alouatta pigra*) playing (Photo by Arturo González Zamora).

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## Brief description

This ethogram was developed during studies of free-ranging individuals of the two howler monkey taxa that live in southern Mexico, the mantled howler monkeys (*Alouatta palliata mexicana*) and the black howler monkeys (*A. pigra*). Our studies have been ongoing for the last 16 years at Los Tuxtlas (Veracruz) and Campeche.

This ethogram extends previous behavioral lists and ethograms of these species published by us (Dias 2002; Dias et al. 2009; Rangel-Negrín et al. 2012) and includes behavioral categories described in detail in the literature (Brockett et al. 2005; Dias et al. 2008).

This is an ethogram of the social interactions exchanged between adult individuals, defined as when the presence or behavior of one individual is directed toward another or affected the behavior of another individual (Whitehead 2008). It does not include vocalizations as we have not studied them. We present a combined ethogram as we have observed most behavioral categories in both species. When a category was observed in a single species, we note so (APM = *Alouatta palliata mexicana*; API = *A. pigra*).

If you are interested in extending this ethogram with your own data, please contact us (pdias@uv.mx).

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**Affiliative behaviors:** behavior or set of behaviors that favor group cohesion.

1. Hug (*Abrazo*): contact that happens when the actor places its arms around the body of the receiver. This behavior may or may not be reciprocal.
2. Hug with tail (*Abrazo con la cola*): contact that happens when the tail of the actor surrounds the body of the receptor.
3. *Grooming (Acicalamiento)*: the actor touches with its hands some part(s) of the body of another individual, splitting delicately apart the hair, and with visual attention.
4. *Allogrooming (Aloacicalamiento)*: the actor touches with its hands some part(s) of the body of another individual, splitting delicately apart the hair, and with visual attention. Reciprocal behavior, because the actor is also receptor of the same behavior.
5. *Play face (Cara de juego)*: fast and repeated head movements, exposing the teeth.
6. *Greeting ceremony (Ceremonia de saludo)* [APM]: in the first stage, one of the participants—or both—approaches its partner, and both males start emitting vocalizations that are specific to this behavior [mostly throat rumbling and clucking; Wang & Milton, 2003]. If one of the males is sitting, he adopts a quadruped posture and waits until body contact is established. In the second stage, while standing in a face-to-face posture, males grab each other's shoulders with one hand, while sniffing the opposite armpit. Throughout this stage males keep producing the same vocalizations. In stage three, males proceed to a mutual rump-to-face position and sniff each other's genitals. Finally, in stage four, males either move away from each other or engage in other social interactions.
7. *Contact (Contact)*: the actor places some part of its body touching another individual, and stays in this position for 5 seconds or more.

8. *Chest contact (Contacto pechos)*: the actor places its chest in contact to the chest of another individual. This can be done for variable length of time, but always more than five seconds.
9. *Inviting to groom (Invitación al acicalamiento)*: the actor approaches towards an individual, approaching its back or another part of its back. The receptor may groom or ignore.
10. *Invitation to play (Invitación al juego)*: the actor approaches another individual reaching with its hand(s) or leg(s), and /or doing rapid movements. This can include jumping towards an individual, touching, and/or “play face”. The receptor may accept and play, or ignore.
11. *Play (Juego)*: two or more individuals interact with rapid movements, having physical contact through touching, biting and chasing, without harming or wounding its play mates. This behavior can occur while the individuals are hanging from the tail or legs, or sitting or standing on the branches. This behavior may even occur when an individual is on top of another individual.
12. *Finger play (Juego dedos) [API]*: two individuals have hands together, and mutually move and touch their fingers. Both individual’s eyes are focusing on the hands. This behavior occurs for a variable time, but it should last longer than 5 seconds.
13. *Hand holding (Manos estrechadas) [API]*: two individuals remain with their hands together, with either fingers or only the palms clasped. The duration of this behavior is variable, but it should happen for longer than 5 seconds (Brockett et al. 2005).
14. *Mount (Monta)*: an individual climbs on top of another individual (either dorsally or ventrally).
15. *Scratching (Rascado)*: the actor repeatedly moves its hand in one area of the receptor’s body. It does not require visual attention.
16. *Touching (Toques)*: instantaneous contact (less than 5 seconds) of any body part of the actor to any body part of the receptor.

*Touching with one hand (Toque con la mano)*: the actor touches with one of its hands (for less than 5 seconds) any part of the body of the receptor. Touching with hands has been registered for the following body parts: arm pit, mouth, arm, head, tail, neck, genitals, shoulder, back, hand, foot.

*Touching with two hands (Toque con las dos manos)*: the actor touches with both hands (for less than 5 seconds) any part of the body of the receptor. Touching with two hands has been registered for the following body parts: arms, two hands, one hand, back.

*Touching with the mouth (Toque con la boca)*: the actor briefly touches with its mouth (for less than 5 seconds) any part of the receptor's body. Touching with the mouth has been registered for the following body parts of the receptor: mouth, back, breast, face, and hand/arm.

*Touching with the tongue (Toque con la lengua)*: the actor briefly touches with its tongue (for less than 5 seconds) any part of the receptor's body. Touching with the tongue has been registered for the armpit and the face of the receptor.

*Touching with the tail (Toque con la cola)*: the actor briefly touches with its tail (for less than 5 seconds) any part of the receptor's body

*Head to head touching (Toque cabeza-cabeza)*: the actor briefly touches with its forehead (for less than 5 seconds) the receptor's forehead.

*Touching with the foot (Toque con la pata)*: the actor briefly touches with its foot (for less than 5 seconds) any part of the receptor's body. Touching with the foot has been registered for the face and the shoulder of the receptor.

**AGONISTIC BEHAVIOR:** behavior or set of behaviors observed in competition context. It includes behaviors that produce wounds and those that do not have physical contact, such as threat or supplantation. It also includes submissive and appeasing behaviors that are aimed at avoiding conflict.

17. *Slapping (Manotazo)*: the actor slaps with its open hand any part of the receptor's body.
18. *Punching (Puñetazo)*: the actor hits with its closed hand any part of the receptor's body.
19. *Chasing (Persecución)*: the actor approaches another individual who quickly leaves. The actor keeps moving towards the receptor for some time (variable) or distance.
20. *Fight (Lucha)*: includes a number of pushing, slapping, punching and/or biting acts.
21. *Approach/retreat (Aproximación/alejamiento)*: the actor approaches the area occupied by another individual without threatening, and the receptor changes its place with respect to the actor. This behavior is classified based on the response of the receptor.
22. *Charge (Aproximación rápida)*: the actor approaches quickly to the area occupied by another individual, threatening, and the receptor changes places with respect to the actor. The difference between this behavior and "chasing" is that this interaction ends when the receptor changes its place.
23. *Supplantation (Suplantación)*: the actor approaches the area occupied by another individual, without threatening, and the receptor changes its place with respect to the actor. The actor then occupies the spot abandoned by the actor.
24. *Blocking (Impedir progression)*: the actor places itself in front of the receptor, blocking its way. The actor faces the receptor and may re-orient its body towards the receptor's movement direction and surrounds it.

25. *Threat (Amenaza)*: the actor shakes and/or breaks branches looking towards the receptor. This behavior may happen together with vocalizations and/or short charging (important to note if other recipient leaves area or not/ignore).
26. *Pushing (Empujar)*: the actor pushes the receptor.
27. *Bite (Mordida)*: the actor bites some part of the receptor's body.
28. *Agonistic support (Apoyo agonístico)*: the actor interacts agonistically with two other individuals whom are having an agonistic interaction themselves. The actor supports one of these individuals.



**Submissive and appeasement behaviors:** submissive behaviors aim at avoiding conflict between individuals.

29. *Submissive position for actor (Posición sumisa-actor):* the actor, looking towards the receptor, lays on its chest as if it were cowering (it may include scared face –see below).
30. *Submissive position for receptor (Posición sumisa-receptor):* the receptor shrinks its shoulders and body, looking smaller. It may include facial expression with the mouth and eyes wide open. It may happen with low vocalizations. This behavior is only presented by receptors.
31. *Avoiding (Evitar):* the actor goes away from the receptor, but the receptor does not show any behavior as a response.
32. *Flee (Huir):* when facing an attack or threat the receptor quickly flees from the actor. This behavior is exclusive of the receptor.
33. *Scared face (Cara de miedo):* the individual raises the eyebrows, widely open its eyes and retract its lips slightly showing its teeth. This facial expression may be accompanied by moving its head downwards.

## Sexual behaviors

34. *Lingual display (Lengüeteo)*: quick and rhythmic movements of the tongue, in and out of the mouth in the direction to an individual of the opposite sex, often while staring.
35. *Presenting (Presentación)*: a female directs her perianal area towards the male. Sometimes the female does repeated sighting towards the male and make the lingual display. Sometimes, the female arches her body (rising the rump area and lowering her back and belly) while presenting.
36. *Inviting to copulation (Invitación a la cópula)*: a sequence of “presenting” and “lingual displays” towards a male. This behavior may include touching with hands to the face of the male, sniffing genitals, touching with mouth, and touching with tongue.
37. *Complete copulation (Cópula completa)*: the male mounts the female dorso-ventrally, inserting his penis in the female’s vulva. This behavior includes pelvic thrusts and a post-ejaculatory pause.
38. *Incomplete copulation (Cópula incompleta)*: the male mounts the female dorso-ventrally, inserting his penis in the female’s vulva. This behavior may or may not include pelvic thrusts. There is no post-ejaculatory pause.
39. *Sniffing genitals (Olfateo genitales)*: the actor approaches its nose towards the genitals of another individual, without physical contact. Sometimes female lets out drops of urine that the male may smell or taste. Note this.
40. *Touching tongue-genitals (Toque lengua-genitales)*: the male briefly (less than 5 seconds) touches the vulva of the female; or, a female licks the testicles and/or penis of the male.
41. *Touching tongue-tongue (Toque lengua-lengua)*: the actor briefly (less than five seconds) touches with its tongue the tongue of an individual of the opposite sex.

42. *Complain (Reclamo)*: this behavior occurs after an ignored invitation to copulation. The female pulls several times the hand of the male and emits high pitch vocalizations, and goes away from the male.
43. *Interfering in ongoing copulation (Interferir en cópula)*: a male places its body between a couple that is copulating. This male may also pull or push the other male.

**Other behaviors with social connotation**

44. *Rubbing urine (Frotar orina)*: the actor urinates on a branch and rubs its urine with its hand. It may slash itself or another individual. Excludes female urination in sexual context.
45. *Marking (Marcaje)*: the actor rubs its perianal area, chin (in the case of males) or arm pits on the branches.
46. *Sniffing (Olfateo)*: the actor approaches its nose toward any part of the body of another individual without making physical contact. Important to record when it is sniffing testicles between or among males, but this category excludes sniffing of female genitals in sexual context.
47. *Ignore (Ignorar)*: this behavior consist in diverting the face or eyes away from, or turn its back to the actor. It only occurs in the receptor as a response to invitations (play, copulation, grooming). It also can occur as a response to a threat.

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