1 Communication

The position of the ears and tail, and the overall posture, are most indicative of the animal’s immediate intentions. Flehmen (tonguing and gaping in carnivores) and the vomeronasal organ function in sexual behavior are discussed. Visual communication is an aid to understanding animals, but both vocal and olfactory communication can be problems.

INTRODUCTION

Communicating with animals, in particular, learning to understand the messages the animal is sending, is the most important part of diagnosis. Communication is a vital part of animal husbandry and the art of veterinary medicine, and a very useful adjunct to the science of veterinary medicine. Before ordering a complete blood count and liver function tests, the astute clinician will already know that a dog is suffering from abdominal pain because it assumes an abnormal posture with rump high and head low, or that a horse that paces in its stall and kicks at its belly is suffering from colic.

Another important aspect of communication between veterinarian and patient or between handler and stock is assessment of an animal’s emotional state or temperament. Adequate restraint or, preferably, a quiet, tractable patient is necessary for thorough examination and diagnosis. Most practitioners learn eventually to recognize animals that will be aggressive or fearful and, therefore, require tranquilization, muzzling, or more stringent methods. It would be helpful for agriculture and veterinary students to learn in advance how to recognize animals’ moods. Learning by experience to recognize behavior problems may occur at the expense of a badly bitten hand or kicked leg. For their own safety, as well as for acuity of diagnosis, clinicians should learn to listen to and watch for the messages their patients are transmitting both to them and to each other. Farmers can prevent injury to themselves and to their stock if they can interpret the animals’ messages.

Communication between animals and humans occurs frequently, especially between dogs and their owners and cats and their owners. Dogs can respond to pointing by choosing the correct container, and it is not surprising that trained working gun dogs are better than pet gun dogs. Horses are more limited in their ability to interpret human gestures. Of the four horses tested, three could respond to touching the correct bucket out of two; in one test, only one horse responded to pointing by approaching the correct bucket. In another test, horses did respond to pointing by approaching one of two buckets, if the pointer was close to the bucket or the pointing gesture was longer than a second but only if the pointing gesture was sustained (dynamic). Goats rival dogs in their ability to follow human pointing and gazing.
Dogs and cats can determine where hidden food is when a person indicates the hiding place by pointing to it momentarily or dynamically from as far away as 80 cm. When the animals knew where the food was, but could not reach it, dogs were more likely to look at the owners sooner and for a longer time than cats. Dogs owned by blind people apparently do not realize that the owner is blind because they also look at unobtainable food, then at the owner, then at food, but they add a sound, noisy mouth licking (licking their chops). Dogs will watch a human (owner or stranger) searching for, manipulating, and eating a hidden treat longer than they watch familiar dogs. They spend the least time observing feeding behavior. A single dog has been trained to use arbitrary signs to communicate. She would press a striped symbol for a walk, a toy, or water. Best of all, she would touch a sheet of newsprint to signal that she wanted access to her urination area. Despite their ability to communicate with humans, dogs do not seek help for their owners in an emergency situation such as when the owner has a heart attack or when the owner is pinned under a bookcase.

Animals communicate not only by auditory signals, as humans do, but also by visual and olfactory signals. Many olfactory messages cannot be detected by humans, although male pheromones, such as those contained in the urine of tomcats and the very flesh of boars and billy goats, are quite discernible to humans. We are all aware of vocal communication by animals, but many of these calls remain to be decoded. It is the visual signals made by ear, tail, mouth, and general posture that are of most benefit in gauging the temperament and the health of the patient.

**PERCEPTION**

**Vision**

**Acuity**

Communication in animals depends on their ability to perceive messages. The sensory abilities of domestic animals, with the exception of dogs and cats, have not been studied systematically. The perception of animals is almost always compared with that of humans. Dogs and cats have a higher critical flicker fusion (point at which a flickering light appears to be fused, or a steady light) than humans, which means that dogs and cats can see television, but in some cases the image may appear jerky to them. Cats respond to television especially rapidly moving animate (mice, birds) or inanimate objects (balls) and will spend 6% of their time watching the screen. Cats can discriminate illumination at one-fifth the threshold of humans, but their resolving power is only one-tenth that of humans. Cross-eyed Siamese cats do not have stereoscopic vision; other cats do.

Environmental conditions affect visual acuity. Free-ranging cats have been shown to be hypermetropic, whereas caged cats are myopic. The visual acuity of cattle, measured by using a closed or partially opened circle at various distances from the cow, is inferior to that of humans. Bulbs have fairly poor vision; they are able to discriminate a 36-cm solid black disc from a similar disk with a white center if the center was 1 cm or larger and the bull was within 1.5 m. This indicates a visual acuity of only 23°, similar to the horse (23°) or the dog (10°). In some studies, pigs have been found to have poorer visual acuity than cattle—a hundredth or a thousandth of a humans. In the Snellen system, humans have 20/20 acuity whereas horses have 20/30, dogs have 20/85, and cattle or pigs 20/200 acuity. This means that what a person could see from 200 feet would have to be within 20 feet for a bull to see. Cattle can discriminate objects at 2 lux of illumination. Cattle are also poorer in brightness discrimination than are humans. They have a brightness discrimination threshold of 66 lux in bright light and 4.8 lux in dim light, whereas humans have discrimination thresholds of 105 and 4.2 lux.
see in dimmer conditions than humans, they can make visual discrimination at a level of light equivalent to the illumination in a dense forest on a moonless night.\textsuperscript{753} An important question is, “Do all people look the same to animals, that is, can an animal tell the difference between people?” The answer is definitely yes. Pigs can tell people apart, even if olfactory cues are masked, on the basis of visual cues such as height and facial appearance. They can even distinguish humans apart in dim (20 lux) light.\textsuperscript{1042} Cattle recognize people by their faces or the color of their coveralls, and use height to discriminate between people.\textsuperscript{1383,1671} Sheep can recognize faces of other sheep and differentiate them on the basis of photographs. They can remember at least 25 different sheep faces for more than a year. In addition, they are able to recognize human faces, even faces of those they have not seen for many months.\textsuperscript{999} Dogs associate their owners, voice with their face and when a strange voice is played while the owners picture is displayed the dogs gaze longer indicating that their expectations had been violated.\textsuperscript{4} All people do not look the same to sheep, cattle, dogs or pigs, and probably this is true of most domestic animals. Therefore, the animals can remember who has treated them well or painfully.\textsuperscript{1382}

\textit{Color vision}

A question often put to a behaviorist is whether animals have color vision. All species of domestic animals have been shown to possess color vision in that they will make discriminations based on color, but color probably is not as relevant to these animals as it is to birds, fish, and primates. For example, teaching cats to discriminate between colors is very difficult, although they learn other visual discriminations with ease and have two types of cones that absorb green and blue. Nevertheless, cats,\textsuperscript{1406} dogs,\textsuperscript{723} cattle,\textsuperscript{419,688} pigs,\textsuperscript{1036,1406,1407} goats,\textsuperscript{298} and sheep\textsuperscript{1381} can all make discriminations based on color alone. Color vision in domestic animals is not identical to that in humans. In the most carefully conducted studies, dogs appear to see the world not in shades of gray but rather in shades of violet, blue, and yellow. Their vision is similar to that of color-blind or dichromat humans, who see the green light as pale yellow, the yellow as yellow, and the red as dark yellow.

Ruminants can discriminate medium and long wavelengths (yellow, orange, and red) better than they can short wavelengths (violet, blue, and green). Cattle can discriminate red from blue and green but have difficulty discriminating green from blue. Animals can not only perceive colors but also be influenced behaviorally by color. For example, calves are more active in red light and less startled by loud noises in green light.\textsuperscript{1508} Bulls, indeed, can perceive the matador’s red cape.\textsuperscript{1607} Horses can discriminate red from blue but some horses have difficulty distinguishing green or blue green (wavelength 480 nm) from gray.\textsuperscript{327,389,1202,1513,1782} It may be easier to teach horses to discriminate colors if the stimuli are presented on the ground rather than at nose level. Color may be a more important feature of the equine environment than previously thought because horses do not habituate to objects of different colors and shapes, but do habituate if all the objects are the same color. Apparently, one blue blob is similar enough to another blob that the horse realizes it is not a threat.\textsuperscript{553} Some colors—blue, black, white and yellow—cause more reaction when the horse encounters them on the ground than others—brown, green, red, and gray.\textsuperscript{745}

\textit{Monocular and binocular vision}

Eye placement in the skull also affects vision. Horses have eyes set quite laterally and can, therefore, see to the side and far to the rear. They cannot see well right in front of their heads. Lateral vision is necessarily monocular, and horses see binocularly only in the 70° directly in
front of the head. Contrary to many popular and scientific sources, horses do not have a ramped or slanted retina; the retina is similar to that of other animals. Figures 1.1 and 1.2 illustrate the fields of vision of the cat and horse, respectively. The binocular overlap (areas where the horse is viewing objects with both eyes simultaneously) is down the nose and not straight ahead.

Horses can see clearly with their heads lowered, contrary to popular belief. They do so by adjusting their eyeball to a horizontal position.

When the horse lowers its head, the binocular field is directed toward the ground for grazing and the monocular fields are in position to scan the horizon. When the head is raised with the nose pointing forward, the horse uses the binocular field (both eyes) to scan the horizon, and the monocular (single eye) lateral vision becomes limited.
Audition

Acuity

In hearing, as in vision, cats and dogs appear to perceive more than humans. Humans can hear 8.5 octaves; cats can hear 10. Cats have 40,000 cochlear fibers and humans have 30,000, although the range of hearing in cats is only 1.5 octaves greater than that of humans because higher frequency detection requires a disproportionate increase in cochlear nerve fibers; the number of fibers needed per octave is not constant but, rather, rises with the rise in frequency. Cats, despite their mobile pinnae, can discriminate between sounds 5° apart, whereas humans can discriminate sounds 0.5° apart. The pinnae significantly lower the auditory threshold in the cat. The absolute upper limit of hearing in cats is 60–65 kHz (kilohertz = kilocycles per second) and 45 kHz in dogs. Dogs and cats can discriminate one-eighth to one-tenth tones. Sheep also appear to perceive higher frequencies than do humans. Dogs and adult cats are not known to produce ultrasonic calls, but rodents do make ultrasonic noises that the carnivores use to locate them.

Practical application

The importance of hearing to cattle is indicated by the fact that they will avoid the side of a maze where milking facility noises are played. Dogs are quieter when classical music is played but more reactive when heavy metal is played. The auditory acuity of dogs has been used in silent dog whistles and ultrasonic (but not to the dog) distracting devices.

Olfaction

Acuity

Olfaction is to animals what writing is to humans—a message that can be transmitted in the absence of the sender. The sender must be present for auditory or visual signals to be sent, but an odor persists for minutes (or days) after the sender has gone. Olfactory acuity is probably the most important sense of domestic animal species because individual odor recognition and pheromonal release are an important part of their communication. Dogs probably have the greatest olfactory acuity, and this macrosmatic species is the one most investigated. Dogs can detect aliphatic acids at one-hundredth the concentration detectable by humans; The lowest concentration of amyl acetate that dogs can detect is two parts per thousand. They can distinguish between the odors of identical twins and detect the odors of fingerprints 6 weeks after the fingerprints were placed on glass. Dogs frequently are trained to sniff out drugs and natural gas leaks, and bloodhounds have been used for centuries to track people; apparently, no modern invention is as reliable as the canine olfactory mucosa. However, when thermally stressed or physically tired, their rate of detecting explosives falls from 91% to 81%.

When administering drugs to odor-detecting dogs or those used in tracking, care must be taken by the veterinarian because a combination of corticosteroids can interfere with olfactory discrimination. Considerable controversy exists about the ability of dogs to match a human scent from one part of the body, for example, the hands, with another part, such as the elbows. Although dogs can be trained to do so, it appears to be a difficult concept for them to grasp. This is probably because they can easily discriminate odors from different body parts. The same dog can learn to detect at least 10 different odors. Dogs can be trained to detect cadavers and
live scent. Dogs trained to do both are less accurate—more distracted by cadaver odor when commanded to find a live human scent.\textsuperscript{1170}

Pheromones and the vomeronasal organ have been identified in the intermammary area of lactating sows, bitches, mares, and doe goats as well as the cheek glands of cats,\textsuperscript{1464} and these may be of value in reducing aggression and fear and encouraging feeding. The use of synthetic versions of these pheromones and that of the feline cheek glands are discussed under the appropriate species.

The vomeronasal organ lies between the hard palate and the nasal cavity in all species except humans. It is a paired tubular organ into which nonvolatile material can be aspirated. Receptor neurons in the lining of the organ detect pheromones and send information more directly to the hypothalamus than neurons in the main olfactory system. In ruminants and horses, flehmen or lip curl accomplishes this by closing the nostril while the animal breathes deeply. Cats gape and dogs tongue using their tongue to move material into the opening of the incisive ducts that open into the vomeronasal organ. Each neuron expresses only one pheromonal receptor gene. In mice, the vomeronasal organ allows recognition of sex and individuals are recognized by combinatorial activation of neurons.\textsuperscript{797} Domestic animals are not as dependent on the vomeronasal organ for reproduction as rodents, but it still plays a role as will be discussed for each species.

**HORSES**

**Vocalizations**

**Neigh**

The neigh (or whinny) is a greeting or separation call that appears to be important in maintaining herd cohesion. It is most often heard when adult horses or a mare and foal are separated. A separated mare and foal will neigh repeatedly. These appear to be nonspecific distress calls, which the mare, but not the foal, may recognize individually.\textsuperscript{2055} Some horses will call to their owners, but usually only when they are in their line of sight.

**Nicker**

The soft nicker is a care-giving (epimeletic) or care-soliciting (et-epimeletic) call. It is given by a mare to her foal upon reunion and probably is recognized specifically by each.\textsuperscript{1909} A horse may also nicker to its caretaker and a stallion to a mare in estrus.

**Snorts, squeals, and roars**

Nickers or neighs usually elicit a reply; other equine vocalizations, such as snorts, squeals, and roars, do not. The roar is a high-amplitude vocalization of a stallion and is usually directed to a mare. A sharp snort is an alarm call. More prolonged snorting or sneezing snorts appear to be a frustration call given when horses are restrained from galloping or forced to work. Snorts and nickers are sounds from the nostrils. The mouth is closed. Other calls are given with the mouth open.

When two strange horses meet, or when horses have been separated for some time, they greet each other by putting their muzzles together nostril to nostril (Fig. 1.3). The nostrils are flared, but if any vocal signals are given, they are inaudible to humans. Usually one, the other,
Fig. 1.3  Greeting. Nostril-to-nostril investigation, in this case by a horse and a pony.

or occasionally both of the horses will squeal and strike or jump back although neither has been bitten or threatened. The squeal is, therefore, a defensive greeting. It is heard frequently when horses are forming a dominance hierarchy and many bites are being exchanged. Mares that are not in estrus squeal and strike when a stallion approaches too closely. A squeal may also be a response to pain.

Visual signals

Expression

The horse’s ears are probably the best indicator of its emotions. The alert horse looks directly at the object of interest and holds its ears forward. Ears pointed back indicate aggression, and the flatter the ears are against the head, the more aggressive the horse (Fig. 1.4). Frequently, veterinarians are called upon to examine a horse for soundness for a prospective buyer. If the horse reacts to examination, or even saddling, by swiveling its ears back, it may not be a desirable purchase, even if it is perfectly sound physically.

Other facial expressions of the horse are more subtle; nevertheless, they can be used profitably to understand a horse’s mood. A submissive horse turns its ears outward. Young horses (less than
Fig. 1.5  The submissive posture of a horse. The tail is tucked in and the ears are turned outward. The horse is also snapping (opening and closing its mouth while retracting the lips).\(^{867}\)

3 years old) have a more dramatic display, snapping, also called champing or tooth-clapping, in which the lips are retracted, exposing the teeth that are sometimes clicked together (Fig. 1.5). This expression is shown by a yearling colt to an approaching stallion or toward an adult who is threatening him. The sexually receptive mare shows a unique expression, the mating face, in which her ears are swiveled back and her lips hang loose (Fig. 1.6). She may also exhibit snapping. The flehmen response, or curled upper lip, of the courting stallion is discussed in the next section. A horse that sees but cannot reach food, or is anticipating food, makes chewing movements and sticks out its tongue (Fig. 1.7). This may be a submissive signal. More difficult to identify is the horse in pain. A horse that is exhausted and in pain will show loose lips but clenched masseter or cheek muscles. Before a horse is in such pain with colic that it kicks at its belly, it will repeatedly swivel its ears back as if attending to its abdomen. The various facial and postural expressions of horses have been illustrated by McDonnell.\(^{1255}\) Horses tend to position their ears in the same direction in which they are looking. Thus, when the horse’s ears are pointed straight ahead, it is looking straight ahead. This can be a clue that the horse is

Fig. 1.6  The mating expression of the mare.\(^{867}\)
about to shy at an object. Usually, the rider can identify the frightening object by looking where the horse’s ears are pointing. The horse can then be coaxed to investigate and conquer its fear of the object. When the horse turns its ears to the side and back, it is looking to the side.

Posture
The posture and bodily actions of the horse are also useful in interpreting its moods. The relaxed horse stands quietly, whereas its nervous counterpart prances and chafes at the least restraint. The aggressive horse, when threatening to kick, lashes its tail and may even lift one of its hind legs. The frightened horse tucks its tail tightly against its rump and stands with its feet close together. Muscle guarding is seen, especially if the animal anticipates pain. A few mares will urinate and lash their tails, splattering urine, as they are being chased, and it should not be confused with the frequent urination but with deviated tail seen in estrous mares. The stallion moving his mares assumes a unique posture, called herding, driving, or snaking, with head down, nearly touching the ground, and ears flattened (Fig. 1.8).

Horses paw the ground not in aggression but rather in frustration when they are eager to gallop or, more commonly, when they want to graze and are restrained by rope or reins. Pawing to eat may be a behavior derived from pawing through snow for grass and might be considered a form of displacement behavior. Tail lashing and pawing can be signs of discomfort.

Fig. 1.7 The food-anticipating expression of the horse. (Copyright 1978, with permission of Elsevier Scientific Publishing.)

Fig. 1.8 Driving posture of the horse. The stallion, left, drives a mare. This behavior is also called snaking, herding, or driving [rounding].
Tactile sense

Horses can detect a fly on their skin and respond either by moving their skin or swishing their tails. Riders make use of the horse’s ability to perceive a slight pressure on his flank in order to signal dressage movements. Very light pressure on the skin is used to calm a horse. Another use of the horse’s tactile sense or more likely pain receptors is the twitch. When the horse’s upper lip is twisted with a chain or rope, endorphins are released and analgesia is produced.

Olfactory signals

Scent marking

Olfactory communication plays an important part in the sexual behavior of horses. Stallions curl their upper lip in the flehmen position or “horse laugh” when they smell the urine of a mare (Fig. 1.9). Estrous urine alone does not stimulate more episodes of flehmen by stallions than does nonestrous urine, but the frequency of flehmen by a stallion toward a particular mare in his herd increases as she approaches estrus, perhaps because the mare urinates more frequently. After the stallion investigates urine by putting his lip in it, the flehmen position carries the urine into the nasal cavity. When his lips are raised in the flehmen position, the nostril opening is partially blocked and the horse, by breathing deeply, carries the urine into the vomeronasal organ. Although stallions flehmen most frequently, geldings and mares also exhibit the behavior in response to olfactory or gustatory stimuli. Cough medicine or a new bit often causes the horse laugh or flehmen—obviously, not a sign of amusement. Stallions usually urinate on the urine (scent mark) as they are exhibiting flehmen.

Horses also use olfactory cues, especially from their own or other horses’ manure, to find their way home. Wild stallions use manure piles, or stud piles, along well-used pathways, possibly to scent mark. These piles may separate bands of horses both spatially and temporally. Even in a pasture, stallions select one place to defecate and then back into the pile to eliminate, so the pile does not grow much wider. On the other hand, mares and geldings face outward, gradually increasing the diameter of the pile. Because horses do not eat grass contaminated with feces, a pasture containing mares and geldings rapidly becomes “horsed out” or inedible. Despite the discrimination of older horses against feces, foals show coprophagia, as discussed in more detail in Chapter 6, “Development of Behavior.” Horses respond to predator odor by

Fig. 1.9  The flehmen response or lip curl. The location of the vomeronasal organ is indicated by the arrow.
increased sniffing, but only seem frightened (refuse to eat and increase heart rate) when the odor is combined with the sound of a plastic bag being dragged over the ground. Horses have individual sensitivities. Some are more reactive to odors, others to tactile or auditory stimuli, but there is no general sensitivity. A horse that responds strongly to a sound is not necessarily going to respond strongly to a spicy taste.

**Artificial pheromones**

The equine appeasing pheromone, from the intramammary sulcus of the lactating mare can reduce the signs of fear and the elevation of heart rate in response to a novel stimulus—a bridge.

**DOGS**

**Vocalizations**

The common vocal communications of dogs are the bark, whine, howl, and growl.

**Bark**

Barking is a territorial call of dogs. It is used to defend a territory and to demarcate its boundaries. Stray dogs, whose resting places may be quite temporary, rarely bark. As a stray dog passes the yards of owned dogs, however, it precipitates territorial barking. The observant owner can recognize various types of barks. The bark to be let in the house differs from that directed at human intruders, which may differ from that directed at canine intruders. Barking occurs in wild canids; a wolf in a semi-naturalistic pen will bark at an intruder, but barking has been a trait selected for in domesticated dogs. People obtain dogs because they bark and can serve to warn their owners of the approach of intruders. Unfortunately, dogs are much more likely to bark in response to another dog’s bark than to the sound of a human intruder. The barking trait can become a problem in a highly urbanized environment. Two thousand two hundred complaints about barking are filed in Los Angeles per year. For this reason, a dog’s barking can be a problem for the owner. A more acute problem is the barking of kenneled or caged dogs in a veterinary clinic. The noise level generated by barking can exceed the 90-decibel limit of the Occupational Safety and Health Act. Animal hospitals must, therefore, be constructed with very good sound insulation.

Excessive barking can be punished with a collar that sprays citronella on the dog’s chin or an electric shock collar could be used to teach the dog to keep barking to a minimum. The only type of electronic collar that is humane is that which is activated by the animal’s bark rather than by the human. A final resort is vocal cordectomy (debarking), which may save the life of a dog that has been a barking problem. Various procedures are described for vocal cordectomy. Dogs are not rendered silent, but the strength and pitch of their voices are lowered.

**Whine and howl**

Whining is an et-epimeletic or care-soliciting call of the dog. It is first used by puppies to communicate with the mother, who provides warmth and nourishment. Mature dogs whine
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when they want relief from pain or are in even a mildly frustrating situation, such as when they want to escape outdoors or reach a rabbit for which they are digging.

Howling is a canine call that has not been deciphered well. It occurs more frequently in wild canids, coyotes, and wolves and in some breeds of dogs, such as huskies, malamutes, and to a lesser extent hounds. Harrington and Mech found that the incidence of howling in wolves increased 10-fold during the home-site season. As the year’s pups mature, the pack becomes more dispersed and the howling apparently takes the place of scent marking in coordinating pack member spacing and activity.

Harrington also has found that wolves can discriminate strange adult from strange pup howls and answer only the former. A different component, lower in frequency, occurs in the answering howls of wolves approaching the source of a strange howl. Whether this is true in dogs as well remains to be determined.

Growl

Growling is an aggressive or distance-increasing call in dogs.

Visual signals

A dog’s emotional state can be determined by observation of its ears, mouth, facial expression, tail, hair on its shoulders and rump, and overall body position and posture (Fig. 1.10). The calm dog stands with ears and tail hanging down. When it becomes alert, its tail and ears are pointed upward. The dog may point with one front foot. As the dog becomes more aggressive, the hair on the shoulders (hackles) and the rump rises and the lips are drawn back. The ears remain forward and the tail may be slowly wagged. With increasing aggression, the lips are retracted and the teeth exposed in a snarl. The dog stands straight. As the dog becomes frightened, the ears go back until they are flattened against the head and the tail descends until it is between the legs.

Posture

The posture of the fear-biting dog, the one most likely to injure a veterinarian, is that of the frightened dog with tail and ears down and the body leaning away from the source of fear. It will have raised hackles and lips retracted in a snarl, which may expose the molars as well as the canines. Care must be taken when approaching a dog to notice any lifting of the lip, because this may be the only prediction of defensive aggression or fear biting. The fear biter will escape if possible; but if it is approached within its critical distance, which may be a yard (approximately a meter or less) from it, it will attack.

More common, fortunately, is a dog in which fear is not mixed with aggression. The fearful dog crouches with its tail between its legs and its ears flattened down. If the dog is abjectly submissive, it will lie on its side and lift its hind leg, displaying the inguinal area. It may also make licking intention movements, that is, sticking its tongue out but not contacting anything. Finally, it may urinate. This behavior probably represents a reversion to puppy habits in which the puppy lies down on its side and presents the inguinal area to the mother (who is, of course, dominant over the puppy) and allows her to lick and clean it.

General posture is also a good indication of the dog’s mood. A lowered body posture with depressed tail is associated with fear and fear-based aggression and a tall, especially a rigid,
posture with tail raised and stiff is associated with offensive aggression. Dogs wag their tails to the right of center when encountering their owner or a stranger, but to left when encountering a strange dominant dog.1564

During a submissive approach, dogs curve their bodies, wiggling toward the superior, whereas a dominant dog stands straight and walks stiffly with tail and ears erect. This stiffening of posture can be used to predict when an initially friendly greeting is about to become an attack.

Dogs greet their owners as they did their mothers: by licking their faces. As puppies, dogs lick their mothers’ faces to beg for regurgitated feed. Although wild canids frequently regurgitate food for their pups, not all domestic dogs do so; nevertheless, the begging behavior is shown...
by domestic puppies. The behavior persists in the adult dog who either licks the owner, or, if prevented by discipline or its small stature, makes licking intention movements. Licking their own lips, yawning, or even falling asleep sitting up are all signs of ambivalence in dogs. A few dogs will “grin” as a submissive greeting. They show their teeth with flattened ears.

Dogs have a play signal; it is necessary to signal that the action that follows is play because, otherwise, the recipient of the playful act will consider it genuine aggression or sexual activity and respond in kind. A bowing with the forequarters lowered and the hindquarters elevated and topped by a rapidly wagging tail is the signal for canine play. Often, one paw is waved or rubbed at the dog’s own muzzle. Interspecific communication is important, too. People use various motions and vocalizations to signal that they want to play with a dog. The most successful are lunging or bowing toward the dog while whispering or speaking in a high-pitched voice.

Genetic and surgical alteration

Ears, tail, and hair position are all important in visual communication between dogs, but communication tends to break down in breeds that have been modified either genetically or surgically. Dogs with dependent ears, such as hounds, can only hint at attentiveness or fear. It is hard to detect piloerection on a long-haired dog. Can an Afghan raise its hackles? Hair also prevents many breeds from seeing the signals of other dogs. The Old English sheepdog is a good example because it has hair across its face and cannot see, and because of coccygeal amputation, its tail position must be left to the imagination. Merely cutting the hair that obstructs a dog’s vision can improve its temperament. Dogs with docked tails learn to wag their whole hindquarters so that pleasure, if not fear, can still be expressed.

Olfactory signals

The legendary olfactory acuity of dogs has already been mentioned. Because dogs can smell so well, it is not surprising that dogs use odors as a means of communication.

There are applied uses of canine olfactory abilities too. Although olfactory repellents are seldom effective in dogs, odors can have a positive effect. Wells has found that lavender oil reduces canine vocalization and locomotion during car travel. A chemical has been synthesized from the epithelial cells of the bitch’s mammary sulcus and is available commercially as Dog Appeasing Pheromone®. It has calming effects on newly weaned puppies, dogs afraid of fireworks, and in the veterinary clinic and reduces barking amplitude and increases resting behavior in shelter dogs.

The importance of olfactory communication to dogs is exemplified by the diligence with which male dogs scent mark vertical objects by urinating. Dogs are believed to be capable of identifying species, sex, and even individuals from the odor of the urine. Dogs scent mark much more frequently in areas where other dogs have marked. The record may be that observed by Sprague and Anisko of 80 markings by one dog in 40 hours. Even though male dogs rarely empty their bladders completely, such efforts exhausted this dog’s supply; the last urinations were dry.

Elimination postures

It is appropriate at this point to discuss elimination postures in male and female dogs. Owners are often concerned because their young male does not lift his hind leg but, rather, still squats.
Although standing and lifting the hind leg are typical innate male behaviors mediated by testosterone, 3% of the time males urinate in other positions. Bitches assume not only the squatting position (68% of the occasions that they urinate) but also lift their hind legs (2%) and use various combinations of the two postures.

Urine marking is the most common form of scent marking in dogs, but vertical objects may also be marked with feces, as any kennel cleaner has observed. Again, males are more likely than females to mark with feces (Fig. 1.11). Hart found that castration reduces scent marking in male dogs. Dogs that cannot smell (anosmic) and that, therefore, cannot identify other dogs’ urine, mark less frequently and, in contrast to intact dogs, do not urinate on the urine of other dogs. When dogs scratch after eliminating, they are not making rudimentary burying movements but are spreading the scent and possibly adding the odor of secretions from interdigital sebaceous glands. Intact male dogs mark more during the breeding season; lactating bitches mark around their nest area.

**Urine**

The most powerful means of olfactory communication in the canine species is the urine of an estrous bitch. Doty and Dunbar have shown that male dogs are more strongly attracted to the urine of an estrous bitch than to vaginal or anal sac secretions, although Goodwin et al. present strong evidence that the vaginal secretion methyl p-hydroxy-benzoate is what induces the actual mating behavior sequence in the male (see Chapter 4, “Sexual Behavior”). Dogs “tongue,” that is, flick their tongues against the palate just behind their incisor teeth, introducing estrous urine into the vomeronasal organ. This is the canine equivalent of flehmen.
Dunbar also demonstrated the marked preference by an estrous bitch for male urine as compared with either estrous or nonestrous urine. The urine contains pheromones, substances secreted by one animal that affect the behavior of another animal. In estrous urine, these compounds are probably estrogen metabolites. The urine of a bitch in heat can attract males from great distances. The attractant effect of the bitch’s pheromone is usually considered a nuisance, but it has practical applications. For instance, the pheromone could be used to attract stray dogs that could then be easily captured. One might expect that male dogs would inevitably be attracted to the urine of a receptive female, but Beach and Gilmore noted that a dog without mating experience did not investigate estrous urine in preference to anestrous urine, whereas sexually experienced dogs did.

**Anal and aural secretions**

Urine is not the only olfactory means by which dogs communicate. The anal gland secretions normally are eliminated with the feces and, no doubt, give them a unique odor. Dogs, on meeting, usually sniff under each other’s tails. This behavior is probably one of identifying the individual by its smell. A very excited dog can express its anal sacs forcefully; the resulting odor is pungent enough to be smelled by humans and may function as a fear pheromone. The secretions of the ears are also believed to function in individual identification, and investigation of one another’s ears is a common greeting behavior of dogs.

**Submissive urination**

Submissive urination is a frequent behavioral problem. It occurs more often in young dogs and small dogs. Living with a dog that is dominant over its owner may be difficult, but living with a dog that urinates submissively is messy. Punishing the dog for urinating in fear or excitement aggravates the problem. The dog is already afraid of its owner, and punishment only confirms and reinforces that fear. The wisest course is to avoid overexciting the dog.

Overenthusiastic greetings and overly harsh punishments should be avoided. If the person in the household who most often elicits the submissive behavior generally ignores the animal, the problem may be minimized. Submissive urination often declines as the dog matures.

**Urine marking**

Another type of communication by pet animals that is not appreciated by humans is urine marking. The stimulus for urine marking in the house is a vertical object, but the motivation of the dog may be elimination, marking, or even separation anxiety. Elimination problems are addressed in the “House breaking” section of Chapter 7, “Learning”. The marking of every vertical object in a city block is another source of pollution that may not only kill the trees sprayed but also spread such urine-borne diseases as leptospirosis. Urine marking may increase the level of aggression in male dogs. Smelling the urine of other dogs does, no doubt, excite a dog regardless of whether it might lead to aggression directed toward humans. For a number of reasons, therefore, dogs should be encouraged to urinate on their own territories only.
CATS

Vocalizations and audition

Many more feline vocalizations exist than those described in Table 1.1; some of these vocalizations may not be recognized by every cat owner.274 The wild ancestor of cats *Felis sylvestris lybica* is less vocal and meows in fewer contexts; its call is longer and lower in frequency and deemed less pleasant by humans.1413 Apparently, we have selected cats to communicate with us in “pleasant” voices. Humans can distinguish positive and negative affect in feline

<table>
<thead>
<tr>
<th>Table 1.1</th>
<th>The vocalizations of cats.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Murmur</td>
<td>A soft, rhythmically pulsed vocalization given on exhalation. Murmurs are the request, or greeting call, which can vary from a coax to a command, and the acknowledgment, or confirmation call, which is a short, single murmur with a rapidly falling intonation.</td>
</tr>
<tr>
<td>Purr</td>
<td>A soft, buzzing vocalization that is easy to recognize. It occurs only in social situations and may indicate submission or a kitten-like state. Remmers and Gautier1596 have shown that purring is associated with rapid contraction of the muscles of the larynx. The laryngeal muscles are driven by a central pattern generator with a cycle of contraction every 30–40 ms.640</td>
</tr>
<tr>
<td>Growl</td>
<td>A harsh, low-pitched vocalization,309 usually of long duration and given in agonistic encounters.</td>
</tr>
<tr>
<td>Squeak</td>
<td>A high-pitched, raspy cry given in play, in anticipation of feeding, and by the female after copulation.</td>
</tr>
<tr>
<td>Shriek</td>
<td>A loud, harsh, high-pitched vocalization given in intensely aggressive situations or during painful procedures.</td>
</tr>
<tr>
<td>Hiss</td>
<td>An agonistic vocalization produced while the mouth is open and teeth exposed. This vocalization is probably defensive and can be used to gauge whether a cat is defensively or offensively aggressing.</td>
</tr>
<tr>
<td>Spit</td>
<td>A short, explosive sound given before or after a hiss in agonistic situations. Saliva is expelled.</td>
</tr>
<tr>
<td>Chatter</td>
<td>A teeth-chattering sound made by some cats while hunting or more commonly when restrained from hunting by confinement.</td>
</tr>
<tr>
<td>Estrus call</td>
<td>A call of variable pitch, lasting a half-second to 1 second. The mouth is opened and then gradually closed. It is given repeatedly by queens in estrus, which is termed calling because the vocalization is so characteristic.</td>
</tr>
<tr>
<td>Howl and yowl of an aggressive cat</td>
<td>These are loud, harsh calls.</td>
</tr>
<tr>
<td>Mowl, or caterwaul, of the male cat</td>
<td>A variable-pitch call, usually given in a sexual context.</td>
</tr>
<tr>
<td>Mew</td>
<td>A high-pitched, medium-amplitude vocalization. Phonetically it sounds like a long “e.” It occurs in mother–kitten interactions and in the same situations as the squeak.</td>
</tr>
<tr>
<td>Moan</td>
<td>This is a call of low frequency and long duration. The sound is “a” or “u.” It is given before regurgitating a hair ball or in epimeletic situations, such as begging to be released to hunt.</td>
</tr>
<tr>
<td>Meow</td>
<td>This characteristic feline call, “ee-ah-oo,” is given in a variety of greeting or epimeletic situations just as the mew and squeak are. Anyone who has tried to restrict a cat’s food will not be surprised to know that cats can be trained to meow twice a minute for 2 hours when the reward is food.564</td>
</tr>
</tbody>
</table>
vocalizations. Agonistic calls are longer in duration and lower in frequency than affiliative calls. Because cats can hear ultrasound it has been used to deter cats from entering an area and, although the technique is only moderately effective, the efficacy increases with time.

Visual signals

Posture

The postures and facial expressions of the cat are shown in Figs. 1.12a and b. A cat carries its tail high when greeting, investigating, or is frustrated. The tail is depressed and the tip is wagged during stalking. When walking or trotting, the tail is held out at a 40° angle to the back, but as the cat’s pace increases, the tail is held lower. A relaxed cat, as does a relaxed dog, usually stands with tail hanging, but the cat’s ears are usually forward. When the cat’s attention is attracted, the tail is raised and both ears are pointed forward and held erect. The aggressive cat walks on tiptoe with head down. Because the cat’s hind legs are longer than its front legs, it appears to be slanting downward from rump to head. Its tail is held down but arched away

![Fig. 1.12](image-url)
from the hocks; it is partially piloerected. Its ears are held erect and swiveled, so the openings point to the side. Its whiskers are rotated forward and its claws are protruded. Subordinate cats crouch in the presence of a dominant cat.

The frightened cat crouches with ears flattened to its head and it salivates and spits. The pupils of the aggressive cat are constricted; as the animal becomes more defensive, the pupils dilate. The light-colored iris of the cat’s eye makes an especially prominent signal of the cat’s mood; it is probably an important intraspecific signal and should be used also to advantage by the veterinarian. The eyes of an excited cat appear red because the retinal vessels can be seen through the dilated pupils. Contrary to popular belief, the “Halloween cat” is not the most aggressive one; this cat, with arched back, erect tail, and ears flattened, which is piloerected and hissing, corresponds to the fear-biting dog. The cat is fearful but will become aggressive if its critical distance is invaded. One clue to the cat’s emotions is that the hind feet appear to be advancing while the front feet retreat; the paws are gathered close together under the cat.

Cats roll on their backs, but sex differences appear in this behavior. Most female rolling occurs during estrus and is directed toward males, whereas most rolling exhibited by young males is toward adult males and is presumably a sign of submission.575

The gape is a response to a strange smell. This expression is most commonly seen when the cat smells a strange cat’s urine, and may be the feline equivalent of the flehmen response of the ungulates. The mouth is opened and the tongue is flicked behind the upper incisors where an opening in the hard palate communicates with the vomeronasal organ1045 (Fig. 1.13). At the
Fig. 1.13 The gape expression of a cat. (A) The cat touches the investigated object with its nose and may lick its nose; (B) then opens its mouth while gazing in a preoccupied fashion. (Drawing by Priscilla Barrett, Cambridge, UK.)

same time, an autonomic response to the odor is occurring whereby the urine brought to the hard palate is aspirated into the vomeronasal organ during parasympathetic stimulation. Fluid is flushed from the vomeronasal organ during sympathetic stimulation.

**Olfactory signals**

*Scent marking*

Male cats scent mark, that is, spray urine, more than females, but both sexes do it. They spray trees along their most frequently traveled path. Spraying is also done by cats that are subjects of aggression. Free-ranging tomcats spray a dozen times per hour. Queens spray once an hour and are more likely to spray when they are in heat. Cats probably also use scent marking to arrange their activity temporally with other cats. Much of the signal value of urine is lost within 24 hours, as evidenced by a comparison of interest in fresh and older urine marks by male cats. Cats can apparently distinguish the urine of familiar cats from that of strange cats. The smell of male cat urine is quite detectable by humans and usually objectionable to them. The smell of tomcat urine is probably caused by the sulfur-containing amino acid, felinine, which is present in highest quantity in tomcat urine and may be an important olfactory component in territorial spraying.

*Anal secretions*

Cats are well known for their fastidious covering of their feces, but in some situations, such as outside their core living area, cats may leave their feces uncovered. Cats probably use fecal and anal sac odor for communication; two strange cats spend considerable time circling one another attempting to sniff in the perianal area. If the cats are not too antagonistic, they will eventually permit each other to sniff.

*Rubbing*

Cheek rubbing (bunting) behavior may also be a form of olfactory communication in that glandular secretion from the cat’s face is deposited on the object bunted. Cats bunt the objects
to which they respond with a gape. Urine up to 3 days old can elicit these responses.\(^{1940}\) Cats also rub each other. In general, the subordinate cat rubs the dominant one. This behavior serves to exchange odors among all the cats in a group, that is, they all smell the same.

**Inter-specific communication**

Dogs and cats appear to interpret each other signals correctly even when the behaviors have opposite meanings in the two species, for example tail wagging which signals annoyance in cats and pleasure in dogs.\(^{582}\)

### BEHAVIOR PROBLEMS

House soiling or inappropriate elimination is the most frequent behavior problem of cats.\(^{259,775}\)

Any animal with a behavior problem should be examined and treated for any concurrent medical problem. This is particularly true of feline house-soiling problems because of the association of urological problems with failure to urinate in the litter box.

The majority of cats prefer clumping litter\(^{252}\) because it is made of fine particles similar to sand. More than one litter box per cat and daily cleaning solve many soiling problems.

Spraying by intact males or females in estrus should be treated by neutering. Spraying nearly always ceases if the tomcat is castrated before he is 4 months old.\(^{1791}\) The result in mature males is more variable, but 87% of older males also abandon the habit after castration.\(^{772}\) Spraying occurs in 5% of spayed female cats but usually is reduced by the same management techniques that improve nonspraying elimination—strict hygiene and a number of litter boxes.\(^{1557}\)

Spraying synthetic cheek gland secretion in the area in which the cat sprays or using a plug-in defuser also is effective. If cats within the household are fighting, the pheromone is less likely to be effective.\(^{624,1448}\) A long-term follow-up indicates that the cats do not habituate to it and spraying remains reduced or eliminated.\(^{1337}\)

### Clawing and scratching

Clawing or scratching behavior may be considered grooming behavior because the cat is loosening old layers of the claw, but seems to be primarily a form of marking behavior. The best teacher of a kitten is its mother, so kittens should be obtained from queens that use a scratching post.\(^{768}\)

If all else fails, the cat should be declawed rather than euthanized or sent to a shelter for eventual euthanization. Without question, the cat will experience some pain at the time of declawing, so every effort should be made to improve analgesia, but there do not appear to be any long-lasting behavior sequelae to onychectomy.\(^{211,1362,2071}\)

### PIGS

**Vocalizations**

Vocal signals are probably the most important means of communication in pigs. Twenty calls have been identified,\(^{738}\) and half a dozen are easily recognizable to humans. Kiley\(^{1013}\) has analyzed the vocalizations of ungulates in depth.
Grunt, bark, and squeal

The common grunt is 0.25–0.4 seconds long and is given in response to familiar sounds or while a pig is rooting. The staccato grunt or short grunt is, as the name implies, shorter (0.1–0.2 seconds) and is given by an excited or investigating pig and may precede a squeal. A crescendo of staccato grunts is given, for example, by a threatening sow and may precede an attack on anyone who disturbs her litter. In a milder form, it can be a greeting. The bark is given by a startled pig. The long grunt (0.4–1.2 seconds) may be a contact call and is associated with pleasurable stimuli, especially tactile ones. The squeal is a more intense vocalization indicating arousal, and a pig that is hurt will scream.

The various grunts and combinations do not appear to have specific meanings, but the intensity of the vocalization varies with the intensity of the situation. A common sequence is to proceed from common grunts to staccato grunts to repeated grunts without interruption to grunt squeals to screams as the animal is approached, chased, picked up, and injected. Staccato greeting grunts are given by pigs that are reunited after a separation, and a series of 20 grunts with no pause may be given by the hungry pig. Nursing calls are described in Chapter 5, “Maternal Behavior.” Changes in the frequency and length of calls can indicate need. When separated from the sow, hungrier piglets call more frequently and at a higher frequency than do satiated ones.

Isolation in a strange place causes pigs to vocalize. Short grunts are followed by screams. At the same time, the rate of defecation increases. Mature pigs often react to restraint by tantrum behavior accompanied by very loud calls, but with no increase in heart rate. When disciplining a subordinate pig, a dominant pig will give a sharp bark as it feints with its snout. The pig in chronic pain grinds its teeth.

Visual signals

Posture

Possibly because the vocabulary of swine is so large, visual signals do not appear to be as important. One can learn something about pig thermoregulatory problems, if not about their moods, by observing their posture. Newborn pigs are relatively deficient in fur or fatty insulation and their surface volume ratio is large; therefore, maintaining body temperature is difficult. Pigs have compensated for their poor physiological abilities with several behavioral strategies to reduce heat loss. A warm piglet lies sprawled out, but a cold one crouches with its legs folded against the body. The surface area is thus reduced, and contact with a cold floor is minimized.

Tail position

The tail, particularly in piglets, is a good index of general well-being in most breeds. Although Vietnamese mini pigs do not curl their tails, a tightly curled tail indicates a healthy pig in most breeds, and a straight one indicates some sort of distress. The pig’s tail is elevated and curled when greeting, when competing for food or chasing other pigs, and during courting, mounting, and intromission. The tail straightens when the pig is asleep or dozing, but curls again when the pig rouses unless the animal is isolated, ill, or frightened. The tail will twitch when the skin is being irritated. Amputation of pigs’ tails removes a valuable, if crude, diagnostic aid.
Group behavior

Group behavior is even more important. Pigs, especially newborn pigs, huddle when they are cold. They thereby convert several small bodies into one large one, both decreasing their surface area and using one another for insulation. Pigs can select an optimal temperature when a gradient is present, both in the laboratory and on the farm. Therefore, heat lamps are provided, and newborn pigs, except those brain damaged by anoxia at birth, stay under the lamp at a comfortable 29°C (85°F). Adult pigs still huddle when they are cold, but their thermoregulatory problem is more apt to be one of hyperthermia. Pigs do not sweat, and although they pant, it is not sufficient for cooling. Again, behavioral thermoregulation takes over and pigs wallow in mud, which is more effective than plain water for evaporative heat loss.

Olfactory signals

Boars may use behavioral signs more than pheromones to determine the sexual receptivity of the sow. Boars are the only male ungulates that do not exhibit flehmen. Instead, they gape as a cat does when they encounter sow urine. Females can identify intact males, probably by the strong boar odor produced by the androgen metabolites present in both the saliva and preputial secretions of boars. Sex differences exist in the ability to detect androstenone. Boars may habituate to this odor because it is present in their saliva. Females can detect the pheromone at one-fifth the concentration that intact boars do.

Olfactory stimuli serve to identify pigs individually, for pigs can distinguish conspecifics by means of odor, including urine odor. When visual, auditory, and olfactory stimuli were available separately and together olfaction appeared to be the most important sense in individual recognition. Pigs investigate any newcomer or any pig that has been temporarily removed by nuzzling. The ventral body surface is a preferred site for sniffing. The ability of pigs to form a dominance hierarchy while blindfolded indicates that olfactory and auditory, rather than visual, signals are important to pigs.

CATTLE, SHEEP, AND GOATS

Cattle posture indicates alertness, aggression, and submission (see Chapter 2). A subtle sign, the showing of the whites of the eyes, (>15% of the eye) can be elicited even by mild frustration such as visible but unreachable food or by social frustration such as removal of the cow’s calf or anticipation of food. Treatment with diazepam several hours before the frustrated experience decreases the percent of visible of eye white.

Vocalizations

Despite the intimate association of humans and ruminants for thousands of years, very little is known about communication in these species. Kiley has analyzed cattle vocalization phonetically and according to the motivation of the animal. The moo is low pitched. The other common vocalization—the call, hoot, or roar—is higher pitched and consists of repeated brief calls, usually by a distressed cow. A threatening bull gives a roar of high amplitude. A very hungry calf will give a high-intensity “menh” call. During copulation, grunting sounds are
heard. Some humans can recognize cows by voice, so it would not be surprising if cattle were able to recognize one another. Cattle appear to respond to a vocalization with a vocalization of similar intensity. An excited call is answered by excited calls. Calves have a special moo, almost a baa, or play call.

Vocal communication in a prey species such as cattle may be most important in transmitting information about general safety or danger. It may have been more important for cattle (and horses) to be alert and ready to flee than to communicate more precise information in their calls. If domestic animal communication is studied in as great a depth and with the same ingenuity as bird communication has been studied, vocal communication may be found to be more precise in domestic animals. Careful analysis of the situation in which a call is given, recording of the call, and playback of the call to conspecifics in a naturalistic setting may help to break the code of domestic animal languages.

Vocal communication in sheep consists of bleating in distress or to initiate contact. Ewes rumble to their newborn lambs (see Chapter 5) and rams make a similar call while courting. The snort is an aggressive communication in sheep.

Goats are frequently kept as pets and, like dogs, can annoy neighbors with their separation vocalizations. Analyzing the problem, as one would for a barking problem, may prevent de-bleating. Providing a companion goat often helps, as does ignoring the vocalization.

**Visual signals**

Submissive postures are the lowered neck and the headshake given mostly by small sheep in the presence of larger ones. Sheep have a visual signal for defensive aggression: they stamp. Threats in sheep are the foreleg kick, often repeated several times and sometimes actually contacting the opponent. The horn threat is movement of the head sharply downward. The twist and low stretch involves stretching the neck and twisting the head with accompanying tongue flicks. Some rams threaten by standing stiffly with their heads up, which causes their necks to bulge. Rams rub their horns on one another’s face, probably spreading pre-orbital secretions. The other visual signals used in courting behavior are discussed in Chapter 4. Sheep rarely will huddle facing one another; head-to-head orientation is aggressive behavior in this species.

Adult sheep continue to use vocalizations as contact calls. Sheep also are able to distinguish conspecifics by means of olfaction. Sheep can recognize photographs of familiar sheep and people, but a photograph of a familiar stock person is not as effective as the stock person himself in calming an isolated lamb.

The typical aggressive and submissive postures of cattle are described in Chapter 2, “Aggression and Social Structure.”

Olfactory signals

Olfactory communication is very important for sexual activity in ruminants. Goats and cattle can distinguish conspecifics by means of urine. Male urine is more easily distinguished than is
female urine. The flehmen response is shown by all male ruminants in response to female urine.

*Communication with humans*

Sheep are aware of human visual activity. They look at a staring human more than a nonstaring human and they are more active and urinate more often.