

Intraspecific social behavior in donkeys (*Equus asinus*): Circadian distribution and characterization

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The interest in keeping and breeding domestic donkeys has increased in recent years. However, the scientific literature regarding donkeys' behavior is still scarce. To shed light to this topic, we investigated the intraspecific social behavior of a group of 13 donkeys (3 geldings and 10 females, aged 3-13 years), stabled in an Animal Assisted Interventions facility in Northern Italy. Six donkeys had been born in the facility, whereas the remaining had arrived at the facility from different locations. The study was divided in two phases. The first phase aimed to define the circadian distribution of donkeys' social behavior. The data for the first phase was collected from videos of three non-consecutive days using scan sampling. The second phase aimed to characterize social interactions between donkeys, by building a sociogram of affiliative interactions and a dyadic matrix of agonistic interactions. This phase concentrated on the hour of the day when the social behaviors were mostly expressed (based on results of first phase), and the data were collected on four days using a continuous sampling method. The results indicated that intraspecific social behaviors were mostly expressed between 8:00 and 9:00 am, when donkeys expressed affiliative behaviors (N=188) more often than agonistic ones (N=102). The most expressed affiliative behaviors were proximity (55%) and following (29.2%) while the most expressed agonistic behaviors were threat (51%), displacement (18.5%) and bite (18.5%). The sociogram highlighted donkeys' tendency to choose one preferred social partner *i.e.*, to form pair-bonds. Seven most interacting pairs were identified based on the number of affiliative interactions (ranking in the highest 10% of all possible pairs). Three of such pairs were composed of unrelated females, two of sub-adults born in temporary vicinity and the remaining two of a mother and offspring. Different dyads were identified based on the expression of agonistic interactions; these were mainly composed of adult donkeys lacking an exclusive pair-bond (N=3 pairs), subadult individuals (N=2 pairs), or a combination of the two characteristics (N=3 pairs). Landau's linearity index excluded a strong linear hierarchy ($h = 0.44$) within the group. Taken together, the pattern of results highlights that pair-bonds are an important aspect of donkeys' well-being and raise the possibility that exclusive pair-bonds reduce agonistic interactions among individuals.