Social Relationships of
White-Tailed Deer In Illinois

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ABSTRACT

Social relationships of 633 marked white-tailed deer (*Odocoileus virginianus*) were studied on 3 areas in central and northern Illinois, 1980-1993, where landscapes are dominated by agriculture. Deer showed some unique social behaviors including formation of large mixed sex groups following crop harvest that remained intact until spring, much higher spring dispersal of female fawns and yearlings, and higher associations of yearlings with maternally related deer in summer and early fall compared with deer observed in southern Illinois. Other intraspecfic associations and behaviors were similar to those described for deer in the more wooded parts of Illinois. Dispersals of both sexes into areas devoid of deer in the spring remains an important aspect of hunting success in central and northern Illinois each fall.

INTRODUCTION

Social relationships enable white-tailed deer to maximize their individual fitness through intraspecific competition as they mature (Hirth 1977). Such behavior is directed at others to alter behaviors such as spacing, access to various resources and, with kin, to promote cohesiveness among group members (Brant 1992). Male and female deer have different life history strategies with a male's reproductive success measured by the number of females he can breed while a female's success depends on the number of young she can recruit into the population (Clutton-Brock et al. 1982). Deer behaviors and social relationships have evolved to promote these objectives within the limitations imposed by their environment.

Hawkins and Klimstra (1970) have identified the basic social groupings of deer in southern Illinois with the primary association that of mother and fawn(s). As fawns mature, males generally leave their natal range after family breakup and avoid their female relatives during the breeding season, while females that do not disperse continue to associate, at least occasionally, with their female relatives (Hawkins and Klimstra 1970, Hirth 1977).

However, where deer must cope with landscapes providing limited permanent cover in winter-early spring and where deer densities are high, social relationships may differ from areas where forests are abundant (Hirth 1977). Hirth (1977) observed more aggre-

gations of mixed sex groups of white-tailed deer throughout the year in south Texas compared with deer observed in a more wooded area in Michigan. In much of Illinois and throughout the Midwestern Agricultural Region, where woody cover is often sparse, the annual cycle of growth and destruction of the "corn forest" creates and then destroys thousands of hectares of food producing cover (Gladfelter 1984). In central and northern Illinois this represents several million acres (Iverson et al. 1989). Deer must adjust socially to this expansion and contraction of habitat where for 8–9 months they are crowded together within the existing forest cover. Do social interactions among sex and age groups change because of the adjustments deer must make seasonally to varying amounts of cover? Do social interaction frequencies differ seasonally by gender and age? Finally, does the fragmented landscape of central and northern Illinois affect emigration rates of both sexes? We examine social relationships observed among deer living in the intensively farmed landscapes of central and northern Illinois and compare these relationships with those described in a previous study of deer life history in southern Illinois (Hawkins and Klimstra 1970).

STUDY AREAS

Between 1980 and 1993, 633 deer were marked November-April using rocket-powered or drop nets (Hawkins et al. 1968) on study areas in east-central (Piatt county, 1980-85), west-central (Brown and Adam counties, 1990-93), and northern (DeKalb county, 1990-93) Illinois. Each area contained a mix of public and private lands and included a wooded public park, providing deer with abundant diurnal cover, protection from severe winter weather, and a refuge from firearm hunters. These protected core areas were surrounded by privately owned farms dominated by row crops and were hunted by archers or firearm hunters from October to early January (archers) and November–early December (firearm hunters) under "any sex" regulations.

The 2,953-ha east-central site consisted of 64% row crops and 36% forest located in within Piatt County, only 2.4% forested in 1985 (Iverson et al. 1989). The 5,942-ha west-central study area was 52% forest, 39% row crops, 5% pasture, and 3% tame hay fields or restored prairie. The surrounding counties were about 20% forested in 1985. The 1,648-ha northern site was 59% row crops, 14% second-growth hardwood forest, 7% tallgrass prairie, 6% mixed species pine plantations, and 5% savanna. Nine percent consisted of a small suburban area, a golf course, and a 128-ha lake. Dekalb County was only 1.6% forested at the time of our study.

Corn and soybeans were planted in about a 50:50 ratio on each area. Following harvest, most fields were disced or chisel plowed further reducing winter-spring food resources and cover.

Hunters concentrated on harvesting antlered males, resulting in high survival of females and increasing numbers of deer on each study area (Nixon et al. 2001). Deer density averaged $10-12/km^2$ on the northern area, $12-25/km^2$ on the west-central area, and $4-6/km^2$ on the east-central area during our studies (Nixon et al. 1995).

METHODS

Captured deer were aged as fawn (< 1 year), yearling (12–24 months), or adult ($\geq$ 25 months) using tooth replacement and wear (Severinghaus 1949). Live deer can be aged up through 2 years based on tooth replacement and wear of their premolars. Females were marked with plastic collars bearing reflective numbers or cattle-type plastic ear tags and males with metal ear tags, colored plastic ear streamers, or numbered cattle-type plastic ear tags. A subset of each sex (51 males, 137 females) were marked with radio collars, with selection of radio marked deer based on the number of radios active at the time and the availability of new radios for deer on each study area. The marking of family groups were often a priority on each area.

Social relationships of marked deer were determined from observations made daily on the Piatt and Brown-Adams study areas and weekly on the DeKalb study area. We include here only observations where we obtained a complete count of deer present during each encounter. Deer were considered unrelated if there was aggression between marked individuals or if deer ignored one another. Maternally related deer were those that were marked and traveled together, did not manifest aggression, and were often seen grooming each other.

All births were assumed to occur June 1. The year was divided into intervals differing in the life history stresses that would affect social contacts. These intervals were June–September (parturition and caring for young fawns for females and antler growth and weight gain for males), October–November (breeding), and December–May (winter-spring foraging, advancing pregnancy and recovery from breeding activities). In Illinois, fawn females often breed at 6–8 months old (Nixon et al. 1995), and a pregnancy for these fawn females was determined from blood progesterone levels (Wood et al. 1986) or from frequent observations of these females as yearlings during late summer into fall. Virtually all yearling and adult females breed each year in Illinois (Pederson 1982, Nixon et al. 1991). Yearling males may engage in breeding activities (Marchinton and Hirth 1984, Sorin 2004) but are often excluded by more dominant older males (Miller et al. 1987).

The frequency of observations among maternally related and unrelated deer was compared seasonally using Chi-square likelihood ratios (Sokal and Rohlf 1995). When multiple comparisons of observations among the sexes and various ages were made, two-tailed tests were adjusted using the Bonferroni correction, resulting in significance levels of 0.012 or 0.017, the level used dependant on the number of comparisons made for the same sex and age class (Holm 1979).

RESULTS

Crop harvests coincided with the breeding season. Family groups remained relatively discrete at this time as males continually searched for females in estrous. These family groups interacted socially when feeding on crop fields but usually bedded apart. Females approaching or experiencing estrous were usually alone or with a mature male, often with 1 or more attendant yearling males present but unable to mate. Once she was bred, any living fawns quickly rejoined her. Postbreeding, with crops removed and crop fields barren of cover, family groups and antlered males began forming large mixed sex aggrega-

tions (up to 80 deer) usually led by a mature doe that fed and bedded together from late December to late February or early March.

In the spring, after breakup of these large groups, pregnant females reduced their home range to a parturition site and drove away their fawns of the previous year. This family breakup resulted in a spring-early summer dispersal of these yearlings of both sexes. Marked male dispersals averaged 57%, 78%, and 68% and marked female dispersals averaged 49%, 22%, and 45% from the east-central, west-central, and northern study areas, respectively. While the bulk of emigration occurred in the late spring, there was an additional dispersal in fall among males only (75% in spring, 25% in the fall). Following parturition, females fed and bedded alone or with their fawns throughout the summer into early fall.

Social interactions
Fawn males were somewhat less likely to be seen with their mother than were fawn females during June–November, but they were equally likely to be with their mother December–May (Tables 1 and 2). Male fawns were also more likely to be seen alone during fall than were female fawns. When not alone, male fawns were more likely to be with male siblings October–May than with female siblings (Table 1). Fawn females were seen with their mother about half of all observations throughout the year. Fawn females also associated with siblings of both sexes at about the same level throughout the year (Table 2).

Yearling males spent about the same amount of time with their mother throughout the year (Table 1) but were more likely to be seen alone during the fall than were female yearlings ($X^2 = 25.3$, df = 1,386, P < 0.0001). Yearling males were much more likely to be with a brother in summer than with either mother or sister (53% of summer observations with a brother, 28% with a sister, and only 12% with their mother, $X^2 = 53.6$, df = 2,803, P < 0.0001). They avoided their sister during the breeding season ($X^2 = 7.5$, df = 1,383, P < 0.007), when they were usually seen alone. During post-breeding, they spent most of their time in company with other yearling or adult males (Table 1).

We found that barren and pregnant female yearlings were about equally likely to associate with their mother during June-September (P > 0.05), but barren females were more likely to be seen with mother from October through May ($X^2 = 43.4$, df = 1,877, P < 0.0001) (Table 2). Parous yearling females were more likely to be seen alone during June-September than were barren females, who were more likely to associate with brothers ($X^2 = 8.1$, df = 1,342, P < 0.004) or sisters ($X^2 = 12.7$, df = 1,342, P < 0.0004) during this interval.

Adult males ignored their mother and other relatives throughout the year, associated with unrelated adult females only during the breeding season and were most often seen alone or with other unrelated males (Table 1). During late spring and summer, these adult males left their winter range and ventured into crop fields devoid of woody cover and separated from females. For 6 adults on the east-central area, these movements averaged 1.2 km; 3 adults on the northern area averaged 0.65 km away from their winter-spring range. They were usually alone or with 1 or more males on these summer ranges (Table 1).

During June–September, 2-year-old females were usually alone and less likely to associate with their mother than were parous yearlings ($X^2 = 6.9$, df = 1,514, P < 0.009). During December–May, 2-year-old females were also less likely to associate with a sister ($X^2 = 10.7$, df = 1,1175, P < 0.001) than were parous yearlings.

Females > 3 years old were less likely to associate with their mother throughout the year (all seasons, P < 0.002) compared with 2-year-old females, but were as likely to be alone during the parturition season (32% for 2-year-old and 31% for 3-year-old females). These older females were also less likely to be alone during the breeding season compared to 2-year-old does ($X^2 = 7.07$, df = 1,735, P < 0.007). Fawns of older females seem to be more active, with less time spent hiding compared with fawns of 2-year-old does, perhaps because these more dominant females could better defend these active fawns from other deer.

DISCUSSION

The basic social interactions observed by us were similar to those reported by Hawkins and Klimstra (1970) as occurring among deer in southern Illinois (primary association of mother and fawns, family breakup in late spring, male groups forming post breeding, regrouping of maternally related females in the fall and winter). However, the restrictions imposed on deer by the fragmented landscapes of central and northern Illinois have created conditions for some behaviors unique to the agriculturally dominated Midwest. These include: (A) formation of large intact feeding and bedding groups of mixed sex following crop harvest. This behavior has been observed in South Dakota (Sparrowe and Springer 1970), Iowa (Zagata and Haugen 1973), and Missouri (Zwank et al. 1979). Hawkins and Klimstra (1970) observed smaller feeding groups of 25–30 deer that separated frequently from day-to-day. The feeding association of mixed sex groups in Illinois was similar to associations observed in south Texas, an area of large openings in the landscape (Hirth 1977); (B) Higher associations of yearling males with their female relatives following family breakup (Table 1). In southern Illinois, yearlings of both sexes had little contact with their dam in summer after family breakup in late spring (Hawkins and Klimstra 1970). The fragmented nature of woody cover and high densities of deer likely resulted in the higher interaction of yearlings with female relatives; (C) Much higher dispersal of females from our study areas compared to southern Illinois where female dispersal averaged only 13% (Hawkins and Klimstra 1970). Aycrigg and Porter (1997) noted a more complex social system occurs where female survival is high and habitat is extensive. Where female survival is lowered and habitat fragmented, female philopatry would be lessened, the situation in much of Illinois (Nixon et al. 2001). Nixon et al. (2007) believed a combination of high female densities and reduced habitats suitable for parturition contributed to this high rate of dispersal among females; (D) Habitat fragmentation and crop harvest facilitates breeding as deer come together within the remaining cover after crop harvest. Fawn production was high on our study areas (Nixon and Etter 1995) and fawn recruitment to one year old was also quite high (Fawn breeders – 0.62-0.78 fawns per doe; yearling breeders – 1.05-1.45 fawns per doe; adult breeders – 1.39-1.79 fawns per doe) (Nixon et al. 1995).

Male fawns are considered to be more independent of family at an earlier age than are female fawns (Schwede et al. 1993). Male fawns are also reported to dominate female

siblings beginning at about 6 months old, which may affect their association (Townsend and Bailey 1981) and our male fawns associated more with male siblings during fall and winter (Table 1). Guinness et al. (1979) found that female red deer calves (*Cervus elaphus*) were more frequently seen with their mother than were male calves.

Other studies have indicated that fawns are not often seen with their mother before September (Hawkins and Klimstra (1970). Our data tallies closely with that of southern Illinois wherein 30-40% of the females observed in summer were alone. We did, however, occasionally observe fawns with their mother even in June (Tables 1 and 2). The reduced habitat available on our study areas may have made observations of these young fawns somewhat more likely. The social position of the mother may also affect fawn hiding behavior. Female No. 110, a dominant doe and leader of up to 40 deer in winter, made no effort to isolate herself from other deer pre-or postpartum.. One of her fawns was seen < 48 hours postpartum with 110 amid a group of deer and was later captured and tagged while with 6–8 other females. This suggests that very dominant females may not have to isolate themselves from other females postpartum because they can retrieve any fawn that wanders into the home range of other females before imprinting on their mother, a problem faced by less dominant females (Ozoga et al. 1982).

During summer, yearling males were often associated with their siblings, were alone, or with unrelated yearling males. They also associated more often with their mother (14%) than yearling males observed in southern Illinois (3%, Hawkins and Klimstra 1970). During the breeding season, yearling males were usually alone or with other yearling males

During the prebreeding season, adult males were seen alone or with other adult and yearling males, often well out in crop fields and away from females and fawns. These male associations often persisted all summer and are thought to reduce male aggression in the fall because of dominance hierarchies formed during the spring and summer (Brown 1974). In the fall they were also usually alone and constantly moving throughout their home range except when with adult females. This pattern of behavior is common with Cervidae where the prevailing breeding system is the "tending bond" type where a dominate male attempts to isolate a female during estrous (Clutton-Brock et al. 1982, Kucera 1978, Marchinton and Hirth 1984).

Barren yearling females associated with their mother and other female relatives more often than parous yearlings throughout the year. Maternal success determines the social status of young females (Miller and Ozoga 1997) and our barren females apparently reverted to fawn status in the social hierarchy. They attempted to associate with their mother as soon as she would permit it after her parturition. We observed that these yearlings usually dominated their younger half siblings of both sexes as they traveled together. Guinness et al. (1979) found that barren red deer hinds also were more likely to associate with female relatives than were parous hinds.

Older females (> 3 years) were seen less often with their mother than were 2-year-old females throughout the year. Schwede et al. (1993) also observed that older females avoided their mother during the summer. Clutton-Brock et al. (1982) observed that red deer female association with their mother declined with age. They also reported that

daughters of dominant mothers spend more time associating with their mothers than daughters with subordinate mothers.

The greater tendency for solitary behavior of male fawns compared to female siblings did not increase male fawn mortality on our study areas (Nixon and Etter 1995). The large numbers of fawns and yearlings dispersing from our areas did impact hunting success over a considerable area. For example, we tracked dispersers over a 40,000 km^2 area surrounding the east-central study area (Nixon et al. 1991), frequently onto areas devoid of deer by late spring (Nixon and Hansen 1992). If, as seems likely, such dispersals occur throughout central and northern Illinois, hunters often depend on dispersal behavior to restock many heavily hunted areas each fall (Hansen et al. 1997). The success of such restocking would depend on the distance from a source population and hunting pressures existing from year-to-year. The fall dispersal of yearling males also contributes to harvests as hunters seek antlered males, and these yearlings traverse areas where the dangers are unknown.

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LITERATURE CITED

Aycrigg, J. L. and W. F. Porter. 1997. Sociospatial dynamics of white-tailed deer in the central Adirondack Mountains, New York. J. Mammal. 78:468–482.

Brown, B. A. 1974. Social organization in male groups of white-tailed deer. Pp. 436–446. In V. Geist and F. Walther (eds). The behavior of ungulates and its relation to management. Vol. 2. Int. Union Conserv. Nat. Publ. 24. Morges, Switzerland.

Brant, C. A. 1992. Social factors in immigration and emigration. Pp. 96–141. In N. C. Stenseth and W.Z. Lidicker, Jr. (eds). Animal dispersal: small mammals as a model. Chapman and Hall, NY.

Clutton-Brock, T. H. , F. E. Guinness, and S. D. Albon. 1982. Red deer: behavior and ecology of two sexes. The Univ. Chicago Press, Chicago, Ill. 378pp.

Gladfelter, H. L. 1984. Midwest agricultural region. Pp. 427–440. In L. K. Halls (ed). White-tailed deer: ecology and management. Stackpole Books, Harrisburg, Pa.

Guinness, F. E., M. J. Hall, and R. A. Cockerill. 1979. Mother-offspring association in red deer (*Cervus elaphus* L.) on Rhum. Anim. Behav. 27:536–544.

Hansen, L. P., C. M. Nixon, and J. Beringer. 1997. Role of refuges in the dynamics of outlying deer populations: two examples from the agricultural Midwest. Pp. 327–345. In W. J. McShea, H. B. Underwood, and J. H. Rappole (eds). The science of overabundance: deer ecology and population management. Smithsonian Institution Press, Washington, D.C.

Hawkins, R. E. and W. D. Klimstra. 1970. A preliminary study of the social organization of the white-tailed deer. J. Wildl. Manage. 34:407–419.

Hirth, D. H. 1977. Social behavior of white-tailed deer in relation to habitat. Wildl. Monog. 53. The Wildlife Society, Washington, D. C.

Holm, S. 1979. A simple sequentially rejective multiple test procedure. Scand. J. Stat. 6: 65–70.

Iverson, L. R., R. L. Oliver, D. P. Tucker, P. G. Risser, C. D. Burnett, and R. C. Rayburn. 1989. The forest resources of Illinois: an atlas and analysis of spatial and temporal trends. Ill. Nat. Hist. Surv. Spec. Publ. 11. 181pp.

Kucera, T. E. 1978. Social behavior and breeding system of the desert mule deer. J. Mammal. 59:463–476.

Marchinton, R. L. and D. H. Hirth. 1984. Behavior. Pp. 129–168. In L. K. Halls (ed). White-tailed deer: ecology and management. Stackpole Books, Harrisburg, Pa.

Miller, K. V., O. E. Rhodes, Jr., T. R. Litchfield, M. H. Smith, and R. L. Marchinton. 1987. Reproductive characteristics of yearling and adult male white-tailed deer. Proc. Annul. Conf. S.E. Assoc. Fish and Wildl. Agencies 41:378–384.

Miller, K. V., and J. J. Ozoga. 1997. Density effects on deer sociobiology. Pp 136–150. In W.J. McShea, H.B. Underwood, and J.H. Rappole. The science of overabundance: deer ecology and population management. Smithsonian Institution Press, Washington, D.C.

Nixon, C. M., L. P. Hansen, P. A. Brewer, and J. E. Chelsvig. 1991. Ecology of white-tailed deer in an intensively farmed region of Illinois. Wildl. Monog. 118. The Wildlife Society, Washington, D.C.

Nixon, C. M., and D. Etter. 1995. Maternal age and fawn rearing success for white-tailed deer in Illinois. Amer. Midl. Nat. 133:290–297.

Nixon, C. M., J. B. Sullivan, R. Koerkenmeier, D. Etter, A. Wolf, J. Roseberry, J. Kube, and E. J. Heske. 1995. Illinois Forest Game Investigations. Ill. Dept. Nat. Resources, Fed. Aid in Wildl. Restor. Final Rep. Proj. W-87-R-17.

Nixon, C. M., and L. P. Hansen. 1992. Habitat relationships and population dynamics of deer in the intensively farmed Midwestern United States. Pp 22–29 In R. D. Brown (ed). The biology of deer. Springer-Veriag, NY.

Nixon, C. M., L. P. Hansen, P. A. Brewer, J. E. Chelsvig, T. L. Esker, D. Etter, J. B. Sullivan, R. G. Koerkenmeier, and P. C. Mankin. 2001. Survival of white-tailed deer in intensively farmed areas of Illinois. Can. J. Zool. 79:581–588.

Nixon, C. M., P. C. Mankin, D. R. Etter, L. P. Hansen, P. A. Brewer, J. E. Chelsvig, T. L. Esker, and J. B. Sullivan. 2007. White-tailed deer dispersal behavior in an agricultural environment. Amer. Midl. Nat. 157:212-220.

Ozoga, J. J., L. J. Verme, and C. S. Bienz. 1982. Parturition behavior and territoriality in white-tailed deer: impact on neonatal mortality. J. Wildl. Manage. 46:1–11.

Pederson, V. C. 1982. Productivity of various age classes of Illinois deer. Pp. 108–125 In F. Loomis, J. Kube, and J. Garver (eds). Ill. Dep. Conserv., Fed. Aid in Wildl. Restor. Final Rep., Proj. W-63-R.

Schwede, G., H. Hendrichs, and W. McShea. 1993. Social and spatial organization of female white-tailed deer (*Odocoileus virginianus*) during the fawning season. Animal Behavior 45:1007–1017.

Severinghaus, C. W. 1949. Tooth development and wear as criteria of age in white-tailed deer J. Wildl. Manage. 13:195–216.

Sokal, R. R. and F. J. Rohlf. 1995. Biometry. W.H. Freeman and Co., San Francisco, CA.

Sorin, A. B. 2004. Paternity assignment for white-tailed deer (*Odocoileus virginianus*): mating across age classes and multiple paternity. J. Mammal. 85:356–362.

Sparrowe, R. D. and P. F. Springer. 1970. Seasonal activity patterns of white-tailed deer in eastern South Dakota. J. Wildl. Manage. 34:420–431.

Townsend, T. W. and E. D. Bailey. 1981. Effects of age and weight on social rank in penned white-tailed deer. Amer. Midl. Nat. 106:92–101.

Wood, A. K., R. E. Short, A. Darling, G. L. Dusek, R. G. Sasser, and C. A. Ruder. 1986. Serum assays for detecting pregnancy in mule and white-tailed deer. J. Wildl. Manage. 50:684–687.

Zagata, M. D. and A. O. Haugen. 1973. Winter movements and home range of white-tailed deer at Pilot Knob State Park, Iowa. Proc. Iowa Acad. Sci. 79:74-78.

Zwank, P. J., R. D. Sparrowe, W. R. Porath, and O. Torgerson. 1979. Utilization of threatened bottomland habitats by white-tailed deer. Wildl. Soc. Bull. 7:226–232.

Table 1. Frequency (% of total observations per period) of observations of marked male deer with relatives and strangers during three seasonal periods on three study areas in central and northern Illinois, 1980–1993. Birth date is assumed to be June 1 of the birth year.

Period	No. marked deer seen per month	Total Observations	Mother	Siblings		Half Sibling		Other Relatives	Alone	Strangers			
				M	F	M	F			YM	AM	YF	AF
Fawn													
Jun–Sept	3-8	52	35	19	40	0	0	0	6				
Oct–Nov	8-10	21	29	33	14	0	0	0	24				
Dec–May	17-78	1,191	43	24	19	<1	7	4	3				
Yearling													
Jun–Sept	30-37	316	14	10	13	<1	5	0	17	20	6	8	6
Oct–Nov	21-22	69	11	0	3	0	6	<1	48	13	9	3	6
Dec–May	17-25	240	14	4	<1	<1	5	0	25	26	19	2	5
Adult													
Jun–Sept	10-15	80	0	0	0	0	0	0	40	31	24	0	5
Oct–Nov	16-23	65	0	0	0	0	0	0	54	5	11	0	31
Dec–May	13-19	220	<1	<1	0	0	<1	0	22	31	42	0	2

Table 2. Frequencies (% of total observations per period) of social contacts by marked female deer (with breeding status) with relatives (other includes aunt, cousin, nephew, niece, grandmother) during three seasonal periods on three study areas in central and northern Illinois, 1980–1993. Birth date is assumed to be June 1 of the birth year.

Period	No. marked deer seen per month	Total Observations	Mother	Fawns			Sibling		Half Sibling		Other Relatives	Alone
				M	F	Unk	M	F	M	F		
Fawn (not breeding)												
Jun–Sept	1-5	27	56				22	19	0	3	0	0
Oct–Nov	8-10	54	48				15	28	0	7	0	2
Dec–May	43-84	1,211	45				21	20	<1	3	8	2
Yearling (barren)												
Jun–Sept	17-24	154	23				19	14	<1	9	14	21
Oct–Nov	14-22	109	38				2	6	8	20	14	12
Dec–May	11-23	382	39				<1	5	14	25	12	4
Yearling (parous)												
Jun–Sept	20-15	168	14	4	1	22	7	3	0	3	2	41
Oct–Nov	19-21	96	18	10	12	27	0	11	0	11	2	8
Dec–May	17-26	497	19	8	13	25	<1	14	1	8	11	1
2 year-old (parous)												
Jun–Sept	31-45	348	7	9	10	29	0	2	1	5	5	32
Oct–Nov	32-37	208	5	19	19	33	0	4	1	5	5	9
Dec–May	27-45	680	18	11	16	25	0	8	1	10	9	3
≥3 year-old (parous)												
Jun–Sept	61-89	1,016	2	15	21	26	0	2	0	<1	4	31
Oct–Nov	65-75	529	<1	23	28	33	0	2	0	1	7	4
Dec–May	59-90	2,097	2	22	33	17	0	6	<1	1	10	4