A Late Born White-tailed Deer, *Odocoileus virginianus*, Fawn in Southcentral Wisconsin

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Published reports of peak breeding and parturition dates for White-tailed Deer (*Odocoileus virginianus*) indicate that deer in northern regions typically breed during November and give birth during late May and early June. However, we report a late-born White-tailed Deer fawn killed by a vehicle between 12-13 March 2007 in south central Wisconsin. Morphology measurements and body weight indicated the individual was 63-76 days old, was born between 26 December 2006 and 8 January 2007, and was conceived between 14-27 June 2006. To our knowledge, this observation represents the latest documented breeding activity in northern deer populations.

Key Words: White-tailed Deer, *Odocoileus virginianus*, parturition, breeding, conception, Wisconsin.

Seasonally polyestrous breeding activities of northern White-tailed Deer (*Odocoileus virginianus*) are clearly synchronized by photoperiod (Verme and Ullrey 1984; Verme et al. 1987). However, timing of peak breeding activities and parturition can be affected by nutrition and deer herd demographics (Demarais et al. 2000). Low quality nutrition can prolong breeding and fawning activities, while high quality nutrition can shift peak breeding and fawning periods to earlier dates (Verme and Ullrey 1984).

Breeding dates vary throughout the range of the White-tailed Deer and may occur throughout the year in Central America or within short (2-3 weeks) time periods in northern deer populations (Dahlberg and Guettinger 1956; Moore and White 1971; Verme 1977; Clark 1981; Webb and Nellis 1981; Ozoga and Verme 1984). Similarly, gestation for deer varies from 196 to 213 days (Cheatum and Morton 1946; Haugen and Davenport 1950; Verme 1965, 1969), with peak parturition occurring in late May to early June in most northern deer populations (Verme et al. 1987; Brinkman 2003; Burris 2005).

Although rarely documented, occurrences of late breeding activity have been reported in northern deer populations. Throughout southcentral and northern Minnesota, previous investigations have reported conception dates in captive and free-ranging deer populations between 3 March and 9 April (Erickson 1952; Kerr and Peterson 1988; DePerno and Anderson 2000). However, we were unable to find documentation in the scientific literature of breeding activity occurring during June in northern deer populations. Our purpose was to report an occurrence of a late-born fawn and subsequent evidence of late breeding activity by White-tailed Deer in southcentral Wisconsin.

On 14 March 2007 a vehicle-killed spotted male fawn was retrieved from State Highway 23 near the village of Plain in Franklin Township, Sauk County, Wisconsin (43°16'30"N, 90°03'00"W). Because Highway 23 is frequently traveled by WEI, we are certain this fawn was killed between 12-13 March 2007. At the time of carcass retrieval, recorded body weight was 17.7 kg (39.2 lbs); however, the hindquarters were slightly scavenged. Because the amount of tissue removed by scavengers was minimal (≤ 1 kg), the estimated body weight of this fawn was 18.7 kg (41 lbs).

Normally, fawns from well-fed adult females average 3-4 kg (6.6 to 8.8 lbs) at birth (Verme and Ullrey 1984; Nelson and Woolf 1985; Verme 1989) and typically gain 0.20 to 0.24 kg (0.44 to 0.53 lbs) per day (Robbins and Moen 1975; Verme and Ullrey 1984). Thus, we assumed the fawn weighed approximately

3.5 kg (7.7 lbs) at birth and gained approximately 15.2 kg (33.5 lbs) between its birth and death. Using body measurements and estimated weight gains, we back-dated from the date of collection, suggesting the fawn was 63-76 days old and was born between 26 December 2006 and 8 January 2007. Assuming a gestation period of between 196 and 213 days (Haugen and Davenport 1950; Verme 1965, 1969), conception likely occurred between 14 and 27 June 2006. Also, physical examination indicated the fawn was in good physical condition with obvious white spotting on a relatively coarse hair coat. Admittedly, we used typical daily weight gains previously reported for fawns born during late spring or early summer (i.e., when nutritious forage is abundant) to estimate age and breeding and conception dates. Given the estimated birth date, it is possible that energy acquisition was limited and impeded growth in this individual due to reduced availability of nutritious food resources and limited milk production by the lactating mother during winter months. Consequently, breeding activity and the subsequent birth date may have occurred earlier than our estimates.

Reasons for late conception may be associated with nutritional limitations or winter weather conditions (DePerno and Anderson 2000). Although unlikely in the farmland region of southern Wisconsin, local nutritional limitations may exist. Verme (1965) noted that adult female deer on low quality diets initiated breeding activities several weeks later than individuals on higher quality diets. Van Deelen et al. (2007) reported a female deer from southern Wisconsin carrying five fetuses and McCaffery et al. (1998) noted that fetal rates among yearling and adult female deer in southern Wisconsin varied from 1.7 to 2.0 fetuses per pregnancy, indicating that high quality food resources are available throughout the farmland region of southern Wisconsin.

Late conception may be associated with mild winter weather conditions and deer breeding age. Because age of the breeding female was unknown, we were unable to determine the influence of breeding age. However, Raedeke et al. (2002) noted lower reproductive success in older-aged (i.e., ≥ 7 years of age) Elk (*Cervus elaphus*) while Rosatte and Neuhold (2006) suggested that age of a cow Elk (i.e., 11 years) may have contributed to her inability to meet annual energy requirements for normal reproduction and subsequent late conception and parturition dates during their study. Alternatively, DePerno and Anderson (2000) suggested that mild winter conditions may have extended estrous in a female deer fawn in southern Minnesota, partly explaining their observation of a late-born fawn. Verme and Ullrey (1984) suggested that yearling female deer achieved estrous later than older aged adults while Cheatum and Morton (1946) and Clark (1981) noted that fawns were bred one month later than adults. Also, female deer evidently experience recurrent estrous cycles (Plotka et al. 1977). For example, Cheatum and Morton (1946) suggested that females were capable of cycling into January, while Knox et al. (1988) reported two to seven estrous cycles in adult female deer and a potential breeding season of 172 days. It is possible that an older-aged female deer may have been unable to meet annual energy requirements for normal reproduction, which contributed to late conception and parturition observed in the present study. However, Woodford and McCaffery (2006) concluded that mild winter conditions during 2005 did not contribute to excessive mortality or depressed spring fawn production, and that deep snow conditions were limited throughout northern Wisconsin and absent by April when deer were most vulnerable to winter effects. To this end, it is also possible that a young White-tailed Deer reached sexual maturity during December 2005 and experienced multiple (6-8) estrous cycles before successfully breeding in mid to late June 2006 and consequently giving birth in late December 2006 or early January 2007.

Despite this uncertainty, we suggest that favorable winter conditions and distribution of farmlands throughout southern Wisconsin likely enable deer to maximize growth and reproductive effort at younger age classes, thus contributing to atypical breeding and parturition activities. Moreover, Rosatte and Neuhold (2006) suggested supplemental feeding may have enhanced survival of a late-born Elk calf by providing sufficient energy for the lactating cow to continue milk production during winter months. We further suggest that abundant food resources throughout the southern farmlands minimized potential growth impediments of this fawn by providing sufficient energy for the lactating mother to continue milk production during the winter season, thereby minimizing potential biases in our estimates of age, birth date, and conception dates.

Nonetheless, the sporadic observation of late-born fawns throughout the farmland regions of Wisconsin highlights the need for a greater understanding of the underlying factors that potentially contribute to late breeding activities by White-tailed Deer throughout the Midwest and Great Lakes states. It may be that by monitoring occurrence of late breeding activities that wildlife biologists may be able to identify additional factors affecting deer population dynamics.

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