

Patterns of Habitat Use and Activity in British Populations of Sika Deer of Contrasting Environments

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Patterns of habitat use and activity are presented for sika deer in two contrasting environments: commercial coniferous forests in Dorset and in the vegetationally more diverse New Forest in Hampshire. Extent of use of different habitats and seasonal changes in habitat use are reported for the two areas. Sika in the New Forest showed extensive use of a range of different habitats and considerable variation in habitat use at different seasons. Overall the majority of time was spent in thicket stage conifer plantings or oakwoods (together accounting for 80—90% of observations in all months). Little use was made of agricultural fields or other open ground beyond the woodland edge and most feeding activity was restricted within the woodlands themselves. Due to lack of availability of deciduous woodland in the Dorset study area, Dorset sika were rarely encountered in such habitats and the majority of animals were recorded throughout the year in thicket conifer. They made extensive use of heathland, saltmarsh and agricultural fields beyond the forest boundary, with almost all feeding activity occurring in these habitats. Dorset sika showed a pronounced diurnal cycle of activity, resting up in cover habitats within the woodland by day, leaving the forest to forage in adjacent heathlands and fields at night. Similar diurnal change in habitat use was shown in the New Forest but animals were seen active throughout the 24 h period. It is suggested that the nocturnal habit of the Dorset sika studied is forced upon them by lack of adequate forage within the woodland habitats and the resultant feeding in heathland or agricultural fields. In such open habitats, they are less subject to disturbance if activity is restricted to the hours of darkness.

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1. INTRODUCTION

Sika deer, *Cervus nippon* Temminck, 1838 were introduced to Great Britain, as elsewhere in Europe and Australasia at the turn of the century. They readily established themselves in the wild and populations rapidly increased in number — often despite the presence in the area of other established deer species. The distribution and current status of sika deer in Great Britain are reviewed by Ratcliffe (1987). Populations in certain areas are at sufficient density as to pose a real economic threat to commercial forestry (review by Ratcliffe, 1987) or agricultural land (Mann, 1983); in addition sika hybridise readily within the native

red deer (*e.g.* Lowe & Gardiner, 1975, Harrington 1982, 1985, Ratcliffe, 1987) and may pose a threat to the genetic integrity of that species.

As with many introduced species, sika deer in Europe — and in Australasia (*e.g.* Challies, 1985) — have succeeded in establishing themselves despite gross differences in resources available from those experienced in their native range. In Japan, the preferred habitats are foothills and hilly land at lower altitude, although human competition for these areas has forced them into more mountainous areas (Takatsuki, 1987). They are primarily forest dwellers, but appear to be characteristic of early successional stages rather than climax woodland, preferring clear fells, young plantations and scrubland to dense forest. Even in their native Japan however, sika are found in a great variety of different habitats — from sea level to 2,500 m and in scrublands, secondary grasslands, evergreen broadleaved forest (Takatsuki, 1987). Such opportunism has undoubtedly contributed to their success when introduced to other countries.

Early observation in U.K. suggested that sika were primarily associated in this country with coniferous woodlands or heathland on rather acid soils, and again suggested that they preferred young plantation or early, pre-thicket or thicket stages of growth (*e.g.* Horwood & Masters, 1970). It is possible however that this reflects more the areas of initial introduction (Ratcliffe, 1987), and habitat availability, than true preference. Sika have been established in deciduous and mixed woodland in the New Forest in Hampshire since 1904, and as their range expands elsewhere it is clear that they may be as versatile and flexible in terms of habitats occupied in the U.K. as in their native Japan.

This paper presents an analysis of habitat use by populations of sika deer established in two completely different types of environment in Southern England: commercial coniferous forest in Dorset and the more varied mixed woodlands of the New Forest in Hampshire. The two areas offer to the deer totally different resources so that habitats used and patterns of habitat use are necessarily different. However, comparisons of the patterns of habitat use expressed in the two areas show clearly how the sika use the resources available in each case to satisfy similar requirements, and highlight those fundamental requirements in each season of the year.

2. STUDY AREAS

The New Forest in Southern Hampshire is an extensive area of some 37,500 ha of mixed vegetation occupying a central position on the Eocene and Oligocene strata in the downfold of chalk known as the Hampshire Basin. Rising to just

over 130 m above sea level in the north, the area consists of various levels of sedimentary sands and gravels, covered in the main by thin soils. Of the entire area, some 9,000 ha are occupied by towns and villages a further 8,500 ha are enclosed for commercial silviculture; of the remaining 20,000 ha, the majority consists of deciduous woodland, open heathland and acid tolerant grassland (for a full description see Tubbs, 1968, 1986 or Putman, 1986).

Within the Forest as a whole sika deer are restricted in the main to a small area in the south of the forest. This area, comprising Frame Heath Inclosure, Stockley, New Copse and Hawkhill, together with the adjacent heathlands of the forest and the neighbouring Beaulieu Estate, (grid reference: SZ 340025) occupies some 1,000 ha and is bounded to the north by the Southampton to Bournemouth railway line, the Lymington river to the west and the sea to the south. It is an area of mixed and deciduous woodland with several pockets of coniferous plantation. The total population of sika deer is estimated at ca. 170 (but see Putman & Sharma, 1987); the area also supports small, transient populations of fallow deer (*Dama dama*) and roe deer (*Capreolus capreolus*).

Comparative data were collected from two study sites within commercial coniferous forest in Dorset. The main block of Wareham Forest (grid reference: ST 8594), situated to the west of Poole Harbour between the A35 and A352 trunk roads, consists of some 3,000 ha of coniferous woodland (primarily Corsican pine, *Pinus nigra*) planted on tertiary deposits of acid sands and gravels. Surrounding the commercial timber blocks are extensive tracks of agricultural land and smaller reaches of acid heath. Populations of sika deer are estimated at several hundreds; the area also supports small populations of roe deer. The nearby Purbeck Forest (ca. 2,000 ha), situated to the south of Poole Harbour (grid reference ST 9885), is essentially very similar in type. Plantations of Corsican pine established between 1949 and 1958 form the nucleus of the area and are surrounded by acid heathland to the east, farmland to the west. (Studies of the behaviour and ecology of sika deer in Wareham and Purbeck forests have previously been reported by Horwood and Masters; 1970).

3. METHODS

Transect routes were established in each study site to sample areas representative of the main vegetation types of the study site. In the New Forest, separate routes were established for transects covered on foot — in the core of the animals' range — and for transects covering a larger area around that core, which were surveyed by motor car. Walked transects were between 1 mile — 1 1/2 miles long and took ca. 40 minutes to traverse. Between September 1979 and September 1980, walked transect routes were surveyed for a full 24h period once a week: each route was walked hourly between 0400 and 2000 GMT and through the night at 2200, 2400 and 0200 hours. Each time deer were located, records were made of habitat occupied, number of deer visible, by age and sex, and activity. Walked transects, while they provide detailed information, necessarily survey only a small part of the total range. Accordingly, a second set of transects, covering a far greater area, were surveyed from a vehicle. In the New Forest a route covering nine miles of forest tracks was traversed every other hour through the 24h period, once each week, from May 1980 to November 1981. Similar transect routes were established in Wareham and Purbeck forests, (where due to the lower density of

sika, such driven transects were the only method employed). Transects in Wareham and Purbeck were surveyed in alternate weeks from October — December 1980 (Wareham) and January — October 1981 (Purbeck). In each case, as for walked transects, records were made of animals seen, habitat occupied, numbers of deer of each age and sex and activity. Nighttime observations were facilitated by use of a car-mounted searchlight, which enabled animals up to 1/4 mile away to be detected.

For the purpose of this study, nine distinct vegetational-types or habitats were recognised, as:

1. Deciduous woodland. Mainly deciduous stands with a mixed canopy, dominated by oak (*Quercus robur*) and beech (*Fagus sylvatica*), but with occasional Scot's Pine (*Pinus silvestris*) and Douglas Fir (*Pseudotsuga menziesii*). A secondary canopy of holly (*Ilex aquifolium*), yew (*Taxus baccata*), hawthorn (*Crataegus monogyna*) or blackthorn (*Prunus spinosa*) is common. Ground vegetation is sparse, but there are patches of *Agrostis capillaris* and *A. curtisii*, and occasionally bramble (*Rubus agg*) and rose (*Rosa canina*). This is by far the most frequent habitat encountered within the woodland areas of the New Forest; it is but poorly represented in the primarily coniferous forests of Wareham and Purbeck.

2. Coniferous plantation. This was defined as any area planted with conifers (of whatever species) in or after 1975. No tree is higher than 1.5 m and there is an extensive and varied ground cover containing several species of grasses and forbs, as well as patches of *Calluna vulgaris*.

3. Prethicket conifer. Areas of conifer planted around 1965 with trees at approximately 4.5 m in height. Lower branches meet but do not interlock. Areas are extensively grassed, but *Calluna vulgaris* and *Rubus* are also present (particularly at Wareham).

4. Thicket conifer. Trees in thicket-stage areas were planted around 1950, exceed 6 m in height and have needle-less, interlocking, lower branches. The areas are very dense and, due to poor light conditions ground vegetation is almost non-existent.

5. Polestage conifer. Polestage areas are dominated by trees planted in 1930—1940. The areas have been opened up by extensive thinning and by removal of all lower branches. In consequence, a ground cover of grasses, forbs and commonly bracken (*Pteridium aquilinum*) has become re-established; in addition a shrub layer of holly (*Ilex aquifolium*) and birch (*Betula* sp.) may be developing.

6. Clear fell. In both coniferous and mixed or deciduous woodland, clearfelled areas are identified as a distinct habitat type. Such areas are open and recolonised by herbs, grasses, bramble and rose.

7. Rides. Grassy and gravel-covered rides transect all three forests, as access routes and boundaries to forest compartments. They support a rich growth of grasses (*A. capillaris*, *A. curtisii*, *Luzula campestris*, *Deschampsia flexuosa*, *Holcus lanatus* and *Festuca* species) as well as rushes (*Juncus* sp.) and many forbs.

8. Heathland. In all study sites, areas of heathland adjoin the main woodland blocks. Characterised by *Calluna vulgaris*, which constitutes 85% of the cover, it also support clumps of *Ulex europaeus*, *Molinia caerulea*, and *Vaccinium*. In the New Forest, heathland areas are regularly cut or burned on a 12 year rotation (Tubbs, 1968, 1986); by contrast at Purbeck, where the heathlands are not managed in this way, the *Calluna* may be tall enough to offer considerable shelter to deer when lying down.

9. Agricultural land. Once again, in all areas, woodland margins adjoin agri-

Table 1

Vegetation types recognised in this study and their relative availability to the deer in the two study areas. *Heathland, being an extensive, perimeter habitat was estimated using a depth of 200 m.

Habitat	Area in study area as a whole (ha)	Area surveyed in walked transects (ha)	Area surveyed in driven transects (ha)
New Forest			
Deciduous woodland	322	4.7	40
Coniferous plantation	1	0.8	0.5
Prethicket conifer	117	1.6	1.4
Polestage conifer	217	0	35
Clearfell	41	1.5	11.5
Rides	28	2.2	7
Heathland* and saltmarsh	95	0	5
Agricultural fields	7	0	3
Purbeck Forest			
Deciduous woodland	25	—	1
Thicket conifer	1523	—	20
Rides	28	—	10
Heathland* and saltmarsh	314	—	53
Agricultural fields	240	—	36

cultural land. In most cases such farmland is pasture grazed by cattle and sheep or horses.

The relative area of each of these community-types within the Dorset and New Forest study areas is shown in Table 1.

Of necessity, survey transects could not sample all vegetation types equally, nor in perfect proportional relationship to their availability within the population's entire range. In presenting analyses of habitat use patterns therefore, in Tables 2, 3 and 4, correction has been made for this sampling bias: numbers of animal observations in any habitat have been weighted by the relative area of that habitat surveyed in relation to its total availability within the animals' range, before overall percentage figures of habitat occupancy have been calculated. Values in Tables 2—4 thus represent corrected percent occupancy of different habitats as for the entire study area, and should be related to the relative areas of those different habitat-types available within the entire study site column 1 of Table 1).

4. RESULTS

Patterns of habitat use in Purbeck and the New Forest are summarised in Tables 2 and 3 which also show seasonal changes in habitat

Table 2

Use of available habitats by sika deer in Purbeck Forest during 9 months observation in 1981. Numbers are the estimated percentage use made of each habitat by the whole study population (data from driven transects). Percentage occupancy was calculated on the basis of the absolute number of observations (N). Note, however, that percentages were calculated after these raw data had been weighted for differential sampling bias. See text for details.

Habitat	Jan	Feb	Mar/Apr	May	June	July	Aug	Sept
Deciduous woodland	4	4	2	0	0	0	0	7
Thicket conifer	46	23	40	58	53	59	41	36
Mature conifer	0	0	0	0	0	0	0	0
Heathland and saltmarsh	13	38	15	9	15	13	18	17
Agricultural fields	33	32	41	32	27	24	37	38
Woodland rides	4	3	2	2	5	4	4	2
N	629	285	556	322	243	191	265	507

use during the year. While, in commercial conifer forests such as Wareham and Purbeck, the varied species composition of the different blocks and different growth stages provides considerable diversity of habitat, sika seemed to restrict their activity primarily to one woodland type: the relatively impenetrable thicket stage coniferous areas. Pattern of use of the range revealed by driven transects was simple, with animals lying up in dense thicket during the day and moving out onto the heaths or onto farmland to feed at night (Fig. 1). This regular daily migration was most marked and similar throughout the year; indeed (Table 2) the overall pattern of use of the available habitats changed little between the seasons.

In contrast to the primarily coniferous woodland of sika habitat in Dorset, the New Forest offers the deer a more varied environment and one of predominantly deciduous woodland. In response, driven transects revealed a more variable pattern of habitat use, and showed more pronounced seasonal variation in the communities exploited (Table 3). Most of the animals favoured deciduous woodland habitat throughout the winter period, continuing to exploit these mixed woodlands in spring and summer during the hours of darkness, but during daylight making extensive use of a variety of other habitats, most notably prethicket areas of conifer. Use of agricultural land was minimal.

The more extensive surveys of driven transects were supported, in the New Forest, by walked transects from 1979–80; offering a more comprehensive survey of the animals' movement and activity but restricted to only one part of the populations' range. Results (Table 4) show a broadly similar pattern of habitat use as that revealed by driven transects, with extensive use of areas of prethicket conifer and of oak wood-

Table 3

Habitat use by sika deer in the New Forest (Hampshire) in 1980-81. Numbers are the estimated percentage use made of each habitat by the study population (data taken from driven transects). Percentage occupancy was calculated on the basis of the absolute number of observations (N). Note, however, that percentages were calculated after these raw data had been weighted for differential sampling bias. See text for details.

Habitat	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Deciduous woodland	36	44	48	36	36	25	27	32	38	51	70	65
Thicket and prethicket conifer	48	38	34	54	51	57	52	47	34	32	19	18
Polestage conifer	6	8	5	3	4	7	7	7	6	9	5	6
Mature conifer	0	0	0	0	0	0	0	0	0	0	0	0
Clearfell and plantation	1	3	4	1	2	2	5	3	11	2	1	2
Heathland	0	0	0	0	0	0	0	0	1	1	0	0
Open fields	1	3	4	1	1	2	3	2	1	1	0	1
Woodland rides	8	4	5	4	5	6	6	7	10	5	5	8
N	576	585	295	346	1167	1032	906	1156	582	1512	1260	354

Table 4

Habitat use by sika deer in the New Forest from walked transects of core area (1979-1980). Numbers are the estimated percentage use made of each habitat by the study population. Percentage occupancy was calculated on the basis of the absolute number of observations (N). Note, however, that the percentages were calculated after these raw data had been weighted for differential sampling bias.

Habitat	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Deciduous woodland	64	64	74	53	47	44	31	49	70	58	61	72
Thicket and prethicket conifer	19	19	12	38	35	39	62	29	13	14	30	17
Polestage conifer	7	5	4	1	2	4	1	9	8	24	5	8
Mature conifer	0	0	0	0	0	0	0	0	0	0	0	0
Clearfell and plantation	6	10	7	4	12	8	3	7	5	0	0	0
Woodland rides	4	3	3	4	4	5	3	6	4	4	4	3
N	648	406	304	556	464	412	394	372	395	394	397	652

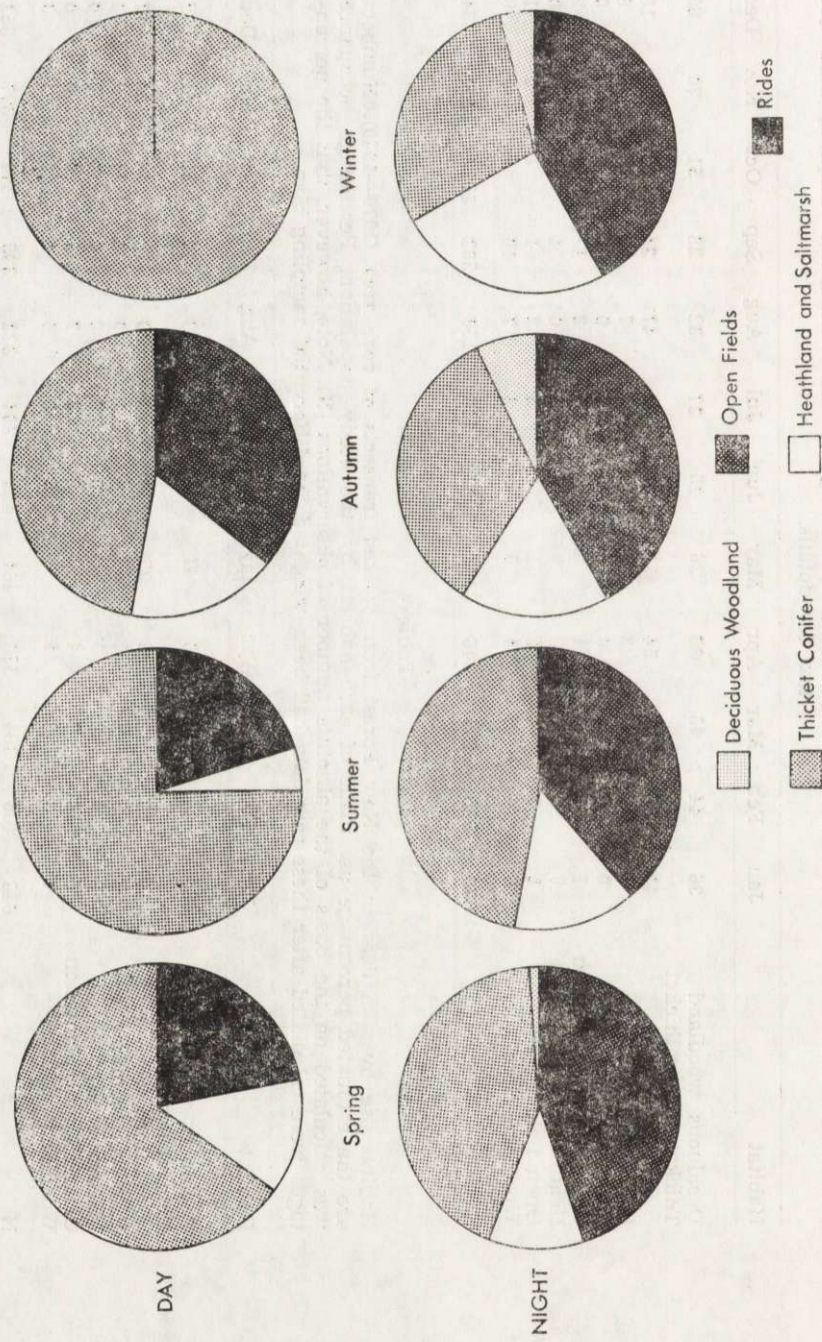


Fig. 1. Differences in daytime and nighttime occupation of habitats by sika in Purbeck Forest. (Spring: March—May; Summer: June—August; Autumn: September—November; Winter: December—February).

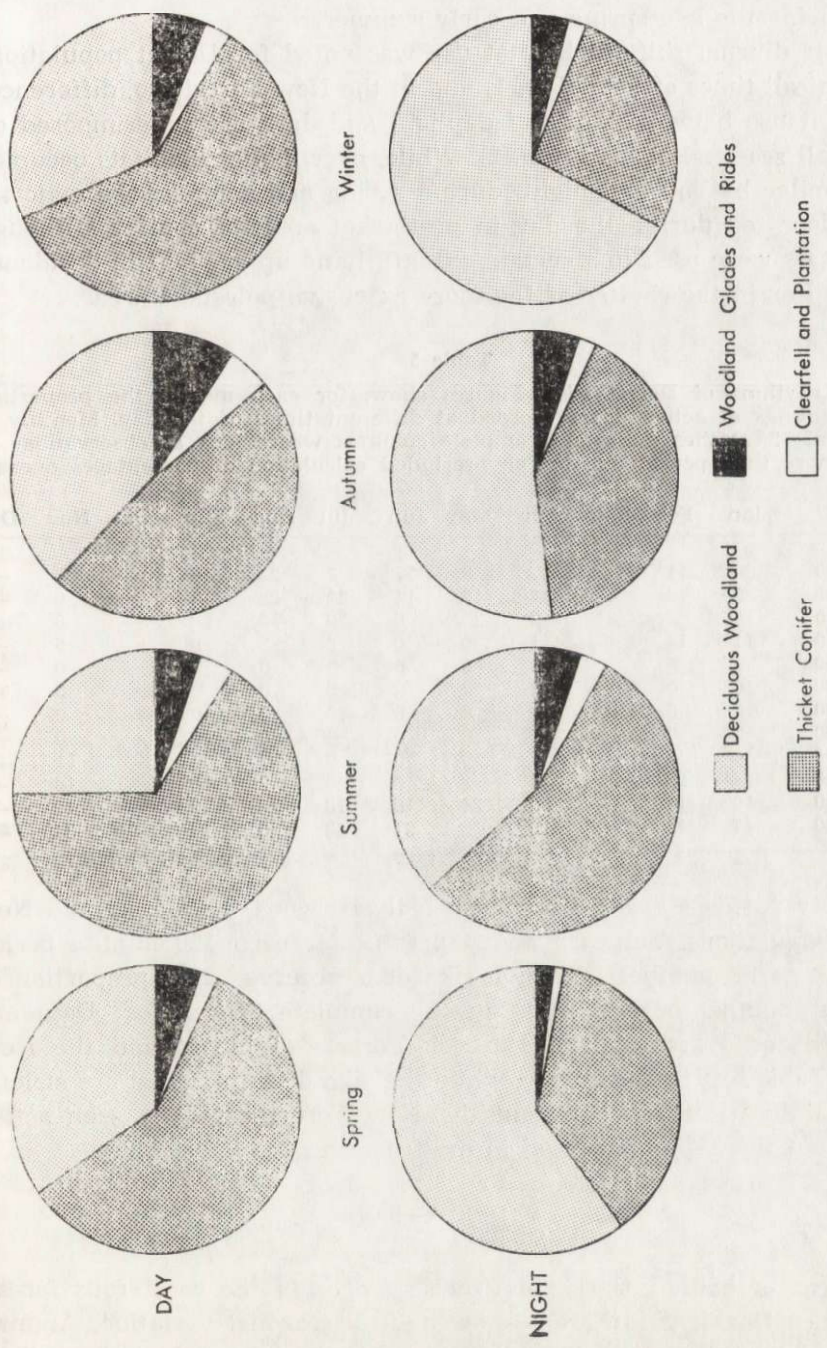


Fig. 2. Differences in daytime and nighttime occupation of habitats by New Forest sika. (Spring: March—May; Summer: June—August; Autumn: September—November; Winter: December—February).

land throughout the year; use of deciduous woodlands is at its highest during autumn and winter, while greatest use is made of prethicket areas during the late spring and early summer.

A clear diurnal shift in habitat use was noted for Dorset populations of sika at all times of year (Fig. 1) and in the New Forest too, differences in habitat use between hours of daylight and dark are superimposed on an overall seasonal change (Fig. 2). While, over winter, habitats occupied were similar by day and night, during spring and summer the majority of the deer fed during the day in prethicket areas of conifer (although all habitats were used to a certain extent), lying up at night in deciduous woodland or in the shelter of the more extensive polestage areas.

Table 5

Activity rhythms of Dorset sika. Figures show, for each month, the proportion of all sightings of active deer recorded at different times of the day. Monthly N as in Table 2. Dashes indicate incomplete columns where lack of observations in one or more time period due to fog precluded calculation of percentages overall.

Hours	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0—0200	20	11	—	17	8	27	7	21	10	—	25	—
0200—0400	9	10	—	11	13	14	22	22	8	—	0	—
0400—0600	10	6	—	9	26	6	10	15	28	—	0	—
0600—0800	11	14	—	1	0	0	0	2	0	—	5	—
0800—1000	1	0	—	0	0	0	0	0	0	—	0	—
1000—1200	0	0	—	0	0	0	0	0	0	—	3	—
1200—1400	0	0	—	0	0	0	0	0	0	—	0	—
1400—1600	0	0	—	0	0	0	0	0	0	—	0	—
1600—1800	8	5	—	4	0	0	0	0	0	—	11	—
1800—2000	14	22	—	10	3	3	0	2	18	—	10	—
2000—2200	10	18	—	30	34	19	18	18	22	—	12	—
2200—2400	17	14	—	18	16	31	43	20	14	—	34	—

Activity patterns also differed markedly between the Dorset and New Forest populations. Tables 5 and 6 present for each 120 minute period of the day, the number of active sika deer observed as a proportion of the total number of deer seen in the complete 24h period. Data are presented for Wareham and Purbeck Forests (Table 5) and the New Forest (Table 6). It is clear that while the sika deer in Dorset are strictly nocturnal in habit, sika deer in the New Forest could be seen active throughout the 24 hours period in most seasons.

5. DISCUSSION

Patterns of habitat use shown by sika deer in the coniferous forests of the two Dorset study areas showed little seasonal variation. Animals lay up during the day in the cover of thicket-stage coniferous woodland

Table 6

Activity rhythms of New Forest sika deer. Figures show, for each month, the proportion of all sightings of active deer recorded at different times of the day. Monthly N as in Table 3.

Hours	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0—0200	9	5	7	2	7	7	7	9	10	8	10	2
0200—0,400	9	5	3	2	7	3	5	7	5	7	9	3
0400—0600	5	2	2	8	10	10	13	11	4	3	5	6
0600—0800	4	5	3	3	11	10	9	9	3	5	4	6
0800—1000	11	5	2	15	6	9	5	5	2	13	15	12
1000—1200	11	13	23	4	9	7	4	3	2	8	4	8
1200—1400	4	4	12	4	5	7	2	1	5	4	2	6
1400—1600	2	5	9	7	8	5	2	2	3	9	6	5
1600—1800	20	16	9	20	8	6	2	6	13	12	14	17
1800—2000	10	16	18	23	7	8	13	10	21	14	9	15
2000—2200	7	12	3	10	18	16	22	24	19	10	6	10
2200—2400	8	9	9	2	3	11	16	13	12	7	16	10

blocks, foraging out onto heathland or agricultural land at night. Essentially similar results were reported for these same populations by Horwood and Masters (1970). In neither Wareham nor Purbeck forests were areas of plantation or clearfell abundant; with little forage available within the forest itself, therefore, the deer must leave the woodland to feed in the more open habitats beyond the forest boundary. Such a restriction of choice in terms of available feeding area also explains both the lack of seasonal variation observed in habitat use, and the fact that animals in both Dorset populations are strongly nocturnal. This pattern of activity is no doubt imposed upon them by the fact that they must leave the cover of woodland in order to forage and are less subject to disturbance if using these exposed habitats at night.

The more varied pattern of habitat use reported for the sika of the New Forest — and seasonal change in habitats favoured — reflects the greater variety of habitats available to the deer which offer acceptable forage and shelter at different seasons. Thus, during the summer, the majority of the New Forest sika feed during the day in small groups in prethicket areas, exploiting the extensive forage supply and also the high degree of cover offered by this relatively dense habitat. Diet at this time of year shows a high intake of grass and leaves (Mann & Putman, 1989) and these items are relatively available in all habitats; although prethicket areas are favoured, some use of all available habitats is thus observed. At night, still in small groups, most of the deer lie up in deciduous woodland or in the shelter of the more extensive polestage areas. Some animals are however observed feeding throughout the 24h period.

During autumn, when acorns and leaves fall, the characteristics of

a large part of the New Forest habitat change rapidly. Prethicket areas still provide cover and food but, both in quality and quantity, forage available is poorer than that offered by deciduous woodlands — which also provide a considerable amount of shelter. Habitat use patterns are seen to shift, with high use of these broadleaved woodlands by day and night. In late autumn and winter, when the mast crop has been exhausted and most of the fallen leaves are decaying, food supplies within the forest are more limited; the deer start to feed more extensively on coniferous browse and *Calluna* (Mann & Putman, 1989). These are still available in a variety of habitats; the animals still spend most of their time within deciduous woodland, but may forage out into prethicket and heathland areas. The fact that sika within the New Forest may find adequate feed within the Forest woodlands through much of the year and thus do not need to leave cover in order to forage also perhaps explains the fact that animals remain active throughout the 24 h period and do not show the pronounced nocturnal habit of Dorset populations. Similar differences in diurnal patterns of activity in relation to disturbance were observed in red deer (*Cervus elaphus*) populations by van de Veen (1979).

The pronounced diurnal migration of Dorset sika deer between thicket stage coniferous woodland and open habitats reflects a response to needs for both forage and shelter from disturbance. Over a longer timescale, seasonal changes in habitat use of New Forest animals correspond to the different relative importance to the animals of food and shelter at different times and to seasonal change in the forage and cover characteristics offered by different habitats. Thus the need for cover is greater in the poorer weather of winter, and must assume greater importance in determining habitat use; in summer, the importance of cover is related merely to freedom from disturbance. Likewise, while in spring and summer many communities offer acceptable forage, in autumn and winter, foraging opportunities are more restricted. In response to both pressures, patterns of habitat use shift between seasons — and at the same time the deer exploit a far wider range of different habitats in summer than in winter.

Despite the differences in habitats available and, in consequence, differences in habitat use, thriving populations of sika deer occur in all study areas. Clearly the needs for shelter, for cover, for forage can be satisfied as well by deer in the New Forest and Dorset forests and the gross differences in patterns of habitat use expressed in the two areas — with needs for food and shelter satisfied by different communities in each case — show that the actual habitat available to the deer in any area is less important than its structural characteristics.

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W DWU RÓŻNYCH TYPACH LASU W WIELKIEJ BRYTANII

Streszczenie

Porównano użytkowanie środowiska i rytm aktywności jeleni sika żyjących w zagospodarowanych lasach iglastych w Dorset i w bogatym, zróżnicowanym lesie New Forest w Hampshire. Jelenie w New Forest spędzały większość czasu w młodnikach (gatunki iglaste i dąb) i tam też żerowały (Tabele 3 i 4). Sąsiadujące z lasem pola i otwarte przestrzenie były odwiedzane rzadko. Jelenie z Dorset były głównie spotykane w młodnikach iglastych, które stanowiły praktycznie jedyny typ lasu na tym terenie, ale użytkowały też niezalesione wrzosowiska, słone bagna i pola poza lasem (Tabela 2). Jelenie te żerowały prawie wyłącznie na otwartych przestrzeniach. Jelenie z Dorset w ciągu dnia odpoczywały ukryte w lesie, nocą zaś były aktywne i żerowały na otwartych terenach (Tabela 5, Ryc. 1). Jelenie z New Forest były aktywne przez całą dobę (Tabela 6, Ryc. 2). Przypuszczalnie nocna aktywność jeleni z Dorset była powodowana niedoborem pokarmu w lesie. Wymuszało to ich żerowanie na otwartych przestrzeniach, gdzie też były mniej niepokojone nocą.