Entomologiske Meddelelser 35 (1967)

The Heteroptera fauna of Korshage, Zealand, in relation to vegetation in late summer.

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CONTENTS

I. Introduction.

Korshage marks the western entrance to the Isefjord in the northern part of Zealand. It constitutes the northeastern point of the sandy, marine foreland which surrounds the diluvial, hilly Rørvig peninsula. Since 1939 part of Korshage has been a nature reserve. From a scientific point of view this area is of particular interest. Here one of the few remaining dune heaths on Zealand is found in connection with an element of continental plant species. Here also is a rapidly changing coastline: along the Kattegat erosion and smoothing of the coast-line is taking place, whereas opposite Korshage, on the Isefjord coast, a considerable amount of soil is accumulating and the land is extending eastward.

Schou (1945) has studied the evolution of land at Korshage from a geographical point of view. Botanically the area is well known as my father, T. W. Böcher (1945, 1952, 1954, etc.) has extensively analized the plant communities, and since 1934 has followed the vegetational succession connected with the build up of land.

During the late summers of 1963 and 1965 an investigation was carried out of the Heteropterous fauna (Geocorisae) of Korshage. The area investigated was restricted to the territory mapped in Fig. 1. Lying just southeast of the point, it measured about 500 $\times$ 200 m. Here the system of beach ridges, due to the exceedingly rapid accumulation of material, attains its maximum width and is especially distinct (Fig. 2). In connection with this accumulation of land, there is a well defined succession of plant communities from the Isefjord coast westward.

II. Aims and methods.

The purpose of the investigation was

1) qualitative, faunistic: What species of Heteroptera are living in the area?
2) distributional: Where in the area, in relation to the plant communities, are the different species found?
3) quantitative: In what numbers, relative to each other and/or to area-unit, do the different species occur?

Sample lines.

From the eastern coast into the land three "sample lines" (I, II and III, Fig.1) extends so as to traverse as many different plant

communities as possible. The lines were marked at 10 m intervals by means of stones or sticks. The purpose of the lines was 1) to facilitate the field work and 2) to serve as axes along which most of the samples were taken.

Collection.

The collection was undertaken in three ways: By sweeping the herbaceous[1]) vegetation with a heavy insect net, by searching directly on the ground, and by sifting the very low vegetation, especially mosses. In this way the main strata of the area were investigated, by far the most conspicuous of which is the herb (field) stratum (cf. next section).

Sweep net collections.

The predominance of the herb stratum made it natural that the main part of the samples was in the form of sweeping.

The value of sweeping as a method for quantitative research has been very much discussed (e.g. Palmgren 1930, Zubareva 1930, De Long 1932, Gray and Treloar 1933, Beall 1935, Carpenter and Ford 1936, Kontkanen 1937, Romney 1945, Jürisoo 1964). It is unnecessary to review the discussion here, but a few points may be stressed.

Theoretically, if two or more sweeping samples are to be fully comparable, they must be taken in a strictly uniform way by the same person at the same time (!) in vegetation, which has to be homogeneous, dry, neither too low nor too tall, and the weather must be optimal. The "optimal" weather conditions are difficult to define, depending on e.g. the climatic zone, but calm is preferable, and it must be neither unusually cold nor too hot for the season.

Some compromises are of course necessary to comply with these impossible demands. The operator has to perform the strokes with the net as uniformly as possible during the same (short) interval of the day (cf. Marchand 1953, Fewkes 1961, Jürisoo 1964) and more or less identical climatic conditions, and the whole period of investigation should be as short as possible in order to avoid too much change in the faunal composition (if it is not the seasonal changes that are to be studied).

[1]) As regards method of collection, the heath vegetation is considered "herb stratum" — in spite of the fact, that dwarf shrub is the main constituent.

Considering the huge mass of possible sources of error, it is really astonishing, that a number of earlier investigators (Sanders and Shelford 1922, Smith 1928, Shackleford 1929, R. Krogerus 1932, Romney 1945) independently found the yield of 50 sweeps[2]) to be approximately equivalent to the invertebrate population of one square meter[3]). This speaks in favour of the value of sweeping. The present author, however, is only willing to consider it a useful relative method, i.e. it is extremely difficult to relate sweep-net catch to area-unit. In any case, however, so far no other quantitative method has been able to replace the sweep-net; the various cylinder methods etc. (e.g. Beall 1935, Romney 1945, H. Krogerus 1948, Johnson, Southwood and Entwistle 1958) may be more accurate, but they are disproportionately laborious or costly and time consuming. — Sweeping has been used as the only sampling method in a good many modern quantitative investigations of Hemiptera (e.g. Kontkanen 1950, Marchand 1953, Schwoerbel 1957, Jürisoo 1964).

In the present investigation the u n i t s w e e p i n g s a m p l e was chosen as 5 0 s t r o k e s (cf. above). This is in accordance with Smith 1928, Shackleford 1929, R. Krogerus 1932, H. Krogerus 1948 and Marchand 1953. Collection was undertaken as follows. — The sweep net consisted of a bag 50 cm in depth fixed on a circular metal frame of 38 cm diameter and a short handle (45 cm). The sweeps were synchronized with the investigators stride when walking slowly along more or less straight lines. For every 10 strokes the contents of the net was examined and the bugs sorted out by means of a suction-bottle; after one sample (50 sweeps) the catch was killed by means of ethylacetate.

It may be pointed out, that the Heteroptera are among those groups of insects which are best suited for quantitative sweep-net collection. The majority of the species are plant suckers, but even the predators are often closely connected with the vegetation. As with the other hemipterous insects, the feeding habits of adults and immature stages, which are found together in the same environments, are usually identical. Only very few species (at least in northern Europe) are good performers on the wing or powerful leapers. That they are not powerful leapers is an advan-

[2]) With an insect net of about 30 cm diameter. — Sanders and Shelford: about 60 sweeps.

[3]) Romney: one square yard.

tage when compared with the leafhoppers (Homoptera Auchenorrhyncha); on the other hand, this latter group is more homogeneous ecologically, as it is made up of purely vegetarian species moving principally in plant cover accessible to the net (Kontkanen 1950), whereas many of the Heteroptera are more or less confined to the soil surface. This is the reason why it is necessary to introduce other means of collection besides sweeping into an investigation of the land bugs of a certain area.

Other methods of collection.

In localities with relatively sparse vegetation, the soil surface was searched directly, in most cases for one hour, which was considered the unit sample for this type of collection. No attempt was made to correlate the catch obtained by this method with the yield of the sweeping, i.e. to express the results with the same unit e.g. on a square meter basis. It was possible to examine 10—20 square meters per hour. It is inevitable that by searching a selection of the species belonging to the herb- and moss strata is caught in addition to the more permanent ground dwellers.

Samples were taken by sifting from places where mosses and other low plants were prominent. One tenth of a square meter was cut out by means of a sharpened circular metal frame, and the material immediately sifted through a coarse sieve onto a piece of plastic, from which the bugs were caught.

Only very few collections were obtained from the scattered trees and shrubs by beating branches below which a net was held.

Time of collection, weather conditions etc.

Information regarding date and hour of the collections together with some notes on the weather, is to be found in Table 1, which includes all the quantitative samples from the investigation (1—73) in chronological order. Nos. 1—51 date from 1963, Nos. 52—73 from 1965. It will be noticed that the samples were taken during a period of respectively 25 days (14/8—7/9 1963) and 37 days (24/8—29/9 1965). However, the period of sweeping in 1965 was more restricted (24/8—11/9: 19 days).

Most of the samples (66 %) were taken during two and a half hours in the afternoon (1^{30} to 4 p.m.) and the majority during approximately uniform weather conditions: air temperature 17—19°C (84 % of samples), more or less bright sunshine (92 % of

samples) and light to moderate breeze (71% of samples). The catch of six sweep-net samples may be negatively influenced by too strong a wind.

The weather of the two summers in question was relatively cool and wet. Unfortunately so, because this fact made the periods of study longer than desired, owing to the frequent rainy days during which collection was impossible and whereupon it was necessary to await the drying of the vegetation.

The sweep-net collection in 1965 was carried out in order to supplement the material obtained in 1963; most of the searching and sifting was done in 1965. Samples originating from 1963 and 1965, respectively, are combined and treated as a whole in the present paper. This is, admittedly, a very disputable procedure, considering the multitude of factors that might cause the fauna of the two years to be quite different. Pooling of the data seems justified when the following points are taken into account. 1) As mentioned above, the weather was very similar during each of the two summers, i.e. rather cool and wet. 2) It appears from the sweep-net samples that the general composition of the Heteropterous fauna was the same each late summer (cf. Table 3). However, there are some differences, e.g. it looks as if *Phytocoris varipes* in 1965 had exchanged places with *Notostira elongata* as regards abundance, and *Plagiognathus chrysanthemi* was commoner, apparently, in 1965 as compared with 1963. 3) When sweeping samples taken in some localities which in 1963 showed a peculiar fauna composition, are compared with samples obtained from the same places in 1965, they are seen to be fairly identical; (cf. No. 3 to 54 and Nos. 18—19—20 to 56, Table 3). — Notice, that sweeping samples from the oldest part of the dune heath were taken only in 1965. It is accordingly not possible to compare directly the considerable yield of the two samples in question (Nos. 65 and 66) with that of the samples from younger parts of the heath taken in 1963.

It must be stressed that the present investigation deals only with the late summer Heteropterous fauna. This is partly due to an erroneous assumption, based upon previous collections, that the species-composition was relatively constant in mid- and late summer. In addition, the paucity of immature stages in late summer facilitated identification. Recently I have found that the mid-summer aspect of the Korshage Heteropterous

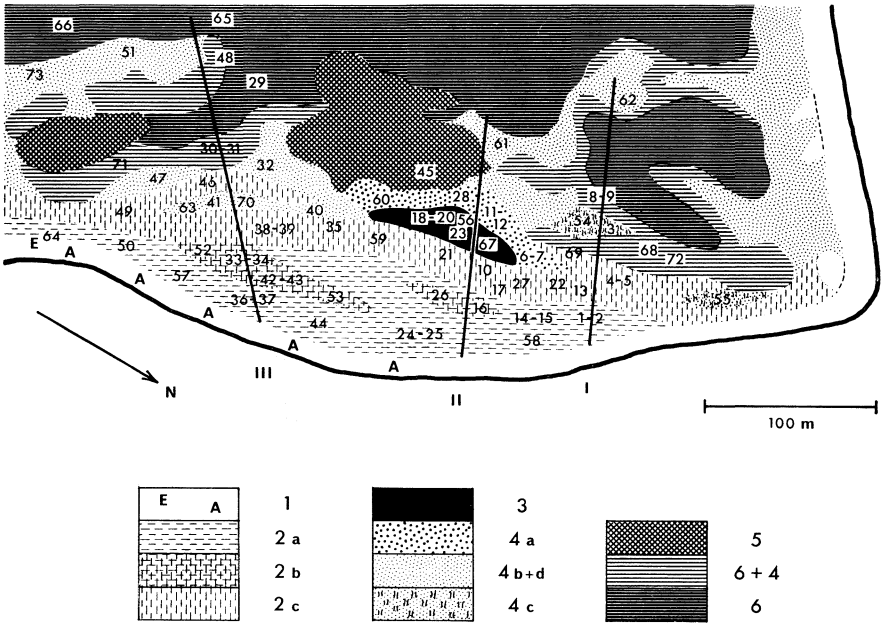

Fig. 1. Map of Korshage with plant communities and sample-localities indicated. 1—73: the numbers of samples (see Table 1). I, II, III: the three sample lines. — Signatures: (1) beach (and "white dune") with fore shore community dominated by *Atriplex* spp. (A) and *Elymus* (E), (2a) outer green dune, (2b) mixed green dune, (2c) inner green dune, (3) dune pasture and swamp, (4a) Thalictrum dune grassland, (4b+d) Carex dune grassland and grey dune, (4c) dune slack grassland, (5) dune scrub, (6+4) dune heath intermingled in dune grassland, (6) dune heath.

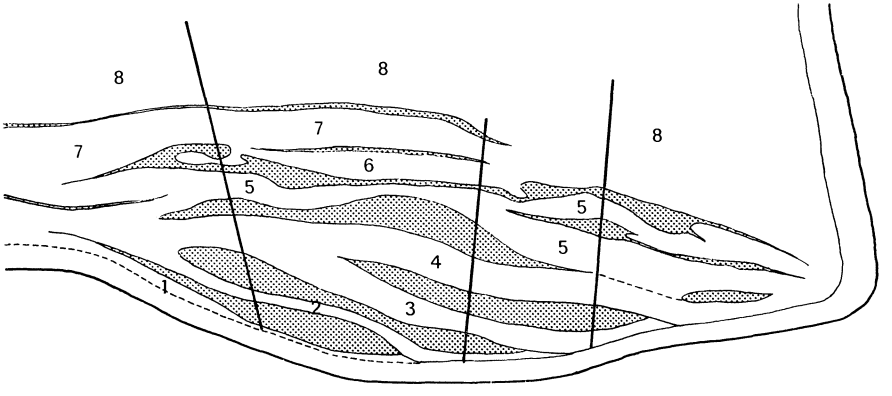

Fig.2. Map of the beach-ridge system of Korshage. The dotted signature indicates depressions between the numbered ridges. — Approximate ages of the beach ridges are as follows (based on T. W. Böcher 1952): (1) 1963, (2) 1941, (3) 1937, (4) 1911, (5) 1895, (6—8) before 1895.

Fig. 3. View from the point of Korshage in a southeasterly direction over the area investigated. In the foreground dense *Ammophila arenaria*-vegetation ("inner green dune"). More distant and to the left the extensive green dune area, in the centre advancing ("younger") dune heath behind which lies the deep depression containing swamp and dune pasture; to the right grey dune. In the background, left, the inlet of the Isefjord, to the right dune scrub and dune heath behind which a coniferous plantation is seen in the distance. — It is possible to distinguish the northernmost part of the beach-ridge system: to the left 4, in the centre 5, and to the right 8. (Compare Figs. 1—2).

Fig. 4. The Isefjord-beach in the southernmost part of the area studied, looking southwards. The vigorous fore shore community is dominated by *Atriplex litoralis* (left) and *Elymus arenarius* (right).

Fig. 5. The transition between swamp (left), dune pasture and "inner green dune" (in the background to the right: beach ridge 4). View towards the north. The shrubs in the middle distance are *Salix cinerea* (left) and *Juniperus communis* (right).

fauna, in fact, deviates greatly from that of late summer concerning both species-composition and relative abundance (see Addendum p. 62).

III. The vegetation.

The vegetation of Korshage constitutes a succession, or sere, of maritime dune communities replacing one another from the Isefjord coast westwards. The youngest seral stage is found on the most recently formed land on the eastern shore, the oldest (probably the local edaphic climax) is a dune heath occupying the western part of the area.

For the purpose of the present investigation a simplified division into plant communities was brought about, which appears in Table 2 and the map, Fig. 1. The terminology is in accordance with Warming (1907), T. W. Böcher (1953) and Burnet et al. (1964). The map was produced partly by means of an air photograph (taken 1959 by Geodætisk Institut, Copenhagen), partly by means of the author's own approximate mapping. Fig. 1 should be compared with Fig. 2, which shows the system of beach ridges together with some historical data concerning the growth of the land. This figure is, besides the author's rough mapping, based on T. W. Böcher (1952, Fig. 3), which in turn is based on the different editions of the topographical maps with a 1 : 20000 scale published by Geodætisk Institut, Copenhagen.

The division into plant communities is summarized below:

1. Beach.
2. Green dune:
   a. Outer green dune.
   b. Mixed green dune.
   c. Inner green dune.
3. Dune pasture and swamp.
4. Dune grassland:
   a. Thalictrum dune grassland.
   b. Carex dune grassland.
   c. Dune slack grassland.
   d. Grey dune.
5. Dune scrub.
6. Dune heath.

A few comments on this division may be given as follows. (For

further information about the flora and the successional stages, see T. W. Böcher 1945, 1952).

The beach of Korshage is composed of pebble and sand alternately, but "white dune" (= fore dune and mobile dune, cf. Warming 1907) is, at present, only found in a few places at the very tip and along the Kattegat coast. The Isefjord beach is largely occupied by a vigorous *Atriplex*-dominated fore shore community (A, Fig. 1), which is manured by the large quantity of decaying seaweed ("wrack") deposited here (Fig. 4).

Without transition the beach passes into the different "green dune" communities, in which *Ammophila arenaria* is the ruling species. East of beach ridge 2 the outer green dune is interspersed with patches of white dune and elements from the fore shore; this area constitutes the youngest seral stage apart from the beach. In the south the outer green dune is bordered against the beach by a fringe of *Elymus arenarius* (E, Fig. 1 and Fig. 4). The inner green dune community is first and foremost covering the prominent beach ridge 4. In the northern part of this the soil is stony ("shingle") and the plant cover is sparse; here the samples Nos. 10, 13, 22, 27 were taken. The rather varied "mixed" green dune vegetation is developed in the lower parts of the furrows between the younger beach ridges (former narrow "lagoons" locked up by spits or bars, cf. T. W. Böcher 1952).

West of beach ridge 4 a deep "valley" contains a small swamp, usually with open water, in the lowest part (Fig. 5); this is surrounded by a "dune pasture", which in turn is replaced (at higher level) by a characteristic steppe-like *Thalictrum minus*-dominated grassland. Other kinds of dune grassland are found in the western part of the beach ridge system, more or less dominated by *Carex arenaria*. A third type of grassland, which includes a few species suggesting drier salt marsh, is developed in two small hollows, former dune "slacks", in the north; it is here termed "dune slack grassland". — The locality, from which the samples Nos. 41, 63, 70 are collected, takes up a position intermediate between the "Carex dune grassland" and the "grey dune", which is very rich in mosses and lichens. A luxuriant form of this last mentioned is found as relic grassland areas in the advancing dune heath (samples Nos. 68, 69, 71, 72), whereas the samples Nos. 51, 61, 73 originate from a poor type of grey dune on the top of beach ridge 8.

A dune scrub dominated by *Ulex europaeus* (here originally in-

troduced by man) is covering parts of the beach ridges 5 to 8. Most of the constituents of the scrub are moreover found scattered throughout the area.

Already on beach ridge 4 the outposts of the *Calluna-Empetrum*-dominated dune heath make their appearance. Further westwards the heath is intermingled in the various kinds of dune grassland (Fig. 3), and on the western part of beach ridge 8 it reaches complete domination.

IV. The Heteropterous fauna of the whole area.

In discussing the abundance and occurrence of the different species of bugs in the samples, the following terms are used:

D o m i n a n c e.

The dominance is the relative frequency of the species. The degree of dominance is generally divided into three classes: dominant-, influent- and recedent species, but according to Kont-

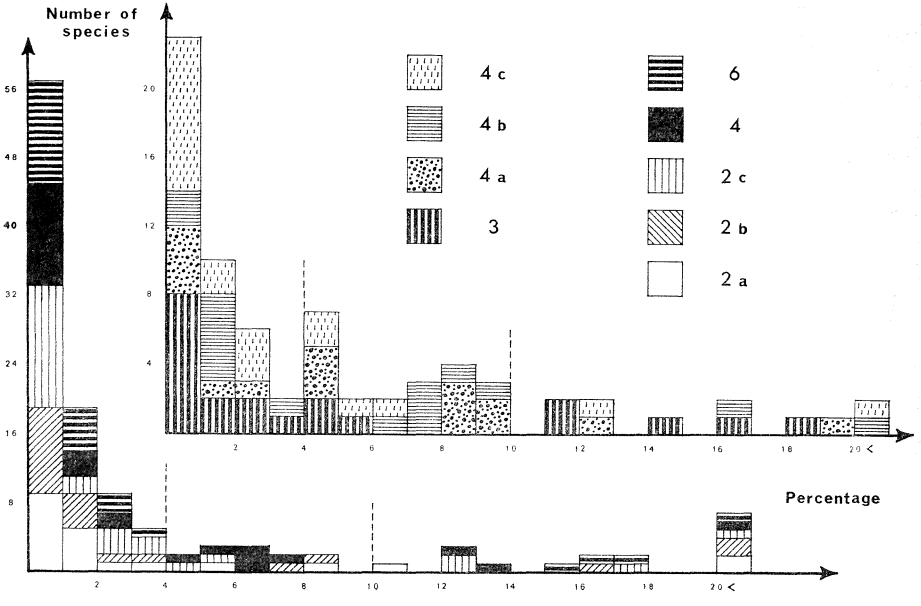

Fig. 6. The number of Heteroptera species which, for each of the plant communities investigated, belong to the different percentage categories. For an explanation of the figures representing the plant communities, see p. 33 and Table 2.

kanen (1948) the limitation of these groups is depending on the actual material: ... "it is (really) not possible to prescribe any definite limits for dominance groups, but each investigator will have to settle the matter in regard to his own material." (loc. cit. p. 35). In his ornithological research Palmgren (1930, p. 132) arrived at the classification: <2 %, 2—5 %, 5<% (of the total of individuals), whereas Kontkanen (1950) applies the limits <6 %, 6—15 %, 15<% in his investigation of leafhoppers. Regarding the present study, Fig. 6 is based on all the sweeping samples and shows the number of species which, for each of the plant communities, is belonging to different percentage categories. It appears, that neither of the classifications mentioned above is well fit for the material; 4 % and 10 % seem to be more natural limits. Accordingly, the following limitation will be used here:

Dominant species: 10< % of the number of individuals
Influent species: 10—4 % - - - - -
Recedent species: < 4 % - - - - -

Constancy.

In a quantitative investigation the percentage of the samples in which a certain species occurs is used to express the constancy of the species. The degree of constancy is divided into three classes, as was originally introduced into plant sociology by Brockmann-Jerosch (1907):

Constant species: in 50< % of the samples
Accessory species: - 25—50 % - - -
Accidental species: - < 25 % - - -

In the cases, from 1963, where two (in one instance even three) sweep-net samples were taken in the same locality, they were, unfortunately, not kept separate. This evidently complicates the calculation of the constancy, because it is impossible to know (when two or more individuals are caught) whether the species was present in both, or in only one of the samples. It was attempted to solve the matter as follows. If, in two mixed samples, more than three specimens of a species are caught, it is statistically most probable that it has been present in both samples. A corresponding calculation is applied in the single instance where three

samples were mixed. Consequently, the following values are used:

2 samples mixed:	1-3	specimens	are	distributed	onto	1	sample(s)
	3<	-	-	-	-	2	-
3 samples mixed:	1-2	-	-	-	-	1	-
	3-4	-	-	-	-	2	-
	4<	-	-	-	-	3	-

The procedure mentioned above is based on the assumption that the individuals are distributed at random in the vegetation, which they certainly are not. In any case, the exactness of the constancy calculation is not very satisfactory, the more "double samples" taken in the same plant community, the less reliable the values.

If the area investigated is considered as a whole, it is seen (Tables 3—5) to be characterized by the following species of Heteroptera (in order of dominance):

H e r b s t r a t u m (sweeping, Table 3).

Dominant and constant:	*Notostira elongata*
	Nabis pseudoferus
Influent and constant:	*Chorosoma schillingi*
	Phytocoris varipes
	Adelphocoris lineolatus
Influent and accessory:	*Ischnodemus sabuleti*
	Stygnocoris pedestris
	Myrmus miriformis
	Nabis ericetorum
Influent and accidental:	*Scolopostethus decoratus*
	Nysius thymi
Recedent and accessory:	*Nabis flavomarginatus*
(Recedent and accidental:	the remainder, 40 species)

In all 1907 specimens of bugs were caught by 56×50 = 2800 strokes of the net, i.e. averagely 0.68 individuals per sweep and 34.04 (± 25.81)[4]) per sample.

M o s s s t r a t u m (sifting, Table 4).

In the "moss stratum" a total of 123 bugs was caught from 19/10 square meter, i.e. averagely 63 individuals per square meter (variation from 24 to 160). — The predominant (and "constant")

[4]) The limits given are in all cases standard deviations.

species was *Plinthisus pusillus*. Another important moss dweller was *Acalypta parvula*.

Ground stratum (searching, Table 5).

Dominant and accidental:	*Scolopostethus decoratus*
	Ischnodemus sabuleti
Influent and constant:	*Alydus calcaratus*
Influent and accessory:	*Stygnocoris pedestris*
	Rhyparochromus pini
	Nabis pseudoferus
	Coranus subapterus
	Eremocoris abietis
	Geocoris grylloides

(Recedent and accessory or accidental: 25 species)

A total of 204 bugs (apart from *Ischnodemus sabuleti,* cf. p. 39) was caught during 10 hours searching, i.e. averagely 20.4 specimens per hour, (but the number varies from 6 to 76!).

It appears clearly, that the faunas of the three strata are highly different.

V. The Heteropterous fauna of the plant communities.

In this section the Heteropterous fauna of the different plant communities is examined and compared on the basis of all the collections obtained.

Most of the information appears in the tables (Tables 6—14, in addition to 3—5). For each community all the species found are listed in order of numbers caught, and for each species is given 1) the average number per sample, 2) the percentage of the total (dominance), 3) the percentage of the number of samples, in which the species occurs (constancy). A cross (×) means, that the species was found in the locality concerned, but not in a quantitative sample. — Abbreviations: D, dominant, I, influent, C, constant, Acs, accessory.

In some instances where the number of samples is small, a calculation of constancy is omitted, as the value would be extremely doubtful. — The "double samples" taken in 1963 (cf. p. 36) further causes the standard deviations (of the number of individuals per sample) to be less accurate.

A commented list comprising all the species of Heteroptera caught in the Korshage area is to be found below, p. 58.

1. Beach.

Searching (one sample, Table 5).

Only a single quantitative sample was taken on the beach, which involved half an hour's searching on the sand among the tussocks of *Elymus*. It was here seemingly possible to catch infinite numbers of *Ischnodemus sabuleti* in all stages of development, especially instar II. Undoubtedly, most of the individuals were pushed down from the lyme-grass, in the sheats of which they were hiding in abundance, so it was not considered worthwhile to collect and count them. The specimens of *Piesma quadratum* and of *Orthotylus flavosparsus* that were caught, may have blown down from their host plants (*Atriplex* spp.) nearby, as it was a windy day.

Special collection.

The bugs caught (beating and sweeping; August 28 and 30, 1963) on some of the commoner plant species of the fore shore community are listed below. The signs express the relative abundance: × = not common (less than 5 specimens caught), ×× = common (5 or more specimens caught), ××× = abundant.

	Atriplex litoralis	Atriplex hastata	Cakile maritima	Elymus arenarius
Aelia acuminata				×
Ischnodemus sabuleti				×××
Stygnocoris pedestris	×			
Piesma quadratum	×			×
Nabis ericetorum	×			
Anthocoris nemoralis	×××			
Anthocoris nemorum	××	××		
Orthotylus flavosparsus	××	××		
Lygus maritimus	×××	×××		
Lygus pratensis	×			
Lygus rugulipennis	×			
Orthops cervinus	××	××		
Calocoris norvegicus			×	

Lygus maritimus was present in huge numbers (many hundreds, adults and nymphs) on each average-sized *Atriplex*-plant, where it was the commonest insect, (the commonest but one being *Coccinella septempunctata).*

2. Green dune.

a. *Outer green dune.*

Sweeping (ten samples, Table 6).

Three species are dominant and constant: *Ischnodemus sabuleti*, *Notostira elongata* and *Nabis pseudoferus*. Two species are influent and constant: *Chorosoma schillingi* and *Phytocoris varipes*.

Characteristic of the Heteropterous fauna of this community is the dominance of *Ischnodemus sabuleti* (the other dominants and influents are characteristic of the area as a whole, cf. p. 37). It appears from Table 3, that the number of *Ischnodemus* is highly varying in the different samples (from 1 to 52 specimens per sample). This is presumably partly due to the fact, that this species in the Korshage area seems to prefer *Elymus* to *Ammophila* as host plant, (cf. Tischler 1960); it is abundant only in samples from localities rich in *Elymus* (Nos. 36-37, 50; cf. Table 3 and below). The variation in number of *Ischnodemus* causes the large standard deviation of the average number of individuals per sample (31.4 ± 21.9); if the species is excluded the value is 21.1 ± 4.4.

Another characteristic is the occurrence of some species belonging to the fore shore community: *Piesma quadratum, Orthotylus flavosparsus* and *Lygus maritimus* (cf. p. 39). — It is further notable, that *Adelphocoris lineolatus,* which is influent and constant in the area as a whole, does not play a significant part in this community (0.3 per sample).

Searching (two samples, Table 5).

The two samples are very different: *Ischnodemus sabuleti* is abundant in No. 57, but is completely absent from No. 58. This reflects the differing ages of the localities in question. No. 57 is taken in the youngest part, where *Elymus* is common, whereas No. 58 originates from the oldest part of the outer green dune, (cf. Table 2).

b. *Mixed green dune.*

Sweeping, only (eight samples, Table 7).

Three species are dominant and constant: *Notostira elongata, Nabis pseudoferus* and *Chorosoma schillingi*. Two species are influent and constant: *Phytocoris varipes* and *Myrmus miriformis*.

Differences from the preceding community are 1) the scarcity of *Ischnodemus sabuleti* and 2) that *Myrmus miriformis* is play-

ing a certain part. — *Adelphocoris lineolatus* has got the same low frequency as in the outer green dune.

Sweeping the voluminous bushes of *Rosa rugosa* growing east of beach ridge 4 yielded a few *Nabis pseudoferus* and *Nabis ericetorum,* but no phytophagous bugs.

c. *Inner green dune.*

S w e e p i n g (ten samples, Table 8).

Four species are dominant and constant: *Notostira elongata, Chorosoma schillingi, Phytocoris varipes* and *Nabis pseudoferus.* Two species are influent and accessory: *Adelphocoris linolatus* and *Stygnocoris pedestris.*

In this community the fauna is more varied than in the outer parts of the green dune, without doubt reflecting the richer flora. New species are added and more species are common in the samples. It is remarkable that now, suddenly, *Adelphocoris lineolatus* is rather frequent (cf. p. 47). *Ischnodemus sabuleti* is still present and also some other elements of the beach fauna were caught here *(Piesma quadratum, Lygus maritimus).* — Notice the increasing influence of *Nabis ericetorum.*

S e a r c h i n g (two samples, Table 5).

Searching was carried out on the "shingle" in the northern part of beach ridge 4. Besides the real ground dwellers, such as *Rhyparochromus pini* and *Coranus subapterus,* it appears that some inhabitants of the herb- and moss strata were caught (e.g. *Chorosoma schillingi, Polymerus brevicornis;* and *Pionosomus varius, Plinthisus pusillus,* respectively).

S i f t i n g (two samples, Table 4).

Half a square meter of *Dicranum scoparium* from the "shingle" was examined. It was inhabited chiefly by the two small lygaeids, *Plinthisus pusillus* (20 per m^2) and *Pionosomus varius* (14 per m^2).

3. D u n e p a s t u r e a n d s w a m p.

S w e e p i n g (six samples, Table 9).

Five species are dominant and constant[5]): *Myrmus miriformis, Phytocoris varipes, Plagiognathus chrysanthemi, Nabis pseudoferus* and *Adelphocoris lineolatus.* Three species are influent and

[5]) In this community the constancy-calculation is exceedingly unreliable.

constant or accessory: *Megalocoleus molliculus, Notostira elongata* and *Nabis flavomarginatus.*

In this compound community is found a Heteropterous fauna which is quite different from that met with in the green dune communities. *Myrmus miriformis* and *Adelphocoris lineolatus* are dominants here, whereas *Notostira elongata* and particularly *Chorosoma schillingi* are less important; and three species, which in the green dune were absent or playing a negligible part, are dominant or influent: *Plagiognathus chrysanthemi, Megalocoleus molliculus* and *Nabis flavomarginatus.*

A further characteristic is the occurrence of a markedly hygrophilous fauna element consisting of *Adelphocoris seticornis, Eurygaster testudinaria* and *Polymerus palustris* which were only found in this, the most humid part of the area.

Special collection.

Sweeping and beating the few bushes of *Salix* spp. around the swamp yielded the bugs listed below. None of them are true willow species. Less than 5 specimens were caught of each species.

	Salix cinerea	Salix repens
Eurygaster testudinaria	×	
Picromerus bidens		×
Anthocoris nemoralis	×	
Anthocoris nemorum	×	
Adelphocoris seticornis		×
Phytocoris varipes		×

4. Dune grassland.

a. *Thalictrum dune grassland.*

Sweeping, only (six samples, Table 10).

Two species are dominant and constant: *Adelphocoris lineolatus* and *Notostira elongata.* Four species are influent and constant: *Myrmus miriformis, Polymerus brevicornis, Chorosoma schillingi* and *Phytocoris varipes,* while four species are influent and accessory or accidental (the constancy-values are not reliable): *Nysius thymi, Megalocoleus molliculus, Ortholomus punctipennis* and *Orthops kalmi.*

The bug fauna of this steppe-like community is very interesting

in several respects: 1) The large number of influents seems to show a peculiar structure of the fauna which may be connected with the low mean number per sample; however, this cannot be the only reason (cf. the green dune communities). 2) The remarkable predominance of *Adelphocoris lineolatus*. 3) The absence of *Nabis pseudoferus* (at least as an adult) and the general scarcity of nabids, which may be due to the lack of a dense grass cover. 4) The comparatively high frequency of *Polymerus brevicornis* and *Ortholomus punctipennis* which must be considered rare species in Denmark. The same applies to *Polymerus vulneratus* and *Globiceps fulvicollis* of which a single specimen was caught.

b. *Carex dune grassland.*

S w e e p i n g (five samples, Table 11).

Two species are dominant and constant: *Notostira elongata* and *Nabis pseudoferus*. Five species are influent and constant: *Phytocoris varipes, Nabis ericetorum, Adelphocoris lineolatus, Chorosoma schillingi* and *Stygnocoris pedestris. Myrmus miriformis* is dominant, but only accidental.

The fauna of this community lacks characteristic features; in general it is very much like the fauna of the green dune. The only real difference seems to be the frequency of *Nabis ericetorum*. — One of the samples (No. 62) differs from the rest on account of the large number of *Myrmus miriformis,* which is absent from the other samples.

S i f t i n g (one sample, Table 4).

As might have been expected, sifting mosses etc. in the locality mentioned p. 34 yielded a result almost identical to that of sifting in the grey dune (cf. p. 44).

S e a r c h i n g (one sample, Table 5).

This one-hour sample gave a meagre yield, but was remarkable because of the discovery of the rare species, *Ceraleptus lividus*.

c. *Dune slack grassland.*

S w e e p i n g, only (three samples, Table 12).

Two species are dominant: *Nysius thymi* and *Adelphocoris lineolatus,* four species are influent: *Chorosoma schillingi, Nabis ericetorum, Myrmus miriformis* and *Notostira elongata.*

The striking feature of this community is the very high fre-

quency of *Nysius thymi* which is difficult to explain. Apart from this the fauna composition resemble very much that of the Thalictrum dune grassland (e.g. the dominance of *Adelphocoris lineolatus),* but the nabids — especially *Nabis ericetorum* — are comparatively frequent here (owing to the more continuous grass-cover?).

d. *Grey dune.*

Sifting (three samples, Table 4).

The yield from half a square meter of mosses in the "luxuriant" grey dune appears from the table; *Plinthisus pusillus* is the strongly dominating species (average 46 per square meter).

By sifting in the poor grey dune an attempt was made to restrict each of the 1/10 m^2 - samples to only one moss-species. The results are listed below (× = less than 5 per 1/10 m^2; ×× = 5 or more per 1/10 m^2).

	Rhacomitrium canescens	Hypnum cupressiforme	Dicranum scoparium
Sciocoris cursitans		×	
Macrodema micropterum			××
Pionosomus varius	×		
Plinthisus pusillus	×	××	
Acalypta parvula	×	××	

Searching (four samples, Table 5).

The yield of two hours searching in the luxuriant type of grey dune is listed below.

	Number of individuals	Percentage of total	
Alydus calcaratus	10	25	) D
Coranus subapterus	10	25	) D
Geocoris grylloides	8	20	) D
Chorosoma schillingi	3	7.5	
Sciocoris cursitans	2	5	
Eremocoris abietis	2	5	
Rhyparochromus pini	1	2.5	
Stygnocoris pedestris	1	2.5	
Nysius thymi	1	2.5	
Nabis pseudoferus	1	2.5	
Nabis ericetorum	1	2.5	
Total:	40	100	

It appears, that *Alydus calcaratus, Coranus subapterus* and *Geocoris grylloides* are the dominating species; however, there is considerable difference between the catches of samples No. 68 + 72 and No. 71.

The sample originating from the poor grey dune (No. 61) shows the Heteropterous fauna to be poor too; *Rhyparochromus pini* is probably the dominating species. — It may be added, that a further search (half an hour) on the southern part of beach ridge 8 did not yield any bugs.

5. Dune scrub.

Sweeping (one sample, Table 3).

The catching of the single sweep-net sample from the *Deschampsia flexuosa-Chamaenerium-Rubus* - dominated vegetation among the scrub appears in the table. *Phytocoris varipes* was the most frequent species.

Special collection.

The bugs beaten from some of the components of the scrub are listed below (× = 1—4 specimens; ××× = abundant). *Ulex europaeus* was not examined because most of the bushes had been killed during the preceding winters. *Pilophorus perplexus* was caught among numerous ants *(Lasius fuligineus)* and aphids.

	Juniperus communis	Quercus robur	Sarothamnus scoparius
Nabis pseudoferus			×
Nabis ericetorum			×
Anthocoris nemoralis			×
Pilophorus perplexus		×	
Orthotylus virescens			×××
Lygus maritimus	×		

6. Dune heath.

Sweeping (seven samples, Table 13).

Three species are dominant and constant: *Scolopostethus decoratus, Stygnocoris pedestris* and *Nabis ericetorum.* One species, *Orthotylus ericetorum,* is dominant and accessory. There were no influents.

The Heteropterous fauna of the dune heath is easily charac-

terized: by the dominance of four species which are not particularly frequent in any of the other communities studied, two of the species do not even occur in the samples taken outside the heath *(Scolopostethus decoratus* and *Orthotylus ericetorum).* This also applies to a number of other true heath-species: *Nysius helveticus, Macrodema micropterum* and *Pitedia juniperina.* Further, the general structure of the fauna is remarkable: the distinction between the four dominants and the rest, without influents interposed. Besides the typical heath-species "the rest" is made up by inhabitants of the plant communities intermingled in the younger parts of the heath. This is easily seen when the samples taken in such localities (Nos. 8—9, 30—31) are compared with samples from the pure, old dune heath on beach ridge 8 and beyond this (Nos. 29, 65, 66; Table 14).

It is interesting that *Orthotylus ericetorum* was exclusively found in the old heath. — The number of individuals per sample in the older dune heath is quite another order of magnitude than in the other plant communities of the area; (cf. Nos. 65, 66; Table 3).

S e a r c h i n g (one sample, Table 5).

What was valid regarding the sweeping also applies to the searching: the number of individuals caught is of quite another order compared with the other communities searched. One hour's searching amongst and beneath the heather and crowberry on beach ridge 8 yielded 76 specimens of nine species (two more species were added later). Here, too, *Scolopostethus decoratus* was dominating together with *Stygnocoris pedestris.* A high degree of preference for either of the two species of dwarf shrub was noted as follows:

Underneath *Calluna:*	*Stygnocoris pedestris*
	Ischnocoris angustulus
	Scolopostethus decoratus
Underneath *Empetrum:*	*Rhyparochromus pini*
	Eremocoris abietis

It is unusual that but a single specimen of *Nabis ericetorum* was found. On other occasions (when the species was directly hunted for) at least ten might be caught per hour.

Searching in the younger parts of the dune heath revealed the same preferences as mentioned above, but a lower frequency and

fewer species. The following were found (beach ridge 5, 15/9 1963): *Rhyparochromus pini, Scolopostethus decoratus, Eremocoris abietis* and *Charagochilus gyllenhali.*

The bug fauna of the Korshage dune heath resemble very much that described by Rabeler (1947) from the "Calluneto-Genistetum" in northwestern Germany.

7. Notes on the frequent species.

The column diagrams (Figs. 7—8) are based on the average number of individuals per swep-net sample of certain species in the different plant communities; the outer green dune and the dune heath are divided into their younger and older portions. Fig. 7 includes the most constant species (apart from *Stygnocoris pedestris),* whereas Fig. 8 deals with the less constant, though frequent species. — The figures summarize some of the trends mentioned in the previous part of this section, and additional features may appear:

Myrmus miriformis seems to be somewhat hygrophilous, as it is most numerous in the humid part of the area. Regarding the green dune communities it is accordingly most frequent in the lower, luxuriant localities (2b). — *Chorosoma schillingi* is rather the opposite of *Myrmus* in being least common (apart from the heath) in the dune pasture and swamp, from which the prefered host plant, *Ammophila arenaria* (Southwood and Leston 1959), is absent. *Chorosoma* is especially numerous in the older parts of the green dune. — *Nabis flavomarginatus* is presumably moderately hygrophilous like *Myrmus miriformis,* but the species is fairly infrequent throughout the area. — *Nabis pseudoferus* is very frequent in the green dune communities and in the Carex-gassland, but in the other kinds of grassland it decreases in number and is completely absent from the older heath. — *Nabis ericetorum* in a striking way acts as a "vicariant" to *N. pseudoferus:* it is numerous in the heath, while playing an insignificant part in the green dune. — *Adelphocoris lineolatus* shows a marked frequency-maximum in the various kinds of grassland and in the dune pasture and swamp. This is undoubtedly connected with the feeding habits of the species, which exclusively feeds on Papilionaceae spp. (Southwood and Leston 1959). Of these only one species *(Lathyrus maritimus)* is found in the outer parts of the green dune, whereas further inland it is replaced by

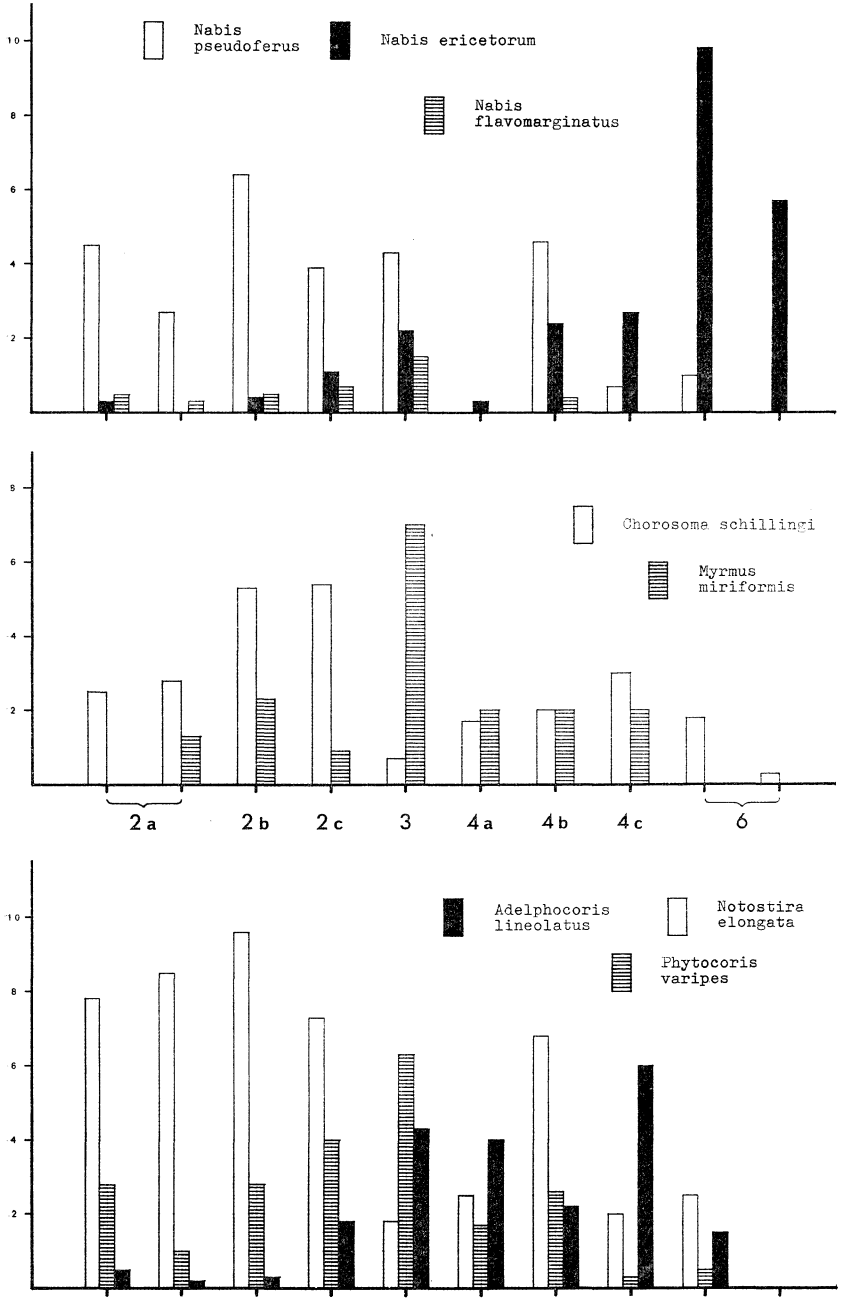

Fig. 7. Horizontal axis: plant communities (cf. p. 33 and Table 2), vertical axis: number of individuals per sample.

several species (cf. Table 2). — *Phytocoris varipes* manifests some preference for the damp localities in contrary to *Notostira elongata,* which is less common here and in the other inland communities (except the "Carex dune grassland"), while it is abundant in the green dune. — Notice the almost parallel variation in number of *Chorosoma schillingi, Nabis pseudoferus* and *Notostira elongata.*

Fig. 8 illustrates the erratic pattern of frequency and distribution which holds good for some of the species. The incidences have all been mentioned in the preceding text.

Considering the other methods of collection (searching and sifting) the material obtained is too small to permit a comparison corresponding to that carried out for the sweeping samples. Nevertheless, a few remarks may be advanced with reference to the searching-material (Table 5).

None of the species are very constant, only one — namely *Alydus calcaratus* — was found in more than fifty percent of the samples. This species was particularly frequent in one of the samples from the grey dune. *Geocoris grylloides* apparently prefers

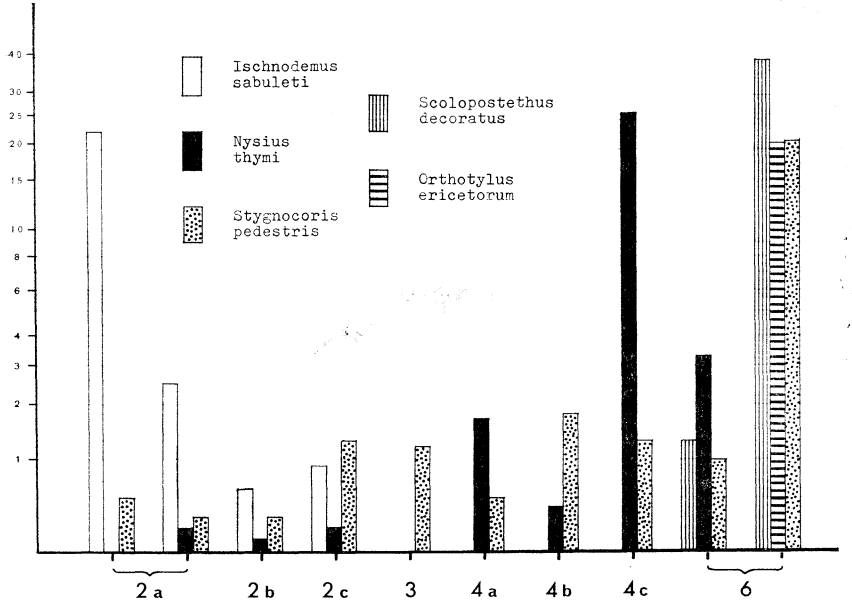

Fig. 8. Horizontal axis: plant communities (cf. p. 33 and Table 2), vertical axis: number of individuals per sample (logarithmic scale!).

the "luxuriant" grey dune. The same applies to *Coranus subapterus,* which seemingly replaces *Stalia major* as a ground-dwelling predator in inland localities. The species last mentioned was exclusively found in the youngest part of the "outer green dune", but by sweeping it was recorded from the "mixed green dune" as well. The other species of nabids were in a few cases caught directly on the earth surface; however, mostly in the lower parts of the vegetation, (e.g. the large number of *Nabis pseudoferus* in the sample No. 58). A number of species *(Rhyparochromus pini, Stygnocoris pedestris, Eremocoris abietis)* undoubtedly have their maximum abundance in the heath, but they are found outside it as well — as opposed to *Scolopostethus decoratus* and *Ischnocoris angustulus.*

8. The variation along the sample lines.

The purpose of this small section is to add some further details to the picture arrived at in the preceding chapter — of the Heteropterous fauna relative to the plant communities.

Each of the diagrams (Figs. 9—11) illustrates the variation of the bug fauna inhabiting the vegetation along one of the three "sample lines" (I, II and III) mentioned p. 28 and figured in Fig. 1. Just as Figs. 7—8, the diagrams comprise the most frequent species and are based on the mean number of individuals per sweep-net sample. Only samples taken in the vicinity of the lines are used, and preferably samples dating from 1963; the four samples from 1965 being included in order to supplement the lines. — The figures do not, of course, pretend to give a true image of the faunal variation along the sample lines; they merely show some marked tendencies.

Sample line I.

This, the northernmost line, is chiefly characterized by traversing the "dune slack grassland" containing the large population of *Nysius thymi,* which is even playing a part in the adjoining communities, especially the dune heath. *Nabis pseudoferus* is remarkably few in number, whereas *N. ericetorum* is frequent — first and foremost in the heath. *Phytocoris varipes,* too, is unusually scarce, while *Polymerus brevicornis* is noteworthy numerous in the samples Nos. 4—5 and is a constant element in samples from adjacent localities. An explanation is offered by the fact

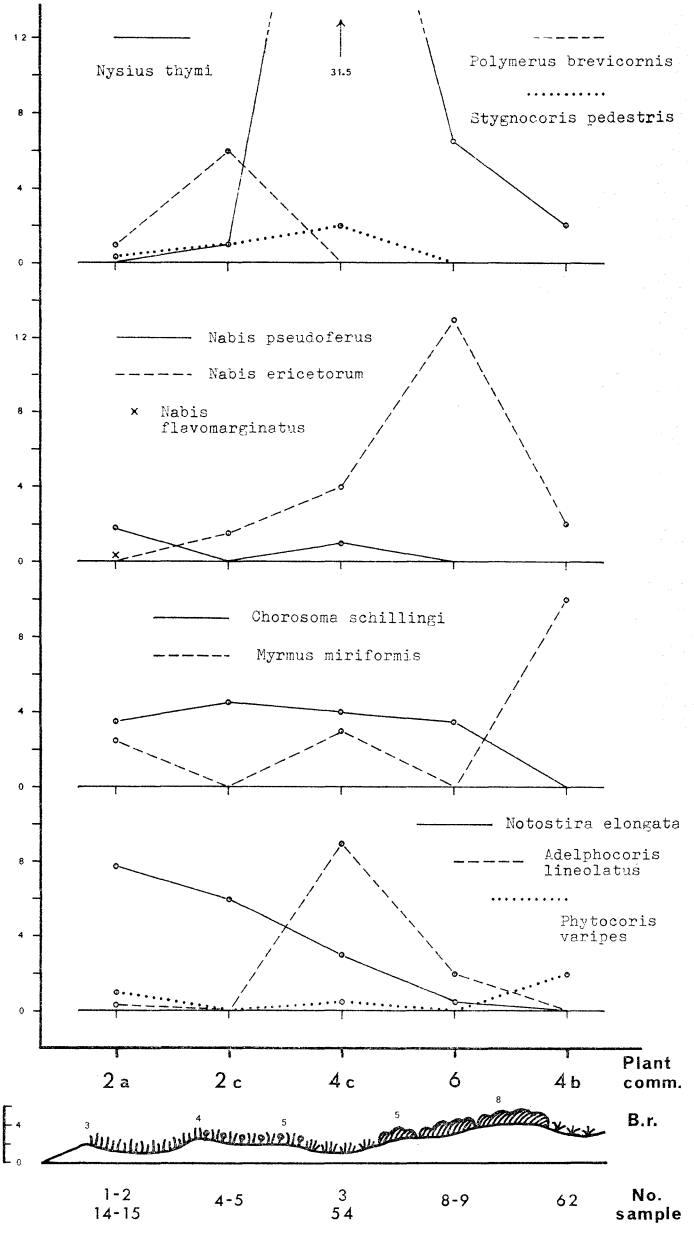

Fig. 9. Sample line I. — Figs. 9—11: The variation in the number of individuals per sample along the three samples lines (cf. Fig. 1). At the base a sketch showing the change of the vegetation along the transect in question. The beach ridges (B.r.) are numbered (cf. Fig. 2). Approximate altitude in metres (small scale on the left). — For an explanation of the figures representing the plant communities, see p. 33 and Table 2.

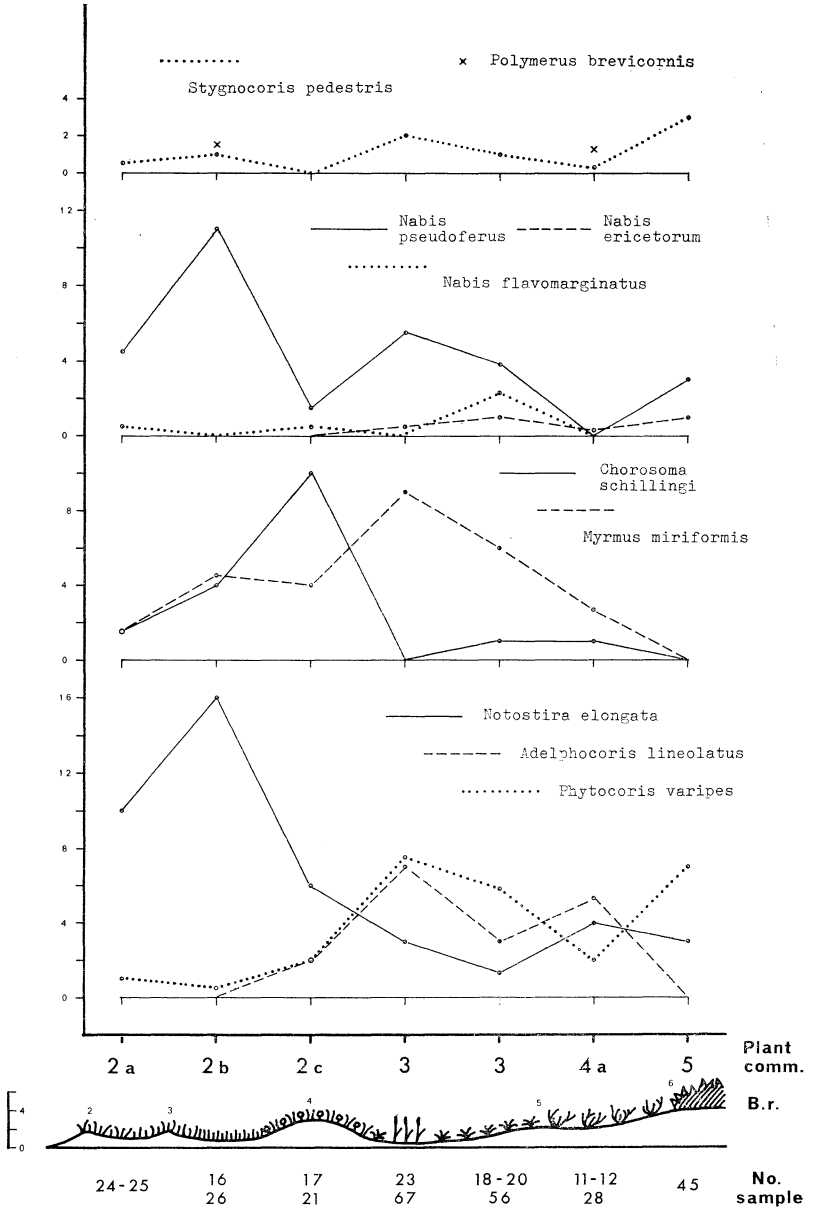

Fig. 10. Sample line II. — See Fig. 9.

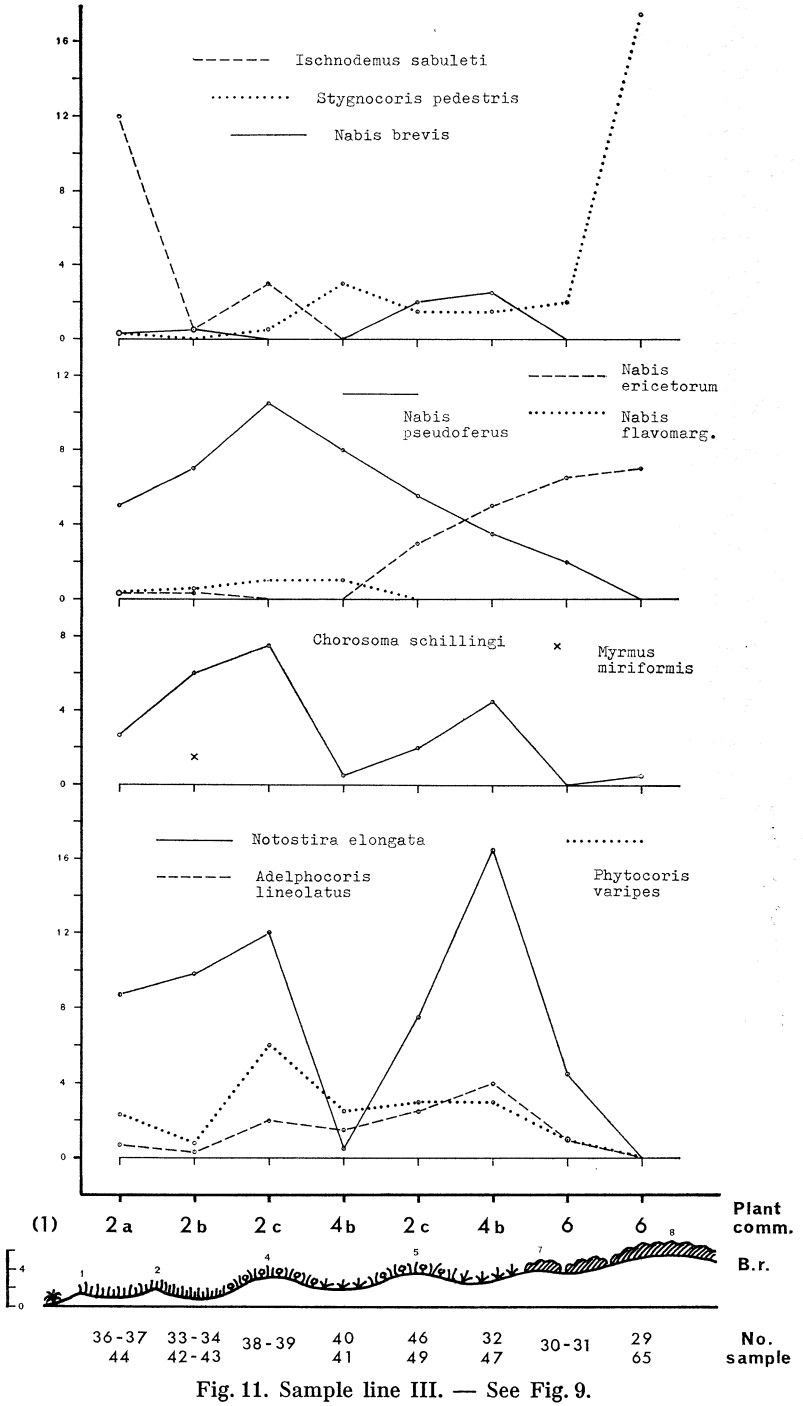

Fig. 11. Sample line III. — See Fig. 9.

that the host plant, *Galium verum* (Wagner 1961), is abundant in the dry area in question.

Sample line II.

This is mainly traversing damp and humid places; no heath localities are included. — As to the two common nabids: here, in sharp contrast to the former line, *Nabis pseudoferus* is predominating, whereas *N. ericetorum* is of no importance. *N. flavomarginatus* and *Myrmus miriformis* are relatively very frequent, both of them having a definite maximum of abundance in the humid localities. This also applies to *Adelphocoris lineolatus* and *Phytocoris varipes* — contrary to *Chorosoma schillingi* and *Notostira elongata* which decidedly prefer the green dune communities.

Sample line III.

The long line in the south is characterized 1) by the youngest "outer green dune", where *Ischnodemus sabuleti* is abundant; 2) by cutting twice the "inner green dune", the two parts of which are separated by sparsely covered and populated Carex grassland-localities (samples Nos. 40 and 41); this provides some of the frequency curves with a double maximum; 3) by traversing both younger and older dune heath.

It appears, that along this line both *Nabis pseudoferus* and *N. ericetorum* are frequent, whereas ideally complementary in distribution. *N. flavomarginatus* is present — few in number — throughout the green dune, while *Myrmus miriformis* is only represented in the "mixed green dune". *Stygnocoris pedestris* is caught along nearly the whole of the line, but it attains a large maximum in the older heath.

Something very peculiar is the occurrence of *Nabis brevis*. This species was on no occasion found north of line III, whereas it was present in most of the sweep-net samples (and in one searching sample) taken on the line or south of it, but only outside the heath. The nearer the southern limit of the area investigated, the more frequent the species: average of the samples Nos. 33—34, 36—37 and 46 on the line is 0.8 specimens per sample — as opposed to 5.7 specimens per sample for the three southernmost samples (Nos. 47, 49 and 50). This is really surprising, because the small area inhabited by the species is apparently indistinguishable from the rest — except in one respect: the position. A tenta-

tive explanation may be proposed, as follows. About one kilometre inland — on the slopes of the Stone Age coast — *Nabis brevis* is by far the commonest nabid, particularly in drier grassland and fallow fields, but even in the old *Calluna*-heath. *N. pseudoferus* has not been found there, and *N. ericetorum* is exceedingly rare. It is therefore believed, that *N. brevis* — preferably an inland-species — has been "caught in the act" of invading the Korshage-area from the south. This is presumably a rather slow process, as the species is brachypterous and unable to fly. *(N. brevis* was not caught by the sweepings in 1965; however, the material is not suitable for a comparison).

Considering as a whole the three figures, the following conclusions may be drawn.

Without doubt *Myrmus miriformis* prefers the fairly damp situations; however, the largest number per sample originates from the "Carex dune grassland" (No. 62, sample line I). As to *Chorosoma schillingi* the diagrams further stress the tendency for it to be "complementary" to *Myrmus*. But this is supposedly caused by the distribution of the host plant, *Ammophila* (cf. p. 47). The three figures clearly show, that where *Nabis pseudoferus* is frequent *N. ericetorum* is infrequent or absent — and vice versa. It has as yet not been possible to suggest a satisfactory explanation of this interesting fact. The remarkable role played by *N. brevis* was considered in detail above. Regarding the three common mirids, *Adelphocoris lineolatus* and *Phytocoris varipes* are declining in frequency towards the extremities of the lines (in the "outer"- and "mixed green dune" and the heath); the maximum is found in the damp, "central" communities, especially on line II (cf. p. 47 concerning *Adelphocoris).* Unlike this, *Notostira elongata* always reaches its peak in the green dune communities and decline in frequency inland (with one exception: the large number obtained in the Carex grassland on line III, samples Nos. 32 and 47).

VI. Heteroptera communities and concluding remarks.

The division of a certain area into plant communities may be carried out in more than one way, and this also applies to the area of Korshage. Nevertheless, even though avoiding difficult and laborious statistical tests, the author claims to have demonstrated a good many differences among the Heteropterous faunas

of the plant communities in question. This seems to show, that on the whole the plant communities dealt with are fairly natural units forming "biocoenotic communities". However, it is obviously hazardous to draw conclusions on the basis of only one suborder of insects in relation to the flora.

But the differences among the bug faunas of the various plant communities are of highly varying magnitude. For example, the faunas of the green dune communities are rather uniform in their general features, whereas greater diversities are encountered when one of these is compared with e.g. the dune heath. It is accordingly tempting to propose a tentative division of the area into what might be called "Heteroptera communities". These coincide with the plant communities, except that the green dune communities (2a, 2b, 2c) and the "Carex dune grassland" (4b) are united to form one large "green dune community", which is considered below. The reasons for this unification appears from the preceding text and Figs. 7—8.

Consequently, the following "bug communities" of the herb stratum[6]) of Korshage are put forward:

A. Beach community.
B. Green dune community.
C. Dune pasture and swamp community.
D. Thalictrum dune grassland community.
E. Dune slack grassland community.
F. Grey dune community.
G. Dune heath community.

Apart from B, these have all been considered and characterized in Section V. The sample No. 62 may indicate a special fauna composition of the uniform *Carex arenaria*-vegetation intermingled in the old heath (cf. p. 43). — Besides B, G is the most extensive and important community of the area. It is believed, that the samples Nos. 65 and 66, which are striking similar, are typical expressions of the older dune heath bug-fauna.

Table 15 shows the composition of the "green dune bug-community" (B). It is based on thirty-two samples; the average num-

[6]) The grey dune is included in spite of the fact that the herb stratum is poorly developed and not investigated. However, the sparse cover causes a special situation (dominance of ground dwellers), which presumably justifies the maintenance of this "community". Otherwise the ground stratum is not regarded in this context because of the insufficient searching material.

ber of individuals per sample is 31.3 ± 14.6. A total of 34 species was found by sweeping. That this value is a reasonable estimate of the real number of species constituting this community is seen, when the cumulative number of species is plotted against the samples (in random order). Only very few additional species are to be expected by continued sweeping.

From the table it appears, that three species are dominant and constant: *Notostira elongata, Nabis pseudoferus* and *Chorosoma schillingi. Ischnodemus sabuleti* is dominant and accessory, whereas *Phytocoris varipes* is influent and constant. These five species are due to their frequency clearly marked out from the rest, and their common frequency is characterizing the community. Another characteristic is the scarcity of some species *(Myrmus miriformis, Nysius thymi, Stygnocoris pedestris, Adelphocoris lineolatus,* etc.) which are common elsewhere in the area.

Among the plant communities of Korshage the mean number of bug-individuals per sample is indeed varying (sweeping: from 20.5 in the "Thalictrum dune grassland" to 86.7 in the older dune heath — searching: from 6 per hour in the "Carex dune grassland" to 76 in the dune heath). However, a single sweeping sample (50 sweeps) and one hours searching on a fallow field less than one kilometre from the point of Korshage (2/9 and 10/9 1965) yielded respectively 383 individuals (26 species) and 101 individuals (16 species). Compared with this the numbers originating from Korshage are low.

But with respect to the number of species Korshage seems to be rich. A total of 90 species of land bugs (presumably more than one fifth of the Danish Geocorisae) has been found in the small area studied (see the next section). This result should be compared with the numbers arrived at by similar, but more extensive investigations of considerably larger areas (e.g. R. Krogerus 1932, Marchand 1953, Schwoerbel 1957, Cmoluchowa 1958, Strawinski 1958, 1959a, 1959b, Andersen and Böcher 1965).

It is further notable that not less than 24 species (27 %) must be considered rare or very rare in Denmark, (cf. next section and the Addendum, p. 62).

Little similarity is apparent when a comparison is made between the Heteropterous fauna of Korshage and the faunas found in other dune areas of northern Europe:

Of the 101 species of Heteroptera listed by R. Krogerus (1932) from the areas of shifting sand on the Finnish coasts, not more than 40 are in common with Korshage, and only one species *(Ischnodemus sabuleti)* is abundant in both places.

Extensive search in the dunes of Terschelling, Holland, (Heerdt and Mörzer Bruyns 1960) revealed 24 species of bugs. Fifteen of these are in common with Korshage, and as a whole there are a good many similarities between the two faunas. However, there are important differences as well, e.g. *Notostira erratica* was present instead of *N. elongata,* and the three species of nabids recorded were *Stalia major, Nabis rugosus* and *N. ferus,* of which *N. ferus* was by far the most frequent. The occurrence of *N. rugosus* in a dune area is — from a Danish viewpoint — most surprising, as the species in Denmark seems to be a wood dweller!

Even when compared with the collections from the large Danish nature reserve, Hansted Reservatet, in northwestern Jutland (Andersen and Böcher 1965) a multitude of dissimilarities could be mentioned — e.g. *Nabis pseudoferus* has not been found in the Hansted reserve. Of the 100 species of land bugs found in Hansted 55 are in common with Korshage, but in the former place collections from some cultivated areas and a coniferous plantation inside the reserve are included.

VII. List of species.

This section lists all the species of Heteroptera found in the area of Korshage studied. Two species (Nos. 3, 14) which were caught before, but not during the periods of investigation, are therefore included.

The systematics and nomenclature are in accordance with Kloet and Hincks (1964). The determinations are based on Jensen-Haarup (1912), Southwood and Leston (1959) and Wagner (1961).

For each species references are given to pages, figures and tables in the preceding text (excluding the sweeping-tables in connection with the different plant communities). The total number of specimens caught ("ex.") is only mentioned when it is less than ten. In some cases the "bug communities" (A—G, p. 56) to which the species preferentially belongs is stated.

It appears from the tables, that only an insignificant part of the material is constituted by unidentifiable immature stages. In the

list is given the percentage of the catch that is made up by nymphs ("juv.").

Unfortunately, it is as yet not possible to say very much for certain about the distribution and frequency of the land bug species in Denmark; the last published fauna list (Jensen-Haarup 1912) is out of date. Regarding some of the species, tentative information is to be found in Andersen and Böcher (1965). In the following list it is merely noted, when a species must — at present — be considered rare in Denmark. — Five species have not previously been recorded from Denmark: *Eurygaster testudinaria* (Geoffr.), *Ceraleptus lividus* Stein., *Ischnocoris angustulus* (Boh.), *Lygus maritimus* Wagn., *Polymerus palustris* (Reut.).

CYDNIDAE:

1. *Legnotus picipes* (Fall.)
   Table 3 — 3 ex. (2 juv.) — (B).

SCUTELLERIDAE:

2. *Eurygaster testudinaria* (Geoffr.)
   P. 42, 59. Table 3 — 2 ex. — (C).

PENTATOMIDAE:

3. *Podops inuncta* (F.)
   1 ex. dating from June 1962. — Rare.
4. *Sciocoris cursitans* (F.)
   P. 44. Tables 3, 5 — 17 % juv. — (F).
5. *Aelia acuminata* (L.)
   P. 39. Tables 3, 5 — 20 % juv. — B.
6. *Pitedia juniperina* (L.)
   P. 46. Tables 3, 5 — 4 ex. — G.
   The species was not found on *Juniperus,* but elsewhere in the dune heath where *Empetrum nigrum* is supposed to be the host plant (cf. Wagner 1966).
7. *Dolycoris baccarum* (L.)
   Table 3 — 6 ex.
8. *Picromerus bidens* (L.)
   P. 42. Table 3 — 3 ex.

COREIDAE:

9. *Ceraleptus lividus* Stein
   P. 43, 59. Table 5 — 1 ex. — Rare.
   The single specimen found is a fifth-instar nymph, and the determination may be doubtful.

ALYDIDAE:

10. *Alydus calcaratus* (L.)
    P. 38, 44, 45, 49. Tables 3, 5 — (F).

RHOPALIDAE:

11. *Rhopalus parumpunctatus* Schill.
    Table 3 — 1 ex.
12. *Myrmus miriformis* (Fall.)
    P. 37, 40—43, 47, 54, 55, 57. Figs. 7, 9—11. Table 3 — C.
13. *Chorosoma schillingi* (Schum.)
    P. 37, 40—45, 47, 49, 54, 55, 57. Figs. 7, 9—11.
    Tables 3, 5 — B.

LYGAEIDAE:

14. *Heterogaster urticae* (F.)
1 ex. dating from June 1962.
15. *Geocoris grylloides* (L.)
P. 38, 44, 45, 49. Tables 3, 5 — (F).
16. *Ischnodemus sabuleti* (Fall.)
P. 37—41, 54, 57, 58. Figs. 8, 11. Tables 3, 5 — B.
About 20 % nymphs in the sweep-net samples (1963) and at least 50 % juv. in the searchings (1965).
17. *Nysius thymi* (Wff.)
P. 37, 42—44, 50, 57. Figs. 8, 9. Tables 3, 5 — E.
18. *Nysius helveticus* (H.S.)
P. 46. Table 3 — 6 ex. — G.
19. *Ortholomus punctipennis* (H.S.)
P. 42, 43. Table 3 — 7 ex. — D — Rare.
20. *Rhyparachromus pini* (L.)
P. 38, 41, 44—47, 50. Tables 3, 5 — 15 % juv. — G.
21. *Trapezonotus arenarius* (L.)
Table 5 — 1 ex.
22. *Macrodema micropterum* (Curt.)
P. 44, 46. Tables 3, 5 — G.
23. *Pionosomus varius* (Wff.)
P. 41, 44. Tables 4, 5 — 18 % juv. — Rare.
24. *Stygnocoris fuligineus* (Geoffr.)
Table 3 — 1 ex.
25. *Stygnocoris pedestris* (Fall.)
P. 37—39, 41, 43—46, 50, 54, 57. Figs. 8—11. Tables 3—5 — 5 % juv. — G.
26. *Plinthisus pusillus* (Sz.)
P. 38, 41, 44. Tables 3, 5 — Rare.
27. *Ischnocoris angustulus* (Boh.)
P. 46, 50, 59. Table 5 — G — Rare.
28. *Scolopostethus decoratus* (Hahn)
P. 37, 38, 45—47, 50. Fig. 8. Tables 3, 5 — 53 % juv. — G.
29. *Eremocoris abietis* (L.)
P. 38. 44, 46, 47, 50. Table 5 — 25 % juv. — G.

BERYTINIDAE:

30. *Cymus glandicolor* Hahn
Table 3 — 7 % juv.

PIESMATIDAE:

31. *Piesma quadratum* (Fieb.)
P. 39, 40. Tables 3, 5 — A.

TINGIDAE:

32. *Acalypta nigrina* (Fall.)
Tables 3, 5 — 4 ex. — Rare.
33. *Acalypta parvula* (Fall.)
P. 38, 44. Tables 4, 5 — 7 % juv. — Rare (?).

REDUVIIDAE:

34. *Coranus subapterus* (De G.)
P. 38, 41, 44, 45, 50. Table 5 — F.

NABIDAE:

35. *Nabis flavomarginatus* Sz.
P. 37, 42, 47, 54. Figs. 7, 9—11. Table 3 — B.
One macropterous male.
36. *Nabis ferus* (L.)
P. 58. Table 3 — 2 ex.

37. *Nabis pseudoferus* Rem.
P. 37, 38, 40, 41, 43—45, 47, 49, 50, 54, 55, 57, 58.
Figs. 7, 9—11. Tables 3, 5 — B.
About 10 % juv. in 1963, considerably more (57 %) in the 1965-material.
38. *Nabis brevis* Sz.
P. 54, 55. Fig. 11. Tables 3, 5.
39. *Nabis ericetorum* Sz.
P. 37, 39, 41, 43—47, 50, 54, 55. Figs. 7, 9—11.
Tables 3, 5 — G.
About 12 % juv. in 1963, considerably more (48 %) in the 1965-material.
40. *Stalia major* (Costa)
P. 50, 58. Tables 3, 5 — B. (See Leth 1962, Andersen and Böcher 1965).

CIMICIDAE:

41. *Anthocoris nemoralis* (F.)
P. 39, 42, 45.
42. *Anthocoris nemorum* (L.)
P. 39, 42 — Very few juv.
43. *Orius niger* (Wff.)
Table 3 — 7 ex. (1 juv.).

MIRIDAE:

44. *Megalocoleus molliculus* (Fall.)
P. 42. Table 3 — C.
45. *Plagiognathus chrysanthemi* (Wff.)
P. 41, 42. Table 3 — C.
46. *Pilophorus perplexus* Dgl. Sc.
P. 45 — 4 ex. — Rare.
47. *Globiceps fulvicollis cruciatus* Reut.
P. 43. Tables 3, 5 — 5 ex.
48. *Orthotylus ericetorum* (Fall.)
P. 45, 46. Fig. 8. Table 3 — 17 % juv. — G.
49. *Orthotylus virescens* (Dgl. Sc.)
P. 45.
50. *Orthotylus flavosparsus* (Shlbg.)
P. 39, 40. Tables 3, 5 — A.
51. *Lygus maritimus* Wagn.
P. 39, 40, 45, 59. Table 3 — A.
About 50 % juv. — *Atriplex* spp. in the beach community undoubtedly are the primary host plants, from which migration takes place so the species is found throughout the area.
52. *Lygus pratensis* (L.)
P. 39. Tables 3, 5 — (C).
53. *Lygus rugulipennis* Popp.
P. 39. Table 3 — 2 ex.
54. *Orthops cervinus* (H.S.)
P. 39 — A — Rare.
The occurence on *Atriplex* spp. is strange; otherwise the species is only recorded from various deciduous trees (Southwood and Leston 1959).
55. *Orthops kalmi* (L.)
P. 42. Table 3.
56. *Polymerus palustris* (Reut.)
P. 42, 59. Table 3 — 1 ex. — (C) — Rare.
57. *Polymerus unifasciatus* (F.)
Table 3 — 1 ex.
This species is otherwise (in Denmark) the commonest of the genus; at Korshage it is apparently replaced by *P. brevicornis*.

58. *Polymerus vulneratus* (Wff.)
P. 43. Table 3 — 2 ex. — (D) — Rare.
59. *Polymerus brevicornis* (Reut.)
P. 41—43, 50. Figs. 9, 10. Tables 3, 5 — Rare.
60. *Charagochilus gyllenhali* (Fall.)
P. 47. Table 3 — 2 ex.
61. *Calocoris norvegicus* (Gmel.)
P. 39. Table 3 — 3 ex.
62. *Adelphocoris lineolatus* (Gz.)
P. 37, 40—44, 47, 54, 55, 57. Figs. 7, 9—11. Table 3 — 30 % juv. — C, D.
63. *Adelphocoris seticornis* (F.)
P. 42. Table 3 — 7 ex. — C.
64. *Phytocoris varipes* Boh.
P. 37, 40—43, 45, 49, 50, 54, 55, 57. Figs. 7, 9—11. Tables 3, 5 — (1 juv.).
65. *Stenodema laevigatum* (L.)
Tables 3, 5 — 2 ex.
66. *Stenodema virens* (L.)
Table 3 — 1 ex.
It is astonishing that only three specimens of these elsewhere so abundant grass-mirids were caught; the "niche" is perhaps occupied by *Notostira elongata?*
67. *Notostira elongata* (Geoffr.)
P. 37, 40—43, 49, 54, 55, 57, 58. Figs. 7, 9—11. Tables 3, 5 — (B).
45 % juv. in 1963, 67 % in the 1965-material. — (See Andersen and Böcher 1965).

Addendum.

During the summer of 1966 the July-aspect of the Heteropterous fauna of Korshage was studied and compared with that of the late summer. Besides finding some striking dissimilarities concerning the relative frequency among the species already known from the area, no less than 23 additional species were found:

SCUTELLERIDAE: *Odontoscelis dorsalis* (F.) (Rare)
PENTATOMIDAE: *Eurydema oleracea* (L.)
Rhacognathus punctatus (L.)
LYGAEIDAE: *Peritrechus nubilus* (Fall.) (Rare)
Stygnocoris rusticus (Fall.)
BERYTINIDAE: *Berytinus crassipes* (H.S.)
PIESMATIDAE: *Piesma capitatum* (Wff.)
TINGIDAE: *Derephysia foliacea* (Fall.) (Rare?)
REDUVIIDAE: *Empicoris vagabundus* (L.)
MIRIDAE: *Lopus decolor* (Fall.)
Tytthus pygmaeus (Zett.) (Rare)
Plagiognathus sp. (*albipennis* group)
Monosynamma bohemani (Fall.) (Rare?)
Monosynamma nigritula (Zett.) (Rare?)
Srongylocoris leucocephalus (L.)

Orthocephalus coriaceus (F.)
Orthocephalus saltator (Hahn) (Rare)
Pithanus maerkeli (H.S.)
Capsus ater (L.)
Stenodema calcaratum (Fall.)
Trigonotylus ruficornis (Geoffr. in Fourcr.) (Rare?)
Teratocoris antennatus (Boh.)
Leptopterna dolabrata (L.)

Two of these are new to the Danish fauna, namely *Tytthus pygmaeus* (Zett.) and *Plagiognathus* sp.

Calocoris roseomaculatus (DeG.) was found just outside the area investigated.

Acknowledgments.

My thanks are due to Prof. dr. phil. C. Overgaard Nielsen for his careful criticizing of the manuscript; to dr. phil. E. Bro Larsen for inspiring discussions; to my father, Prof. dr. phil. T. W. Böcher for much help concerning botanical problems; to stud. scient. N. Møller Andersen for valuable assistance regarding the more troublesome identifications; and to D. E. Jacobs, B.A. and L. Oring, Ph.D. who kindly corrected the English text.

Summary.

During 1963 and 1965 the late summer Heteropterous fauna was studied in a dune and heath area of northwestern Zealand. A small territory containing a fairly well defined succession of plant communities was selected. Here the species composition, its relationship to plant communities, and the variation in relative numbers within the various communities were investigated by use of sweeping samples supplemented by searching and sifting.

Dissimilarities of varying magnitude were found when the bug faunas of the different plant communities were compared. In conclusion, a number of tentative "Heteroptera communities" are proposed, the most prominent of which are those associated with the "green dune" and "dune heath" plant communities. The dominant Heteropterans associated with the "green dune" communities were *Notostira elongata* (Geoffr.), *Nabis pseudoferus* Rem., *Chorosoma schillingi* (Schum.), *Ischnodemus sabuleti* (Fall.), and *Phytocoris varipes* Boh., whereas the dominant bugs of the "dune heath" community were *Scolopostethus decoratus* (Hahn), *Stygnocoris pedestris* (Fall.), *Nabis ericetorum* Sz., and *Orthotylus ericetorum* (Fall.). Important species of other plant communities were *Alydus calcaratus* (L.), *Myrmus miriformis* (Fall.), *Nysius thymi* (Wff.), *Lygus maritimus* Wagn., and *Adelphocoris lineolatus* (Gz.). Special attention was paid to the relative distribution of the *Nabis* spp.

A total of 90 species was found in the study area. This includes a number of forms collected in July 1966 which apparently represent a distinct mid-summer fauna. Many species are, at present, considered rare in Denmark.

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Table 1. — Time of collections, weather conditions, etc.

Sample No.	Date	Time of day	Method	Plant community	Air temp.(°C)	Sun	Wind
	1963:						
1—2	14 Aug.	14.30	Sw	2a	19°	ooo	××
3	17 Aug.	10	Sw	4c	19°	ooo	×
4—5	17 Aug.	11	Sw	2c	19°	oo	×
6—7	17 Aug.	14.30	Sw	4a	19°	oo	××
8—9	19 Aug.	14	Sw	6	20°	o	××
10	19 Aug.	14	Se	2c	20°	o	××
11—12	19 Aug.	15	Sw	4a	19°	o	××
13	21 Aug.	12	Se	2c	18°	oo	××
14—15	21 Aug.	13.15	Sw	2a	18°	oo	××
16	21 Aug.	13.45	Sw	2b	18°	oo	××
17	21 Aug.	14.15	Sw	2c	18°	•	×××
18—20	22 Aug.	14.15	Sw	3	18°	ooo	××
21	22 Aug.	15.45	Sw	2c	17°	ooo	××
22	22 Aug.	16.15	Si	2c	18°	ooo	×
23	23 Aug.	13.45	Sw	3	19°	ooo	0
24—25	23 Aug.	14.30	Sw	2a	19°	ooo	0
26	23 Aug.	15.15	Sw	2b	19°	ooo	0
27	23 Aug.	16	Si	2c	18°	ooo	0
28	24 Aug.	12	Sw	4a	19°	oo	××
29	26 Aug.	13.30	Sw	6	19°	ooo	×××
30—31	26 Aug.	14.15	Sw	6	19°	ooo	×××
32	26 Aug.	14.45	Sw	4b	19°	ooo	×××
33—34	27 Aug.	11	Sw	2b	18°	•	×××
35	28 Aug.	10	Sw	2c	17°	•	×
36—37	28 Aug.	13.30	Sw	2a	18°	o	×
38—39	30 Aug.	14.30	Sw	2c	17°	ooo	×
40	30 Aug.	15.30	Sw	4b	17°	ooo	×
41	31 Aug.	11	Sw	4b	16°	oo	×
42—43	31 Aug.	11.30, 14.30	Sw	2b	17°	oo	×
44	31 Aug.	15.30	Sw	2a	17°	•	×
45	3 Sept.	10.30	Sw	5	18°	ooo	××
46	5 Sept.	14	Sw	2c	17°	o	×
47	6 Sept.	15.30	Sw	4b	18°	oo	×
48	7 Sept.	11.15	Se	6	19°	ooo	×
49	7 Sept.	12.30	Sw	2c	19°	ooo	×
50	7 Sept.	13	Sw	2a	19°	ooo	×
51	7 Sept.	15.30	Si	4d	18°	ooo	×

P. T. O.

Table 1 continued.

Sample No.	Date	Time of day	Method	Plant community	Air temp.(°C)	Sun	Wind
	1965:						
52	24 Aug.	14.30	Sw	2b	21°	o	××
53	24 Aug.	15.30	Sw	2b	20°	•	××
54	28 Aug.	13.30	Sw	4c	18°	ooo	××
55	28 Aug.	14.15	Sw	4c	18°	ooo	××
56	28 Aug.	15.15	Sw	3	18°	ooo	××
57	4 Sept.	11	Se	2a	18°	ooo	×
58	4 Sept.	15.30	Se	2a	17°	•	×
59	5 Sept.	14.15	Sw	2c	18°	oo	0
60	5 Sept.	14.45	Sw	4a	18°	oo	0
61	6 Sept.	14	Se	4d	19°	oo	0
62	6 Sept.	15.30	Sw	4b	19°	oo	0
63	8 Sept.	15	Se	4b	15°	o	×××
64	9 Sept.	15	Se	1	15°	•	××
65	10 Sept.	15.15	Sw	6	16°	ooo	0
66	10 Sept.	16	Sw	6	15°	ooo	0
67	11 Sept.	10.30	Sw	3	18°	oo	×
68	11 Sept.	11.30	Se	4d	18°	oo	×
69	23 Sept.	12	Si	4d	17°	oo	×
70	24 Sept.	11, 14.30	Si	4b	19°	ooo	0
71	25 Sept.	11	Se	4d	19°	oo	×
72	29 Sept.	14	Se	4d	15°	o	×
73	29 Sept.	15	Si	4d	16°	ooo	0

Column 3. The time given is that of the start of sampling.

Column 4. Se = searching, Si = sifting, Sw = sweeping.

Column 5. The number given refer to the plant communities, see p. 33 and Table 2.

Column 6. Measurements in shade, 1.5 m above ground level.

Column 7. Signatures: ooo = bright sunshine, oo = hazy sunshine, o = cloudy sunshine, • = overcast.

Column 8. Force of the wind is given as relative estimates: 0 = calm, × = light breeze, ×× = moderate breeze, ××× = stronger wind (making sweeping rather more difficult).

Table 2. — Plant communities investigated.

Community and Nos. of samples.	Vegetation. !! and ! indicate more or less dominating species, species in brackets are less frequent. Mosses and lichens are only exceptionally included.
1. Beach.	
64, etc.	Atriplex litoralis!! Atriplex hastata, Atriplex patula — Elymus arenarius, Honckenya peploides, Cakile maritima, Crambe maritima, Matricaria maritima, Senecio viscosus.
2. Green dune.	
a. Outer green dune.	
1—2, 14—15, 58:	Ammophila arenaria!! Festuca rubra! Thalictrum minus, Lathyrus maritimus, Galium verum, Achillea millefolium. Hieracium umbellatum, (Rosa rugosa).
24—25:	Ammophila arenaria!! Festuca rubra! Polypodium vulgare, Corynephorus canescens, Pulsatilla pratensis, Thalictrum minus, Sedum acre, Lathyrus maritimus, Jasione montana, Achillea millefolium, Hieracium umbellatum.
36—37, 44, 50, 57:	Ammophila arenaria!! Festuca rubra! Lathyrus maritimus! Hieracium umbellatum! Elymus arenarius, Atriplex hastata, Atriplex litoralis, Thalictrum minus, Cakile maritima, Artemisia campestris, (Phragmites communis, Rumex thyrsiflorus, Achillea millefolium).
b. Mixed green dune.	
16, 36, 42—43:	Agropyrum repens! Festuca rubra! Lathyrus maritimus! Ammophila arenaria, Thalictrum minus, Galium verum, Achillea millefolium, Artemisia campestris, (Elymus arenarius, Rumex thyrsiflorus, Rosa rugosa).
33—34, 52:	Festuca rubra! Carex arenaria! Achillea millefolium! Ammophila arenaria, Thalictrum minus, Pimpinella saxifraga, Campanula rotundifolia, Jasione montana, Artemisia campestris, (Rosa rugosa).
53:	Festuca rubra! Thalictrum minus! Rhinantus minor! Hieracium umbellatum! Ammophila arenaria, Elymus arenarius, Galium verum, Jasione montana, Achillea millefolium, Artemisia campestris.
c. Inner green dune.	
4—5, 17, 21, 35, 38—39, 46, 49, 59:	Ammophila arenaria!! Polypodium vulgare (+ Dicranum scoparium)! Deschampsia flexuosa! Carex arenaria! Festuca rubra, Pulsatilla pratensis, Thalictrum minus, Pimpinella saxifraga, Rhinanthus minor, Galium verum, Campanula rotundifolia, Hieracium umbellatum, (Corynephorus canescens, Rubus idaeus, Lathyrus maritimus, Chamaenerium angustifolium, Thymus serpyllum, Jasione montana, Achillea millefolium, Solidago virga-aurea).
10, 13, 22, 27:	Cladina-Cornicularia aculeata! Corynephorus canescens! Hieracium umbellatum! Dicranum scoparium, Ammophila arenaria, Deschampsia flexuosa, Empetrum nigrum, Thymus serpyllum, Galium verum.

Table 2 continued.

3. Dune pasture and swamp.

18—19—20, 56:	Vicia cracca!! Potentilla anserina! Pimpinella saxifraga! Achillea millefolium! Agropyrum repens, Agrostis tenuis, Festuca rubra, Holcus lanatus, Thalictrum minus, Geranium sanguineum, Potentilla reptans, Hieracium umbellatum, (Salix cinerea, Salix repens).
23:	Scirpus tabernaemontani! Lythrum salicaria! Heleocharis palustris, Carex nigra, Typha latifolia, Juncus compressus, Galium palustre.
67:	Holcus lanatus! Potentilla anserina! Vicia cracca! Lythrum salicaria! Festuca rubra, Scirpus tabernaemontani, Carex nigra, Ranunculus acer, Potentilla erecta, Achillea millefolium.

4. Dune grassland.

a. Thalictrum dune grassland.

6—7, 11—12, 28, 60:	Thalictrum minus!! Pimpinella saxifraga! Achillea millefolium! Anthoxanthum odoratum, Deschampsia flexuosa, Festuca rubra, Carex arenaria, Potentilla reptans, Lotus corniculatus, Geranium sanguineum, Armeria maritima, Galium verum, Campanula rotundifolia, Artemisia campestris, Hieracium umbellatum, (Ammophila arenaria, Silene nutans, Pulsatilla pratensis, Trifolium arvense, Plantago lanceolata).

b. Carex dune grassland.

32, 40, 47, 62:	Carex arenaria!! Pimpinella saxifraga! Deschampsia flexuosa, Pulsatilla pratensis, Thalictrum minus, Galium verum, Campanula rotundifolia, Hieracium umbellatum, (Agrostis tenuis, Festuca rubra, Rumex acetosella, Potentilla reptans, Lotus corniculatus, Trifolium arvense, Geranium sanguineum, Armeria maritima, Jasione montana, Achillea millefolium).
41, 63, 70:	Carex arenaria! Hieracium umbellatum! Cladina, Corynephorus canescens, Luzula campestris, Thalictrum minus, Sedum acre, Pimpinella saxifraga, Thymus serpyllum, Galium verum, Campanula rotundifolia, Hieracium pilosella.

c. Dune slack grassland.

3, 54:	Agrostis tenuis! Festuca rubra! Anthoxanthum odoratum, Festuca ovina, Thalictrum minus, Potentilla reptans, Lathyrus montanus, Lotus corniculatus, Trifolium repens, Pimpinella saxifraga, Armeria maritima, Plantago lanceolata, Campanula rotundifolia, Achillea millefolium.
55:	Potentilla anserina! Plantago maritima! Festuca rubra, Holcus lanatus, Carex nigra, Trifolium pratense, Lotus corniculatus, Plantago lanceolata.

d. Grey dune.

68, 69, 71, 72:	Cladina! Mosses! (Dicranum polysetum, Dicranum scoparium, Hypnum cupressiforme), Corynephorus canescens! Festuca ovina! Carex arenaria! Thymus serpyllum! Hieracium pilosella! Polypodium vulgare, Ammophila arenaria, Anthoxanthum odoratum, Deschampsia flexuosa, Festuca rubra, Luzula campestris, Rumex acetosella, Pulsatilla pratensis, Thalictrum minus, Sedum acre, Potentilla reptans, Trifolium arvense, Viola canina, Pimpinella saxifraga, Galium verum, Jasione montana, Achillea millefolium, Artemisia campestris, Hieracium umbellatum, Gnaphalium arenarium.
51, 61, 73:	Cladina!! Mosses!! (Dicranum scoparium, Hypnum cupressiforme, Rhacomitrium canescens), Corynephorus canescens! Thymus serpyllum! Festuca ovina, Carex arenaria, Thalictrum minus, Plantago maritima, Galium verum, Jasione montana, Artemisia campestris, Hieracium pilosella, Hieracium umbellatum, (Pulsatilla pratensis, Geranium sanguineum).

Table 2 continued.

5. Dune scrub.	
45, etc.	Ulex europaeus!! Rubus fruticosus! Rubus ideaeus, Juniperus communis, Deschampsia flexuosa, Betula verrucosa, Quercus robur, Rosa canina, Sorbus aucuparia, Sarothamnus scoparius, Chamaenerium angustifolium, Lonicera periclymenum.
6. Dune heath.	
8—9:	Empetrum nigrum! Calluna vulgaris! Cladina, Ammophila arenaria, Corynephorus canescens, Thymus serpyllum, Galium verum, Hieracium umbellatum.
29:	Calluna vulgaris!!
30—31:	Calluna vulgaris!! Carex arenaria! Pulsatilla pratensis, Geranium sanguineum, Empetrum nigrum, Rubus idaeus, Pimpinella saxifraga, Veronica chamaedrys.
48:	Empetrum nigrum, Calluna vulgaris.
65—66:	Calluna vulgaris!! Empetrum nigrum! Juniperus communis, Deschampsia flexuosa, Salix repens, Vaccinium uliginosum.

Table 3. — Survey of the Heteroptera caught i quantitative sweeping samples.

Plant community:	2a. Outer green dune						2b. Mixed green dune						2c. Inner green dune								3. Dune pasture and swamp				4a. Thalictrum dune grassland				4b. Carex dune grassland					4c. Dune slack grassland			5. Dune scrub	6. Dune heath					Number of individuals caught	Percentage of total	Occuring in % of samples
Sample No.:	36-37	44	50	1-2	14-15	24-25	16	26	33-34	42-43	52	53	4-5	17	21	35	38-39	46	49	59	18-19 20	23	56	67	6-7	11-12	28	60	32	40	41	47	62	3	54	55	45	8-9	30-31	29	65	66			
Legnotus picipes	—	—	—	1	—	—	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	0.2	5.3
Eurygaster testudinaria	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	+	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0 +	0.0	0
Sciocoris cursitans	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	+	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1 +	0.1	1.8
Aelia acuminata	+	—	2	—	—	—	—	—	2	+	1	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6 +	0.3	7.0
Pitedia juniperina	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	1	0.1	1.8
Dolycoris baccarum	—	—	—	—	—	—	—	—	—	+	—	—	—	—	1	—	—	—	—	—	+	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	1	—	—	4 +	0.2	5.3
Picromerus bidens	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	1	0.1	1.8
Alydus calcaratus	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	+	—	—	—	—	—	—	—	—	2	—	—	—	—	1	—	5	—	—	9 +	0.5	8.9
Rhopalus parumpunctatus	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	+	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0 +	0.0	0
Myrmus miriformis	—	—	—	4	1	3	4	5	2	4	2	1	—	—	8	1	—	—	—	—	18	—	6	18	3	6	2	1	—	—	—	—	10	3	3	—	—	—	—	—	—	105	5.5 I	46.4 Acs
Chorosoma schillingi	4	4	2	5	9	3	3	5	19	5	3	7	9	16	4	2	15	3	1	4	4	—	—	—	5	3	—	2	7	1	—	2	+	3	5	1	—	7	—	1	—	164 +	8.6 I	75 C
Geocoris grylloides	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	1	0.1	1.8
Ischnodemus sabuleti	23	13	52	4	1	10	—	3	—	2	—	—	—	—	—	—	6	—	1	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	117	6.1 I	26.8 Acs
Nysius thymi	+	—	—	—	—	1	2	—	—	—	—	1	2	—	—	—	—	—	—	—	—	—	—	—	2	8	—	—	—	—	—	2	37	26	13	—	13	—	—	—	—	105 +	5.5 I	21.4
Nysius helveticus	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	—	6	0.3	3.6
Ortholomus punctipennis	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	2	3	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	7	0.4	7.0
Rhyparochromus pini	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	0.1	1.8
Macrodema micropterum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	0.2	5.3
Stygnocoris fuligineus	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	+	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0 +	0.0	0
Stygnocoris pedestris	—	1	1	1	—	1	1	1	+	—	—	—	2	—	—	7	1	1	2	—	3	2	—	2	—	—	1	2	2	1	5	1	—	4	—	—	3	—	4	10	25	26	110 +	5.8 I	50 Acs
Scolopostethus decoratus	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5	—	—	46	68	119	6.2 I	5.3
Cymus glandicolor	—	—	—	—	—	—	—	1	—	—	8	—	1	—	—	—	+	—	—	—	—	—	—	—	1	—	—	—	—	—	—	+	+	—	—	—	—	—	—	—	11 +	0.6	7.0
Piesma quadratum	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	0.2	3.6
Acalypta nigrina	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	1	—	2	0.1	3.6
Nabis flavomarginatus	1	—	1	—	1	1	—	—	1	1	2	—	—	—	1	—	2	—	—	4	6	—	3	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	26	1.4	26.8 Acs
Nabis ferus	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	+	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1 +	0.1	1.8
Nabis pseudoferus	11	4	3	1	6	9	6	16	3	25	1	—	—	3	—	4	21	7	4	—	8	—	7	11	—	—	—	—	3	13	3	4	—	—	2	—	3	—	4	—	—	182	10.5 D	60.8 C
Nabis brevis	1	—	9	—	—	—	—	—	2	—	—	—	—	—	—	—	—	1	3	—	—	—	—	—	—	—	—	—	—	—	5	—	—	—	—	—	—	—	—	—	21	1.1	10.7
Nabis ericetorum	1	—	—	—	—	—	—	—	—	1	2	—	3	—	—	2	—	2	4	—	3	—	1	1	—	1	—	1	6	—	—	4	2	5	3	—	1	26	13	9	5	3	99	5.2 I	44.6 Acs
Stalia major	—	—	—	—	—	—	—	—	+	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1 +	0.1	1.8
Nabidae spp. (juv.)	—	—	1	1	—	1	1	2	—	—	—	—	—	1	—	1	—	—	—	—	1	—	—	—	1	—	+	—	—	—	—	—	—	—	—	—	1	—	—	—	—	11 +	0.6	—
Orius niger	—	—	—	+	—	—	—	—	—	—	—	—	+	—	—	—	—	—	—	—	—	—	—	—	+	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	1 +	0.1	1.8
Megalocoleus molliculus	—	—	—	—	—	—	—	—	—	—	—	1	+	—	1	—	—	—	—	—	1	—	12	—	3	—	1	2	—	—	—	—	—	—	4	—	—	1	—	—	—	26 +	1.4	16.1
Plagiognathus chrysanthemi	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	1	27	1	—	—	—	—	—	—	—	—	—	—	—	3	—	—	—	—	—	35	1.8	10.7
Globiceps fulvicollis	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	3	0.2	5.3
Orthotylus ericetorum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	38	22	60	3.2	3.6
Orthotylus flavosparsus	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	0.1	1.8
Lygus maritimus	+	4	1	—	—	—	—	—	—	—	—	—	+	—	—	—	+	—	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—	1	—	1	1	—	12 +	0.6	14.3
Lygus pratensis	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	2	1	1	+	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	6 +	0.3	8.9
Lygus rugulipennis	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	+	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0 +	0.0	0
Orthops kalmi	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5	—	—	—	—	—	—	—	—	—	1	4	—	—	1	—	1	—	—	+	—	1	—	—	—	—	—	13 +	0.7	10.7
Polymerus palustris	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	+	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0 +	0.0	0
Polymerus unifasciatus	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	1	0.1	1.8
Polymerus vulneratus	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	2	0.1	3.6
Polymerus brevicornis	—	—	—	2	2	—	1	2	—	1	—	—	12	—	—	—	—	—	—	—	—	—	—	—	8	4	—	—	—	—	—	—	+	—	—	—	—	2	—	—	—	34 +	1.8	21.4
Charagochilus gyllenhali	—	—	—	—	—	—	—	—	+	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0 +	0.0	0
Calocoris norvegicus	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	0.1	1.8
Adelphocoris lineolatus	2	—	—	+	1	—	—	—	1	+	—	1	+	—	4	5	4	—	5	—	9	13	3	1	6	10	6	2	8	2	1	—	—	11	7	—	—	4	2	—	—	+	108 +	5.7 I	51.8 C
Adelphocoris seticornis	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6	0.3	7.0
Phytocoris varipes	6	1	4	1	3	2	1	—	2	1	11	7	—	—	4	13	12	4	2	5	4	3	19	12	1	5	1	3	4	5	—	2	2	+	1	—	7	—	2	—	—	150 +	7.9 I	64.3 C
Stenodema laevigatum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	1	0.1	1.8
Stenodema virens	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	+	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0 +	0.0	0
Notostira elongata	17	9	5	14	17	20	13	19	11	28	4	2	12	8	4	8	24	11	4	2	4	—	1	6	3	9	3	—	8	1	—	25	—	4	2	—	3	1	9	—	—	311	16.3 D	80.0 C
Miridae spp. (juv.)	—	—	—	—	—	—	—	—	—	—	—	—	5	—	—	—	—	—	—	—	—	—	—	—	2	3	—	—	—	1	—	—	—	4	—	—	—	—	—	—	—	15	0.8	—
Total:	68	38	81	34	41	52	31	54	44	69	35	20	46	28	27	49	86	29	28	18	74	21	80	52	38	54	18	13	39	29	9	46	16	77	53	18	20	60	46	21	123	122	1907	101.8	

+ = present, but not in a quantitative sample. I = Influent. D = Dominant. Acs = Accessory. C = Constant.

Table 4. — Sifting samples.

Sample No.:	22	27	70	69	51	73		
Sample size m^2:	1/4	1/4	1/2	1/2	1/10	3/10		
Plant community:	2c	2c	4b	4d	4d	4d		
Vegetation:	Dicranum scoparium		Hypnum cupressiforme Dicranum scoparium Dicranum polysetum "Cladina", etc.		Rhacomitrium canescens	Rhaco-mitrium canescens Hypnum cupressiforme Dicranum scoparium	Total	Percen-tage of total
Sciocoris cursitans	—	—	5	3	—	4	12	9.8 I
Macrodema micropterum .	—	—	—	—	—	18	18	14.6 D
Pionosomus varius	4	3	—	—	4	—	11	8.9 I
Stygnocoris pedestris	—	—	—	1	—	—	1	0.8
Plinthisus pusillus	7	3	11	23	—	9	53	43.1 D
Acalypta nigrina	1	—	—	—	—	—	1	0.8
Acalypta parvula	—	—	2	6	—	17	25	20.3 D
Acalypta spp. (juv.)	—	—	1	1	—	—	2	1.6
Total:	12	6	19	34	4	48	123	99.9
Per m^2:	48	24	38	68	40	160		

Table 5. — Searching samples.

Plant community:	1	2a		2c		4b	4d				6	Number of individuals caught	Percentage of total	Occuring in % of samples
	Beach	Outer green dune		Inner green dune		Carex dune grassl.	Grey dune				Dune heath			
							luxuriant			poor				
Sample No.:	64 *	57	58	10	13	63	68*	71	72*	61	48			
Sciocoris cursitans	—	—	—	—	—	1	—	2	—	—	1	4	2.0	30 Acs
Aelia acuminata	—	1	—	—	—	1	—	—	—	—	—	2	1.0	20
Pitedia juniperina	—	—	—	—	—	—	—	—	—	—	+	0 +	0.0	0
Caraleptus lividus	—	—	—	—	—	1	—	—	—	—	—	1	0.5	10
Alydus calcaratus	—	—	1	1	1	2	—	10	—	1	—	16	7.8 I	60 C
Chorosoma schillingi	—	—	—	1	—	—	1	2	—	1	—	5	2.5	40 Acs
Geocoris grylloides	—	1	—	—	—	—	3	3	2	—	—	9	4.4 I	30 Acs
Ischnodemus sabuleti	∞	∞	—	—	—	—	—	—	—	—	—	∞	—	20
Nysius thymi	—	4	—	—	—	—	1	—	—	1	—	6	2.9	30 Acs
Rhyparochromus pini	—	—	1	—	4	—	1	—	—	3	9	18	8.8 I	50 Acs
Trapezonotus arenarius	—	1	—	—	—	—	—	—	—	—	—	1	0.5	10
Macrodema micropterum	—	—	—	—	—	—	—	—	—	—	2	2	1.0	10
Pionosomus varius	—	—	—	5	1	—	—	—	—	—	—	6	2.9	20
Stygnocoris pedestris	—	1	2	—	—	—	—	—	1	—	15	19	9.3 I	40 Acs
Plinthisus pusillus	—	—	—	—	1	—	—	—	—	—	—	1	0.5	10
Ischnocoris angustulus	—	—	—	—	—	—	—	—	—	—	8	8	3.9	10
Scolopostethus decoratus	—	—	—	—	—	—	—	—	—	—	32	32	15.7 D	10
Eremocoris abietis	—	—	1	—	—	—	—	—	2	1	7	11	5.4 I	40 Acs
Piesma quadratum	6	—	—	—	—	—	—	—	—	—	—	6	2.9	10
Acalypta nigrina	—	—	—	—	1	—	—	—	—	—	—	1	0.5	10
Acalypta parvula	—	—	—	—	1	—	—	—	—	—	—	1	0.5	10
Coranus subapterus	—	—	—	2	—	1	—	10	—	—	+	13 +	6.4 I	30 Acs
Nabis pseudoferus	1	2	12	—	—	—	—	—	1	—	—	16	7.8 I	40 Acs
Nabis brevis	1	—	—	—	—	—	—	—	—	—	—	1	0.5	10
Nabis ericetorum	—	1	—	—	1	—	—	1	—	—	1	4	2.0	40 Acs
Stalia major	—	3	—	—	—	—	—	—	—	—	—	3	1.5	10
Globiceps fulvicollis	—	—	—	1	1	—	—	—	—	—	—	2	1.0	20
Orthotylus flavosparsus	7	—	—	—	—	—	—	—	—	—	—	7	3.4	10
Lygus pratensis	—	1	—	—	—	—	—	—	—	—	—	1	0.5	10
Polymerus brevicornis	—	—	—	—	1	—	—	—	—	—	—	1	0.5	10
Charagochilus gyllenhali	—	—	—	—	—	—	—	—	—	—	+	0 +	0.0	0
Phytocoris varipes	—	4	1	—	—	—	—	—	—	—	—	5	2.5	20
Stenodema laevigatum	—	—	—	—	—	—	—	—	—	—	1	1	0.5	10
Notostira elongata	—	—	1	—	—	—	—	—	—	—	—	1	0.5	10
Total:	15 (∞)	19 (∞)	19	10	12	6	6	28	6	7	76	204 (∞)	100.1	

*) Half an hour-samples.

Table 6. — 2 a. Outer green dune. Sweeping.
10 samples: 1—2, 14—15, 24—25, 36—37, 44, 50.

	Number of individuals caught	Average number per sample	Percentage of total	Occuring in % of samples
Ischnodemus sabuleti	103	10.3	32.8 D	90 C
Notostira elongata	82	8.2	26.1 D	100 C
Nabis pseudoferus	34	3.4	10.8 D	90 C
Chorosoma schillingi	27	2.7	8.6 I	90 C
Phytocoris varipes	17	1.7	5.4 I	70 C
Nabis brevis	10	1.0	3.2	20
Myrmus miriformis	8	0.8	2.5	40 Acs
Lygus maritimus	5 ×	0.5	1.6	20
Stygnocoris pedestris	4	0.4	1.3	40 Acs
Nabis flavomarginatus	4	0.4	1.3	40 Acs
Polymerus brevicornis	4	0.4	1.3	20
Adelphocoris lineolatus	3 ×	0.3	1.0	20
Aelia acuminata	2 ×	0.2	0.6	10
Piesma quadratum	2	0.2	0.6	10
Nysius thymi	1 ×	0.1	0.3	10
Legnotus picipes	1	0.1	0.3	10
Alydus calcaratus	1	0.1	0.3	10
Nabis ericetorum	1	0.1	0.3	10
Orthotylus flavosparsus	1	0.1	0.3	10
Calocoris norvegicus	1	0.1	0.3	10
Orius niger	0 ×	0.0	0.0	0
Nabis spp. (juv.)	3	0.3	1.0	—
Number of species: 21 Total:	314	31.4 (± 21.9)	99.9	

× = present, but not in a quantitative sample.
D = dominant.
I = influent.
C = constant.
Acs = accessory.

Table 7. — 2 b. Mixed green dune. Sweeping.
8 samples: 16, 26, 33—34, 42—43, 52, 53.

	Number of individuals caught	Average number per sample	Percentage of total	Occuring in % of samples
Notostira elongata	77	9.6	30.4 D	100 C
Nabis pseudoferus	51	6.4	20.2 D	75 C
Chorosoma schillingi	42	5.3	16.6 D	100 C
Phytocoris varipes	22	2.8	8.7 I	63 C
Myrmus miriformis	18	2.3	7.1 I	88 C
Cymus glandicolor	9	1.1	3.6	25
Ischnodemus sabuleti	5	0.6	2.0	25
Nabis flavomarginatus	4	0.5	1.6	38 Acs
Polymerus brevicornis	4	0.5	1.6	38 Acs
Aelia acuminata	3 ×	0.4	1.2	25
Nabis ericetorum	3	0.4	1.2	25
Stygnocoris pedestris	2 ×	0.3	0.8	25
Adelphocoris lineolatus	2 ×	0.3	0.8	25
Legnotus picipes	2	0.3	0.8	25
Nabis brevis	2	0.3	0.8	13
Stalia major	1 ×	0.1	0.4	13
Sciocoris cursitans	1	0.1	0.4	13
Nysius thymi	1	0.1	0.4	13
Megalocoleus molliculus	1	0.1	0.4	13
Dolycoris baccarum	0 ×	0.0	0.0	0
Charagochilus gyllenhali	0 ×	0.0	0.0	0
Nabis spp. (juv.)	3	0.4	1.2	—
Number of species: 21 Total:	253	31.6 (± 11.2)	100.2	

Table 8. — 2 c. Inner green dune. Sweeping.
10 samples: 4—5, 17, 21, 35, 38—39, 46, 49, 59.

	Number of individuals caught	Average number per sample	Percentage of total	Occuring in % of samples
Notostira elongata	73	7.3	23.5 D	100 C
Chorosoma schillingi	54	5.4	17.4 D	100 C
Phytocoris varipes	40	4.0	12.9 D	70 C
Nabis pseudoferus	39	3.9	12.5 D	60 C
Adelphocoris lineolatus	18 ×	1.8	5.8 I	50 Acs
Stygnocoris pedestris	13	1.3	4.2 I	50 Acs
Polymerus brevicornis	12	1.2	3.9	10
Nabis ericetorum	11	1.1	3.5	40 Acs
Myrmus miriformis	9	0.9	2.9	20
Ischnodemus sabuleti	9	0.9	2.9	40 Acs
Nabis flavomarginatus	7	0.7	2.3	30 Acs
Orthops kalmi	5	0.5	1.6	10
Nabis brevis	4	0.4	1.3	20
Nysius thymi	2	0.2	0.6	10
Lygus maritimus	1 ××	0.1	0.3	10
Cymus glandicolor	1 ×	0.1	0.3	10
Nabis ferus	1 ×	0.1	0.3	10
Megalocoleus molliculus	1 ×	0.1	0.3	10
Aelia acuminata	1	0.1	0.3	10
Dolycoris baccarum	1	0.1	0.3	10
Piesma quadratum	1	0.1	0.3	10
Lygus pratensis	1	0.1	0.3	10
Sciocoris cursitans	0 ×	0.0	0.0	0
Rhopalus parumpunctatus	0 ×	0.0	0.0	0
Stygnocoris fuligineus	0 ×	0.0	0.0	0
Orius niger	0 ×	0.0	0.0	0
Stenodema virens	0 ×	0.0	0.0	0
Nabis spp. (juv.)	2	0.2	0.6	—
Miridae spp. (juv.)	5	0.5	1.6	—
Number of species: 27 Total:	311	31.1 (± 9.6)	99.9	

Table 9. — 3. Dune pasture and swamp. Sweeping.
6 samples: 18—19—20, 23, 56, 67.

	Number of individuals caught	Average number per sample	Percentage of total	Occuring in % of samples
Myrmus miriformis	42	7	18.5 D	83 C
Phytocoris varipes	38	6.3	16.7 D	83 C
Plagiognathus chrysanthemi	32	5.3	14.1 D	83 C
Nabis pseudoferus	26	4.3	11.5 D	83 C
Adelphocoris lineolatus	26	4.3	11.5 D	100 C
Megalocoleus molliculus	13	2.2	5.7 I	33 Acs
Notostira elongata	11	1.8	4.8 I	67 C
Nabis flavomarginatus	9	1.5	4.0 I	67 C
Stygnocoris pedestris	7	1.2	3.1	67 C
Adelphocoris seticornis	6	1	2.6	67 C
Nabis ericetorum	5	0.8	2.2	67 C
Lygus pratensis	4 ×	0.7	1.8	17
Chorosoma schillingi	4	0.7	1.8	50 Acs
Ortholomus punctipennis	1	0.2	0.4	17
Globiceps fulvicollis	1	0.2	0.4	17
Lygus maritimus	1	0.2	0.4	17
Eurygaster testudinaria	0 ×	0.0	0.0	0
Dolycoris baccarum	0 ×	0.0	0.0	0
Alydus calcaratus	0 ×	0.0	0.0	0
Lygus rugulipennis	0 ×	0.0	0.0	0
Polymerus palustris	0 ×	0.0	0.0	0
Nabis spp. (juv.)	1	0.2	0.4	—
Number of species: 21 Total:	227	37.8 (± 24.6)	99.9	

Table 10. — 4a. Thalictrum dune grassland. Sweeping.
6 samples: 6—7, 11—12, 28, 60.

	Number of individuals caught	Average number per sample	Percentage of total	Occuring in % of samples
Adelphocoris lineolatus	24	4	19.5 D	100 C
Notostira elongata	15	2.5	12.2 D	67 C
Myrmus miriformis	12	2	9.8 I	83 C
Polymerus brevicornis	12	2	9.8 I	67 C
Chorosoma schillingi	10	1.7	8.1 I	67 C
Nysius thymi	10	1.7	8.1 I	50 Acs
Phytocoris varipes	10	1.7	8.1 I	67 C
Megalocoleus molliculus	6	1	4.9 I	50 Acs
Ortholomus punctipennis	5	0.8	4.1 I	33
Orthops kalmi	5	0.8	4.1 I	33
Stygnocoris pedestris	3	0.5	2.4	33
Nabis ericetorum	2	0.3	1.6	33
Cymus glandicolor	1	0.2	0.8	17
Globiceps fulvicollis	1	0.2	0.8	17
Polymerus vulneratus	1	0.2	0.8	17
Orius niger	0 ×	0.0	0.0	0
Nabis spp. (juv.)	1 ×	0.2	0.8	—
Miridae spp. (juv.)	5	0.8	4.1	—
Number of species: 16 Total:	123	20.5 (± 5.2)	100.2	

Table 11. — 4b. Carex dune grassland. Sweeping.
5 samples: 32, 40, 41, 47, 62.

	Number of individuals caught	Average number per sample	Percentage of total	Occuring in % of samples
Notostira elongata	34	6.8	24.5 D	60 C
Nabis pseudoferus	23	4.6	16.6 D	80 C
Phytocoris varipes	13	2.6	9.4 I	80 C
Nabis ericetorum	12	2.4	8.6 I	60 C
Adelphocoris lineolatus	11	2.2	7.9 I	60 C
Chorosoma schillingi	10 ×	2	7.2 I	60 C
Myrmus miriformis	10	2	7.2 I	20
Stygnocoris pedestris	9	1.8	6.4 I	80 C
Nabis brevis	5	1	3.6	20
Dolycoris baccarum	2	0.4	1.4	20
Alydus calcaratus	2	0.4	1.4	20
Nabis flavomarginatus	2	0.4	1.4	20
Orthops kalmi	2	0.4	1.4	40 Acs
Nysius thymi	2	0.4	1.4	20
Acalypta nigrina	1	0.2	0.7	20
Cymus glandicolor	0 ×	0.0	0.0	0
Miridae spp. (juv.)	1	0.2	0.7	—
Number of species: 16 Total:	139	27.8 (± 13.8)	99.8	

Table 12. — 4c. Dune slack grassland. Sweeping.
3 samples: 3, 54, 55.

	Number of individuals caught	Average number per sample	Percentage of total	
Nysius thymi	76	25.3	51.4	D
Adelphocoris lineolatus	18	6	12.2	D
Chorosoma schillingi	9	3	6.1	I
Nabis ericetorum	8	2.7	5.4	I
Myrmus miriformis	6	2	4.1	I
Notostira elongata	6	2	4.1	I
Stygnocoris pedestris	4	1.3	2.7	
Megalocoleus molliculus	4	1.3	2.7	
Plagiognathus chrysanthemi	3	1	2.0	
Nabis pseudoferus	2	0.7	1.4	
Lygus maritimus	2	0.7	1.4	
Phytocoris varipes	1 ×	0.3	0.7	
Ortholomus punctipennis	1	0.3	0.7	
Orius niger	1	0.3	0.7	
Lygus pratensis	1	0.3	0.7	
Polymerus vulneratus	1	0.3	0.7	
Stenodema laevigatum	1	0.3	0.7	
Cymus glandicolor	0 ×	0.0	0.0	
Orthops kalmi	0 ×	0.0	0.0	
Polymerus brevicornis	0 ×	0.0	0.0	
Miridae spp. (juv.)	4	1.3	2.7	
Number of species: 20 Total:	148	49.3	100.4	

Table 13. — 6. Dune heath. Sweeping.
7 samples: 8—9, 29, 30—31, 65, 66.

	Number of individuals caught	Average number per sample	Percentage of total	Occuring in % of samples
Scolopostethus decoratus	119	17	32.0 D	57 C
Stygnocoris pedestris	65	9.3	17.5 D	72 C
Orthotylus ericetorum	60	8.6	16.1 D	29 Acs
Nabis ericetorum	56	8	15.1 D	100 C
Nysius thymi	13	1.9	3.5	14
Notostira elongata	10	1.4	2.7	43 Acs
Chorosoma schillingi	8	1.1	2.2	43 Acs
Adelphocoris lineolatus	6 ×	0.9	1.6	43 Acs
Nysius helveticus	6	0.9	1.6	29 Acs
Alydus calcaratus	5	0.7	1.3	14
Macrodema micropterum	4	0.6	1.1	43 Acs
Nabis pseudoferus	4	0.6	1.1	29 Acs
Lygus maritimus	3	0.4	0.8	43 Acs
Polymerus brevicornis	2	0.3	0.5	14
Phytocoris varipes	2	0.3	0.5	14
Pitedia juniperina	1	0.1	0.3	14
Dolycoris baccarum	1	0.1	0.3	14
Picromerus bidens	1	0.1	0.3	14
Geocoris grylloides	1	0.1	0.3	14
Rhyparochromus pini	1	0.1	0.3	14
Acalypta nigrina	1	0.1	0.3	14
Megalocoleus molliculus	1	0.1	0.3	14
Globiceps fulvicollis	1	0.1	0.3	14
Polymerus unifasciatus	1	0.1	0.3	14
Number of species: 24 Total:	372	53.1 (± 140.1)	100.3	

Table 14. — 6. Dune heath. Sweeping.
a. "Younger dune heath".
4 samples: 8—9, 30—31.

	Number of individuals caught	Average number per sample	Percentage of total	
Nabis ericetorum	39	9.8	36.8	D
Nysius thymi	13	3.3	12.3	D
Notostira elongata	10	2.5	9.4	I
Chorosoma schillingi	7	1.8	6.6	I
Adelphocoris lineolatus	6	1.5	5.7	I
Alydus calcaratus	5	1.3	4.7	I
Scolopostethus decoratus	5	1.3	4.7	I
Stygnocoris pedestris	4	1	3.7	
Nabis pseudoferus	4	1	3.7	
Polymerus brevicornis	2	0.5	1.9	
Phytocoris varipes	2	0.5	1.9	
Pitedia juniperina	1	0.3	1.0	
Dolycoris baccarum	1	0.3	1.0	
Picromerus bidens	1	0.3	1.0	
Geocoris grylloides	1	0.3	1.0	
Macrodema micropterum	1	0.3	1.0	
Megalocoleus molliculus	1	0.3	1.0	
Globiceps fulvicollis	1	0.3	1.0	
Lygus maritimus	1	0.3	1.0	
Polymerus unifasciatus	1	0.3	1.0	
Number of species: 20 — Total:	106	26.5	100.4	

b. "Older dune heath".
3 samples: 29, 65, 66.

Scolopostethus decoratus	114	38	42.8	D
Stygnocoris pedestris	61	20.3	22.9	D
Orthotylus ericetorum	60	20	22.6	D
Nabis ericetorum	17	5.7	6.4	I
Nysius helveticus	6	2	2.3	
Macrodema micropterum	3	1	1.1	
Lygus maritimus	2	0.7	0.8	
Chorosoma schillingi	1	0.3	0.4	
Rhyparochromus pini	1	0.3	0.4	
Acalypta nigrina	1	0.3	0.4	
Adelphocoris lineolatus	0 ×	0.0	0.0	
Number of species: 11 — Total:	266	86.7	100.1	

Table 15. — "Green dune community" of Heteroptera. (Sweeping, 32 samples).

	Number of individuals caught		Average number per sample	Percentage of total		Occuring in % of samples	
Notostira elongata	266		8.3	26.6	D	97	C
Nabis pseudoferus	147		4.6	14.7	D	78	C
Chorosoma schillingi	133		4.2	13.3	D	94	C
Ischnodemus sabuleti	117		3.7	11.7	D	47	Acs
Phytocoris varipes	90		2.8	9.0	I	69	C
Myrmus miriformis	35		1.1	3.5		41	Acs
Adelphocoris lineolatus	34	×××	1.1	3.4		38	Acs
Stygnocoris pedestris	28	×	0.9	2.8		47	Acs
Nabis ericetorum	25		0.8	2.5		28	Acs
Nabis brevis	21		0.7	2.1		19	
Polymerus brevicornis	20		0.6	2.0		22	
Nabis flavomarginatus	17		0.5	1.7		34	Acs
Cymus glandicolor	10	×	0.3	1.0		9	
Orthops kalmi	7		0.2	0.7		9	
Lygus maritimus	6	×××	0.2	0.6		9	
Aelia acuminata	6	××	0.2	0.6		13	
Nysius thymi	4		0.1	0.4		9	
Dolycoris baccarum	3	×	0.1	0.3		6	
Legnotus picipes	3		0.1	0.3		9	
Alydus calcaratus	3		0.1	0.3		6	
Piesma quadratum	3		0.1	0.3		6	
Megalocoleus molliculus	2	×	0.1	0.2		6	
Sciocoris cursitans	1	×	0.0	0.1		3	
Nabis ferus	1	×	0.0	0.1		3	
Stalia major	1	×	0.0	0.1		3	
Acalypta nigrina	1		0.0	0.1		3	
Orthotylus flavosparsus	1		0.0	0.1		3	
Lygus pratensis	1		0.0	0.1		3	
Calocoris norvegicus	1		0.0	0.1		3	
Orius niger	0	××	0.0	0.0		0	
Rhopalus parumpunctatus	0	×	0.0	0.0		0	
Stygnocoris fuligineus	0	×	0.0	0.0		0	
Charagochilus gyllenhali	0	×	0.0	0.0		0	
Stenodema virens	0	×	0.0	0.0		0	
Nabis spp. (juv.)	8		0.3	0.8		—	
Miridae spp. (juv.)	6		0.2	0.6		—	
Number of species: 34 — Total:	1001		31.3 (± 14.6)	100.1			