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HUHATANKA, A NEW GENUS OF LOBSTER (DECAPODA: MECOCHIRIDAE) FROM THE KIOWA FORMATION (CRETACEOUS: ALBIAN) OF KANSAS

RODNEY M. FELDMANN AND RONALD R. WEST
Kent State University, Kent, Ohio 44242 and Kansas State University, Manhattan 66506

ABSTRACT—Reexamination of the type material of *Squilla? kiowana* Scott, 1970 and study of additional specimens of the same taxon indicates that it is a mecochirid decapod referable to a new genus, *Huhatanka*. This assignment brings to five the number of North American species referable to the Mecochiridae.

INTRODUCTION

THE Kiowa Formation has been the subject of a number of recent papers dealing with various aspects of Cretaceous stratigraphy and paleontology. In 1970, Scott described the organisms collected from the unit, carefully defined their position in the stratigraphic sequence and detailed the paleoecological setting of the unit. One of the forms collected was a small, poorly preserved arthropod represented by two specimens which Scott (1970, p. 85) referred to the Squillidae, a family of stomatopods. Subsequently, the senior author received five specimens of equally poorly preserved specimens from Loren Avis, then a student at Wichita State University. The specimens remained a curiosity until, in 1976, the junior author brought together ten specimens which had been collected by students at Kansas State University. This material, some of which was better preserved than the earlier discoveries, permitted us to accurately identify the organisms for the first time, refer them to the proper order and frame a more complete and detailed description of the animals.

The placement of this species in the Mecochiridae brings to five the total number of species in this family described from North America. Two species of *Pseudoglyphea, P. mulleri* van Straelen, 1936 and *P. bordenensis* (Copeland), 1960 have been described from the Jurassic of Nevada and Borden Island, Canada, respectively and two species of *Meyeria, M. mexicanus* (Rathbun) 1935 and *M. ? harveyi* Woodward, 1900 have been described from the Cretaceous of Mexico and British Columbia, respectively. The only other possible representatives of the family are three specimens which have been collected from the Sundance Formation but have yet to be verified and described (Frederick R. Schram, pers. commun.). The majority of species in the family have been described from Germany and the British Isles although in addition to these localities and North American occurrences, species have been described also from localities in Africa, New Zealand and Antarctica (Förster, 1971). Notwithstanding this broad distribution, mecochirids are rare fossils.

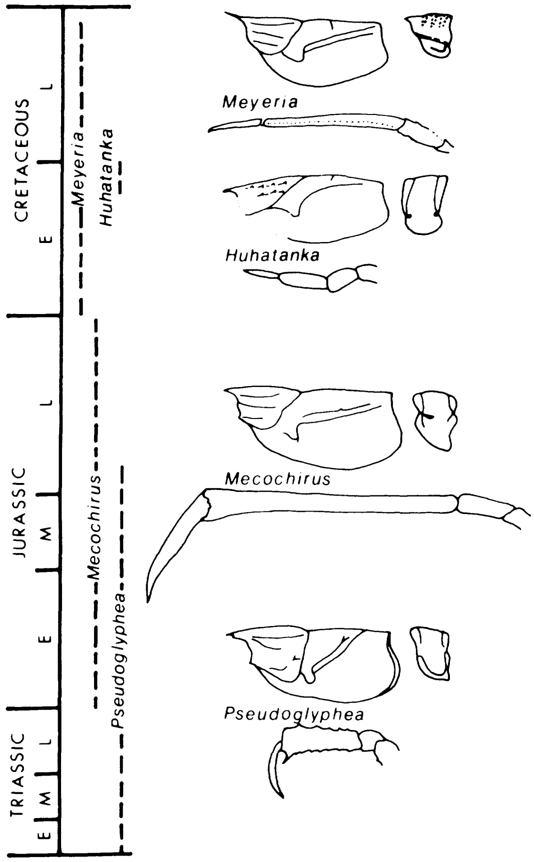
SYSTEMATIC PALEONTOLOGY

Order DECAPODA Latreille, 1803
Infraorder PALINURA Latreille, 1803
Superfamily GLYPHEOIDEA Winckler, 1883
Family MECOCHIRIDAE van Straelen, 1925
Genus HUHATANKA n. gen.

Type species.—*Squilla? kiowana* Scott, 1970, by original designation.

Description.—Cephalothorax with short, smooth rostrum; median, subdorsal and suborbital pustulose ridges; oblique, subparallel cervical and postcervical grooves; branchiocardiac groove weak or absent. Abdomen generally smooth; pleuron of first abdominal somite quadrate; that of remaining somites elongate oval to nearly circular. Pereiopods long, slender, achelate throughout, generally smooth.

Remarks.—Förster recently (1971) summarized information on known representatives of the Mecochiridae. He recognized only *Pseudoglyphea* Oppel, 1861, and *Mecochirus* German, 1827, as valid genera and considered *Meyeria* M'Coy, 1849, synonymous with *Mecochirus; Selenisca* von Meyer, 1847, synonymous with *Glyphea* thereby placing it in the Glypheidea; and *Praeatya* Woodward, 1868, synonymous with *Pseudoglyphea*. *Selenisca*



TEXT-FIG. *1*—Stratigraphic distribution of genera referable to the Mecochiridae. Range data and morphologic sketches, with the exception of those for *Huhatanka*, were taken from Förster (1971) and Glaessner (1969).

and *Praeatya* had been questionably referred to the Mecochiridae by Glaessner (1969, p. R466–R467). *Meyeria* was placed, without question, in the Mecochiridae by Glaessner (1969, p. R465) and was considered distinguishable from *Mecochirus* based on the ornamentation of the cephalothorax and abdomen as well as the length of the first pereiopod. Förster (1971, p. 398) argued that the distinction between the two genera was primarily stratigraphic and that because the species assigned to the two genera were typically preserved in different styles, it was difficult to make detailed morphological comparisons. Where it is possible, he suggested that the characters grade from one genus into another and the genera are, therefore, probably synonymous.

The degree of difference shown between forms typically assigned to the two genera appears to us to be great enough that the genus *Meyeria* should be retained to include those species with thicker, spinose or pustulose, integument, ornamented abdomina and relatively shorter first pereiopods. These types of differences are comparable to those used as points of generic distinction in better known, recent decapods, such as genera of the Nephropidae (Holthuis, 1974).

Using generic discriminators similar to those used by Förster (1971), but retaining *Meyeria* as a distinct genus, the specimens referred to *Huhatanka* n. gen. clearly cannot be assigned to existing taxa (Text-fig. 1). *Pseudoglyphea* is characterized by possession of well developed, broad postcervical and branchiocardiac grooves, neither of which parallels the cervical groove; a spinose rostrum; subquadrate pleura on the second abdominal somite; and a flattened, spiney propodus on the first pereiopods. A point of similarity between this genus and *Huhatanka* is that both have propoda that do not exceed the length of the cephalothorax. Both *Mecochirus* and *Meyeria* have extremely long first pereiopods and in both cases, the propoda exceed the length of the cephalothorax. The pleura of the second abdominal somite in *Mecochirus* are triangular whereas those of *Meyeria* are reduced and subquadrate. The groove patterns of both these genera resemble that of *Huhatanka* in that they are reduced and much more subtly expressed than in *Pseudoglyphea*. This character has led to quite variable interpretations of groove patterns (compare, for example, Förster, 1971, fig. 5 and Glaessner, 1969, fig. 271, 1). The branchiocardiac groove in *Huhatanka* is reduced to the point that it can no longer be identified with certainty.

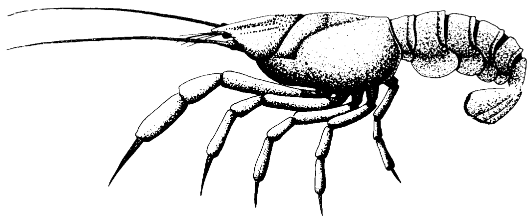
Another aspect of the morphology of this group that has been subject to several different interpretations is that of the nature of the termination of the pereiopods. Förster (1971, p. 404), for example, described the first two pereiopods of *Mecochirus* as subchelate although the widely accepted definition of subchelate (Moore & McCormick, 1969, p. R102) would not embrace them. Subchelae must be grasping structures in which the dactylus rotates back onto some part of the propodus to produce a grasping surface. In *Mecochirus* and, for that matter, *Pseudoglyphea* the backward rotation of the dactylus is restricted by the presence of a spine on the distal termination of the propodus but no functional occlusal surface results (Text-fig. 1). Rather, the terminations of these appendages seem to be better modified for probing and, perhaps, raking the substrate in search of food. They could better be defined as achelate to distinguish them from the truly prehensile subchelae observed on some glypheids, some palinurids and some stomatopods, for example. If the definition was thus restricted, none of the Mecochiridae would possess subchelae.

Etymology.—The generic name is derived from two Plains Indian words; *Huha* = limbs, and *tanka* = large (Riggs, 1893).

HUHATANKA KIOWANA (Scott), 1970
Pl. 1, figs. 1–7; Text-fig. 2

Squilla? kiowana SCOTT, 1970, p. 85, Pl. 7, fig. 5.

Description.—Small size for family, cephalothorax less than 15 mm long. Cephalothorax elongate, more than twice as long as high, greatest height just posterior to the midpoint; dorsal surface slightly arched, posterior margin sigmoid with posteriormost extension at ventral termination, ventral margin convex posterior to the midpoint and straight or slightly concave anterior of the midpoint, anterior margin poorly known. Rostrum short, about 14% of total length measured along dorsum, broad at the base and tapering to a narrow termination, not spinose; region anterior the cervical groove granular, median carina extends from rostrum posteriorad about halfway to cervical groove, subdorsal carinae are subtle ridges defined by slightly coarser granulations than on remainder of anterior surface, supraorbital carinae are subtle ridges defined by single row of granulations; region posterior to the cervical groove smooth or very slightly pustulose, ornamented only by setal pits that are more concentrated along the dorsal midline and diminish in size and concentration ventrally; cervical groove deeply impressed extending in a nearly straight line from near the middle of the dorsal surface anteriorly and ventrally toward anteroventral margin. Postcervical groove weak, extending parallel the cervical groove from near dorsum to a point about two-thirds the distance to the ventral surface where it curves abruptly and sweeps anteriorly and slightly dorsally to intersect cervical groove; marginal groove distinct on posterior and posteroventral margin of carapace, unobservable on anteroventral surface.



TEXT-FIG. 2—Reconstruction of *Huhatanka kiowana* (Scott). Details of sixth abdominal somite, telson and uropods are conjectural.

Abdomen generally smooth; parts of first five abdominal somites are preserved. First somite somewhat reduced, second through fifth somites similar in size. Terga with a subtle arcuate depression extending from the posterior articulating element anteriorly and dorsally to the midline, otherwise smooth. Pleura smooth, separated from terga by a broad shallow groove; pleuron of first somite small and quadrate, that of second somite elongate oval, slightly attenuate at the posteroventral corner; pleura of third through fifth somites nearly circular, smooth; terminal segments of abdomen unknown.

Cephalic appendages poorly known. Basal antennar segments rectilinear, slightly longer than wide, scaphocerite appears to be absent, flagella long, slender. Thoracopods long and slender, apparently achelate, becoming progressively shorter toward posterior, the first two exceeding the length of the carapace; all elements of the walking legs appear to be smooth, slightly constricted at proximal and distal terminations, with greatest width near the middle of each segment; dactyli long and slender nearly the length of propodus and not closing on the propodus, length of dactyli decreasing posteriorly.

Remarks.—Scott (1970, p. 85) described this taxon based on two poorly preserved specimens and assigned them to the stomatopod family Squillidae. Examination of his specimen would seem to indicate that they were not of sufficient quality to permit precise identification and, indeed, he only questionably assigned them to the genus *Squilla*. Additional collecting of the same locality and others in the vicinity have yielded more, and better,

TABLE 1—Measurements (in mm) taken on specimens of *Huhatanka kiowana* (Scott). All measurements must be considered approximations because the specimens have been crushed. KU = University of Kansas Museum of Invertebrate Paleontology; KSU = Kent State University Department of Geology.

Catalog Number	Cephalothorax Length	Abdomen Length*	First Pereiopod Length
KU 500396-Holotype	12.5	12.3 (3)	—
KU 500397-Paratype	—	12.9 (5)	—
KSU 2144 (1)	13.1	11.6 (5)	14.6
KSU 2144 (2)	14.1	—	—
KSU 3765	—	9.2 (4)	—
KSU 3766	9.3	7.7 (4)	—
KSU 3967	9.4	11.7 (6)	17.1
KSU 3768	9.0	5.3 (3)	—
KSU 3769	14.1	11.4 (5)	—
KSU 3770	10.7	10.2 (4)	—
KSU 3771	10.3	9.6 (5)	—
KSU 3774	—	8.2 (4)	—
KSU 3775	—	5.9 (3)	—

* Numbers in parentheses indicate the number of abdominal somites measured.

specimens which permits placement in the Mecochiridae. This conclusion has been confirmed by M. F. Glaessner (pers. commun., 1977) who independently determined that the specimens described by Scott were not stomatopods but were macrurans.

Placement of this taxon in the Mecochiridae is based on the presence of well developed, subparallel cervical and postcervical grooves, granular subdorsal and supraorbital ridges and elongate slender pereiopods which lack chelate or well developed pseudochelate closures. Absence of chelate closures and no apparent "linea" would seem to rule out affinities with any of the anomurans, some of which bear a superficial resemblance to *Huhatanka kiowana*.

Measurements.—Measurements of the specimens of *Huhatanka kiowana* are given in Table 1.

Localities and stratigraphic position.—In addition to the four localities from which Scott (1970) collected material, specimens referred to this taxon were collected from the following localities (KU = University of Kansas Museum of Invertebrate Paleontology; KSU = Kent State University Department of Geology).

KSU 2144 (1 & 2). Kiowa Formation. Buildex Shale Quarry, north of Highway K-4 about 12 km west of Lindsborg, McPherson Co., Kansas. Coll. Loren Avis. This locality may be Scott's Locality M3 (1970, p. 91).

KSU 3764–3776. Lower Kiowa Formation. Exposure below Control Tower at Kanopolis Dam, NE¼, sec. 3, T17S, R6W, Ellsworth Co., Kansas. Coll. Loren Avis and students at Kansas State University. Probably Scott's Locality E5 (1970, p. 90).

These localities, although possibly the same as Scott's localities, are considered distinct as there is no way to assure they are identical. All collecting sites are plotted on Text-fig. 3.

Paleoecology.—Scott (1970) reported this species from four localities in the Kiowa Formation of central Kansas. These four localities outline an area of approximately 283 square km near the junction of Ellsworth, Saline and McPherson counties, Kansas. In all cases the specimens are preserved in a medium dark to dark gray, thinly laminated to laminated, homogeneous to mottled, clay-sized shale/mudstone associated at three of the sites with a cone-in-cone bed (Text-fig. 3). Mineralogically the rock is composed of illite, montmorillonite and kaolinite with quartz, mica, glauconite and carbon as accessories. Scott (1970) interpreted these assemblages at all four localities as disturbed neighborhood assemblages. As defined, these assemblages are basically analogous to a model II assemblage of Johnson (1960) which means the life association is ba-

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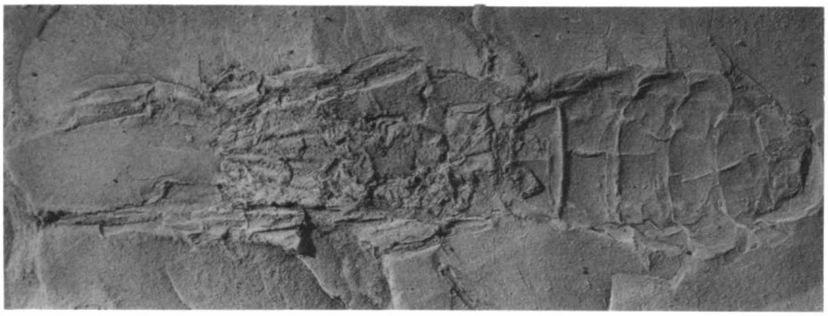
EXPLANATION OF PLATE 1

FIGS. *1–7*—*Huhatanka kiowana* (Scott). *1,* mold of dorsal surface of KSU 2144(1) showing ornamentation of the cephalic region and detail of the abdominal pleurae, ×3; *2,* mold of dorsal surface of KSU 3767 showing elongate pereiopods and bases of antennae, ×3; *3–5*, dorsal, left lateral and right lateral views of KSU 3768, the only inflated specimen, showing details of the groove pattern on the cephalothorax, ×4; *6,* oblique view of KSU 3771 showing the nature of ornamentation on cephalic and thoracic regions, ×3; mold of right lateral surface of KSU 3770. The granular surface on this specimen is a result of secondary growth of gypsum, ×3.



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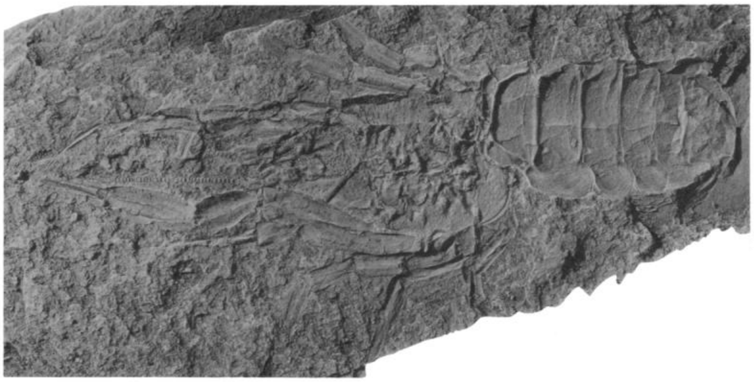

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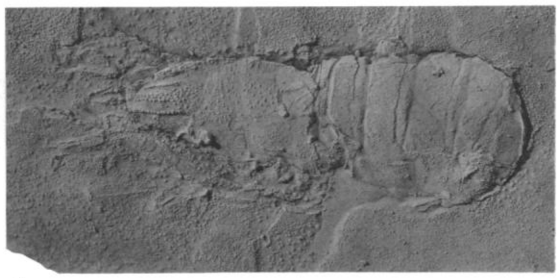

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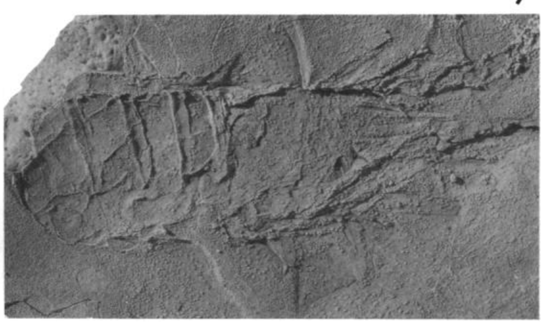

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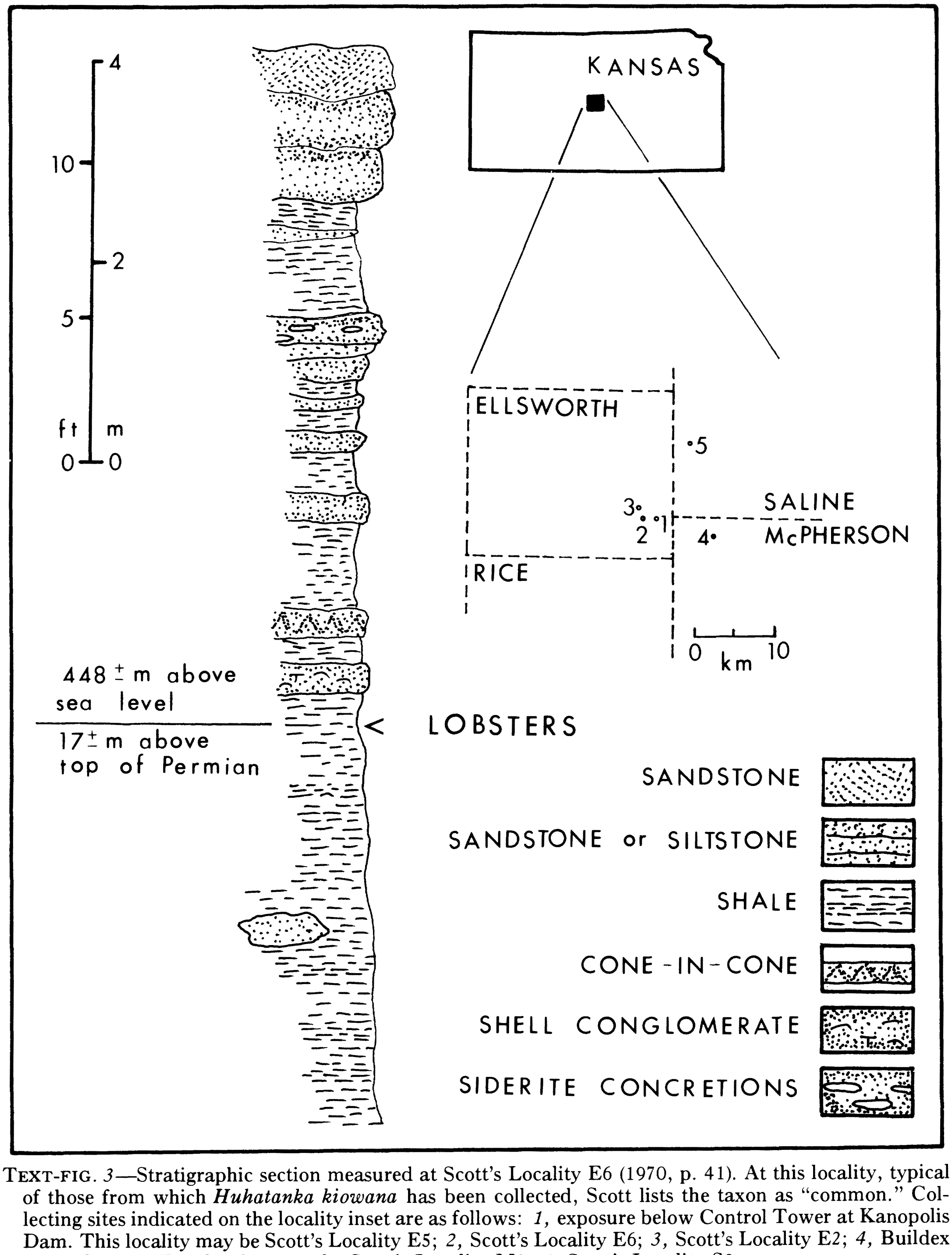

TEXT-FIG. *3*—Stratigraphic section measured at Scott's Locality E6 (1970, p. 41). At this locality, typical of those from which ***Huhatanka kiowana*** has been collected, Scott lists the taxon as "common." Collecting sites indicated on the locality inset are as follows: *1,* exposure below Control Tower at Kanopolis Dam. This locality may be Scott's Locality E5; *2,* Scott's Locality E6; *3,* Scott's Locality E2; *4,* Buildex Shale Quarry. This locality may be Scott's Locality M3; *5,* Scott's Locality S9.

TABLE 2—Composition and structure of the association containing *Huhatanka kiowana*. Data on numbers of specimens collected was taken from Scott (1970, table 3).

Taxa	No. of Speci-mens	Per-cent Speci-mens	Niche Group
Turritella belviderei	44	46.3	Infaunal, low level suspension feeder/swallower?
Nuculana mutata	21	22.1	Infaunal, deposit feeder (swallower)
Nucula cf. *N. rivulana*	7	7.4	Infaunal, deposit feeder (swallower)
Leptosolen otterensis	5	5.3	Infaunal (deep), low level suspension feeder
Tellina? sp. indet.	4	4.2	Infaunal, deposit feeder (swallower)
Corbulids	3	3.2	Infaunal, low level suspension feeder
Huhatanka kiowana	3	3.2	Epi/infaunal, scavenger/deposit feeder?
Modiolus sp.	2	2.1	Epifaunal, high level suspension feeder
Yoldia microdonta	1	1.0	Infaunal, deposit feeder (swallower)
Breviarca subovata	1	1.0	Epifaunal, high level suspension feeder
Crassinella semicostata	1	1.0	Infaunal, low level suspension feeder?
Flaventia belviderensis	1	1.0	Infaunal, low level suspension feeder?
Pholadomya? belviderensis	1	1.0	Infaunal, low level suspension feeder?
?Cytheridea sp.	1	1.0	Epi/infaunal scavenger/deposit feeder?

sically preserved, though somewhat disturbed. Assemblages containing *Huhatanka* were referred to as *Nuculana* associations by Scott (1970). Combining Scott's data for the four localities (M3-1, E2-1, E6-2 and S9-4) we see (Table 2) that 11 of the 14 taxa are bivalves. Considering all 14 taxa, four niche groups are represented; infaunal, low level suspension feeders (6 of 14 species); infaunal, deposit feeders (swallowers) (4 of 14 species); epifaunal, high level suspension feeders (2 of 14 species); with *Huhatanka* and the other arthropod, the ostracode *Cytheridea*, making up the fourth group of epi/infaunal, scavengers/deposit feeders? The two most abundant taxa (*Turritella belviderei* and *Nuculana mutata*) are in different niche groups suggesting some resource partitioning.

The integument of *Huhatanka kiowana* is extremely thin and delicate and contains little or no strengthening ornamentation. Those decapods adapted to a shallow water, high energy environment, typically tend to have thicker or more heavily ornamented exoskeletons than do the ones adapted to deeper or quieter water.

Examination of the anterior region of the cephalothorax shows little or no evidence of orbital ridges or reentrants marking the position of the eye stalks. Even though the anterior region of the cephalothorax is rather poorly preserved in the specimens at hand, some evidence of the existence of these characters should be present if they were developed on the organism. Absence of both characters is typical of forms that have reduced eyes or are blind and who inhabit the aphotic zone or burrow.

Extremely elongate antennae and elongate, achelate pereiopods can also be interpreted as an adaptation to a dark (turbid), low energy environment. This type of development would facilitate searching out debris by scanning the sea floor over a relatively broad area rather than by aggressively capturing live food. Summation of the above observed characters suggests that *Huhatanka kiowana* subsisted on detritus rather than live prey, which it identified by tactile and, perhaps, olfactory senses rather than visually. Small size and, conceivably, a burrowing habit afforded the major mechanisms of defense.

In general the environment was below wave base of a shallow, quiet epicontinental sea with a substrate of organic rich mud that varied from loose to firm. It was firm enough in some places to preserve burrows filled with fine sand and silt-sized quartz as evidenced by the mottled texture. Certainly there were periods of higher energy (storms) and some currents which increased turbidity and transported sand grains and shell fragments. Suggested adaptations of *Huhatanka kiowana* and the subequal distribution of all taxa in the association into two feeding groups (8 suspension feeders and 6 deposit feeders) are compatible with this inferred depositional environment.

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