Apionidae from North and Central America. Part 2. Description of a New Subgenus and Two New Species of *Apion* from Mexico (Coleoptera)

David G. Kissinger
24414 University Ave #40
Loma Linda, CA 92354.

Abstract

A new subgenus, *Xixias* (type species *Apion herculanum* Smith), is described for the *Apion herculanum* group and the *Apion peculiare* group formerly assigned to the *Apion* subgenus *Ixias* Sainte-Claire Deville. Unique features within Apionidae are the structure of the endophallus and the host plant families Caprifoliaceae and Rutaceae. *A. nigrosparsum* Suffrian formerly included in the *peculiare* group is excluded. Two new species described from Mexico,*Apion clarki* Kissinger and *A. hahowdeni* Kissinger, are the first North American *Apion* with tuberculate elytra. Supplmental descriptions and/or distribution records are given for *Apion americanum* Wagner, *Apion basirostre* Sharp,*Apion lebasii* Gyllenhal,*Apion harpax* Kissinger, *Apion peculiare* Wagner and *Apion xanthoxyli* Fall.

Introduction

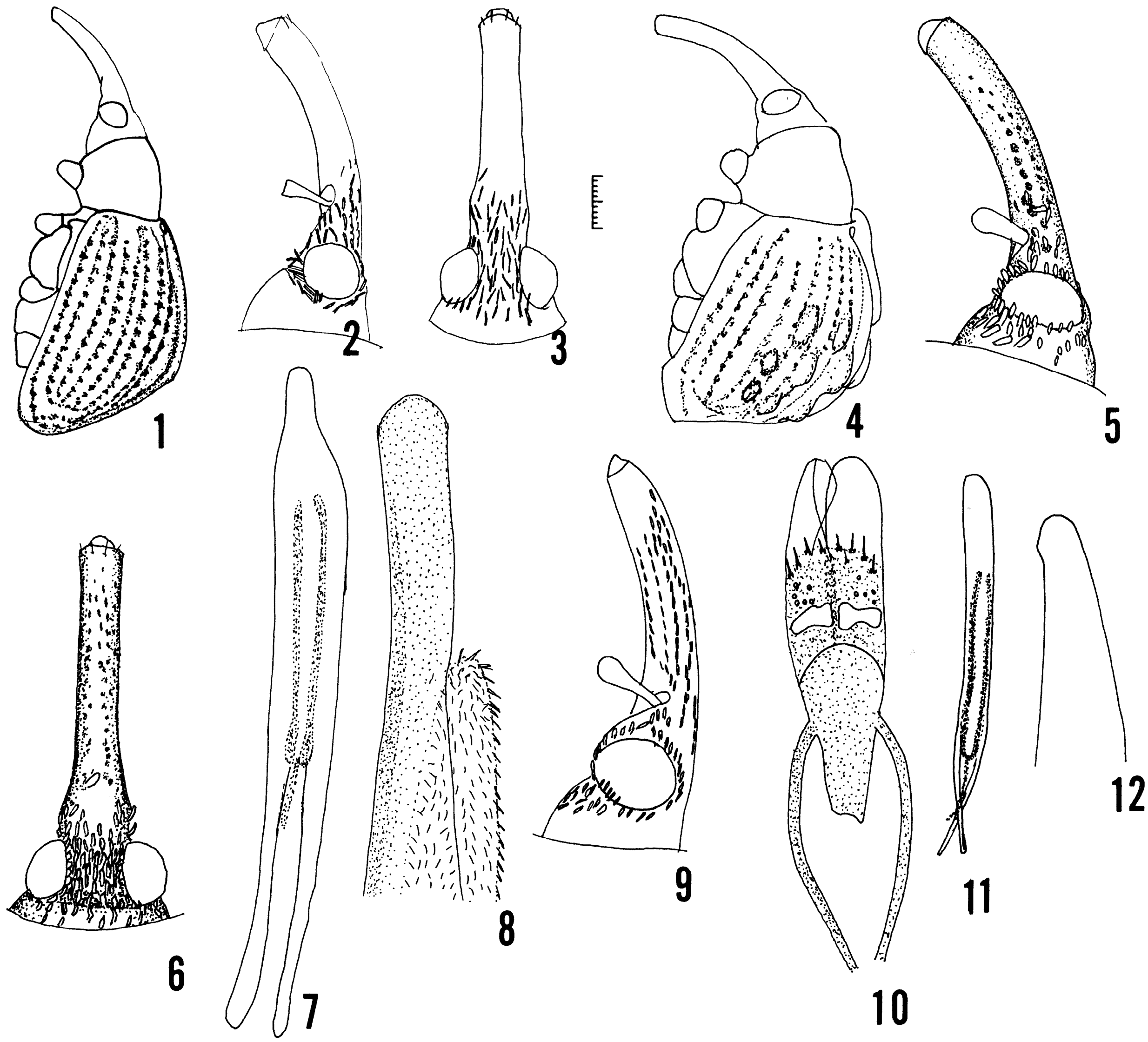
This paper continues a taxonomic study of Apionidae from North and Central America begun in Kissinger (1990). Methods, terminology, acknowledgments and symbols for specimen location are given there.

The genus *Apion* Herbst contains 1500+ species on a world-wide basis and 300+ species in North and Central America. The genus is truly a huge mass of species considering that the average size of a genus in a sister-group, Curculionidae, is about 10 species (Kissinger, 1963). A basic problem is the subdivision of *Apion* based on clear cut criteria.

The subgenera of *Apion* were studied (Kissinger, 1968) in a cursory fashion to relate them to the species of North and Central America. There are approximately 52 subgenera of *Apion*; many were established for European species. Thirteen subgenera were recognized for North and Central America based on fairly apparent characters such as subcephalic ridge and male secondary sexual and genitalic characters; other characters "worked" in differentiating the subgenera in a key for this restricted geographic area but are of unknown significance in the group definition process because the fauna of *Apion* for the world is incompletely known.

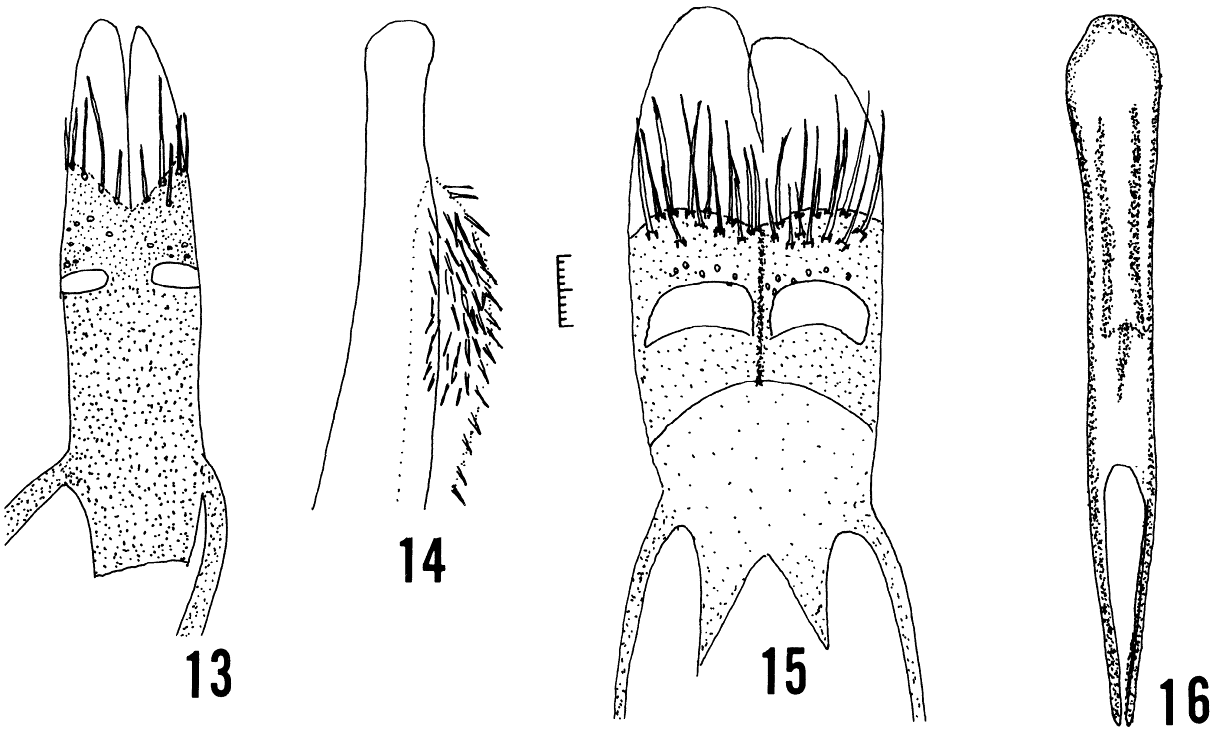
One way to progress toward this goal is to "divide and conquer" by attempting to find groups that may be defined with some ease. One such case is a group of 16 species from the New World which was formerly associated with the *Apion* subgenus *Ixias* Sainte-Claire Deville by Kissinger (1968). While it is doubtful that any group of *Apion* will be easily defined, this one approaches that ideal.

Externally this group of species tends to be reddish brown in color and often has a transverse pattern on the elytra of contrasting bands of light and dark scales. Individually these features are rare in *Apion*, especially in North America; in combination they tend to be diagnostic. *Apion* are often dark piceous in color and have the vestiture uniform in color. Another unusual external character is the robust tarsi; tarsomere 1 tends to about as wide as long; in *Apion* it is usually longer than wide; stout tarsi are also found in *Apion* (*Trichapion*) *tenuirostrum* species group and in *Podapion* Riley of the tribe Aplemonini.



Figures 1 - 12. *Apion* (*Xixias*) *hahowdeni* Kissinger, new species. 8 km S Suchixtepec, Rio Molino, 2200 m, Oaxaca, Mexico (HAHC). 1) female holotype, dorsal view; 2) head of female, lateral view; 3) head of female, dorsal view. *Apion* (*Xixias*) *clarki* Kissinger, new species. 4.4 mi E Cuernavaca, Morelos, Mexico. 4) Female, lateral view; 5) head of female, lateral view; 6) head of female, dorsal view; 7) median lobe of aedeagus, dorsal view; 8) apex of median lobe of aedeagus, lateral view. *Apion* (*Xixias*) *basirostre* Sharp. Barro Colorado Island, Canal Zone, Panama (CWOB). 9) Head of male, lateral view. *Apion* (*Xixias*) *americanum* Wagner. 2 km S Colon, San Jose, Costa Rica (DGK). 10) Tegmen, dorsal view; 11) median lobe of aedeagus, dorsal view; 12) apex of median lobe of aedeagus, lateral view. Scale = 379 for Fig. 1, 4; 188 for Fig. 2, 3, 5, 6, 9; 110 for Fig. 7, 11; 54 for Fig. 10; 27 for Fig. 8, 12.

The internal male genitalia of the group is most distinctive. The endophallus contains a large (400-500), tuning-fork shaped structure that is unique in the family; it may be associated with the gonopore. This is the largest sclerite known to me in the endophallus of



Figures 13 - 16. *Apion* (*Xixias*) *lebasii* Gyllenhal. Pta. Paitilla, Panama (DGK). 13) Tegmen, dorsal view; 14) apex of median lobe of aedeagus, lateral view. *Apion* (*Xixias*) *peculiare* Wagner. Barro Colorado Island, Canal Zone, Panama (DGK). 15) Tegmen, dorsal view; 16) median lobe of aedeagus, dorsal view. Scale = 110 for Fig. 16, 54 for Fig. 13, 15; 27 for Fig. 14.

Apion. I believe it to be analogous to the tubular flagellum found in Cyladini, Nanophyini and other apionids; consequently, this is the closest approach to an endophallic flagellum known to me in *Apion*. The exact structure and function of the sclerite is not known.

Apion Subgenus *Xixias* Kissinger
new subgenus

Type Species: *Apion herculanum* Smith. **Diagnostic Characters:** Endophallus with structure shaped like a tuning-fork about 400-500 microns in length; illustrated in Kissinger (1968), plate 57, figures j and k (See Fig. 7, 11, 16). Free ring of basal piece fused with tegminal plate of paramere. Tarsi robust; tarsomere 1 about as wide or wider than long. Legs of male lack sexual modifications. Subcephalic ridges low, extending posteriorly to near middle of eye (*peculiare* with ridges highly developed). Elytral intervals 7 & 9 each with 1 sensory seta in apical fourth (*Apion peculiare* species group with one sensory seta on interval 9). Derm tends to be reddish brown in color; elytra tend to have contrasting transverse pattern of vestiture.

The *Apion herculanum* and *Apion peculiare* species groups are assigned to this subgenus; the species assigned to each group are listed below.

The type species of *Ixias*, *A. variegatum* Wencker, develops in the stems of mistletoe (Loranthaceae) in Europe. It lacks the endophallic and parameroid characters of *Xixias*, but does have other characters in common with *Xixias*: low subcephalic ridges, presence of stout tarsi, transverse pattern of light and dark scales on elytra (present in many, but not all *Xixias* sp.), and derm of brownish color.

Apion subgenus *Prototrichapion* Voss, with species from Africa and Madagascar, also has some similarity to *Xixias* with its robust tarsi and other characters similar to *Ixias* but the male tarsomere 1 may be toothed on all legs and the subcephalic ridges are higher.

The key to subgenera of North and Central American species of *Apion* based on males in Kissinger (1968) should be modified as follows.

9. Segment 1 of tarsus 1 distinctly longer than wide; body NOT both light brown in color and with transverse pattern of vestiture; endophallus lacking large tuning-fork like structure ...... 12.
   Segment 1 of tarsus 1 stout, about as wide as long; body generally light brown in color with transverse pattern of vestiture more or less distinct; endophallus with tuning-fork shaped structure 400-500 long; North American species elongate, tropical species robust, with body profile subgibbous .... APION subgenus XIXIAS Kissinger

Apion herculanum species group

Six species (*frosti* Kissinger, *hahowdeni* Kissinger, *harpax* Kissinger, *herculanum* Smith, *idiastes* Kissinger, and *umboniferum* Fall) occur from southeastern Canada and northeastern United States to Texas; the species described below extends the range to southwestern Mexico. An unidentified female has been seen from Crater Lake, Or. The adults are associated with the flowers of *Viburnum* sp.; three species have been reared from the fruit of *Viburnum*. No other apionid is known to use the plant family Caprifoleacea as hosts.

Apion harpax Kissinger. ILLINOIS: Cook Co, Desplains, Carle Woods, 10 AUG 1958, herbs, W Suter, 1 female (DGK). (**New Distribution Record**). NORTH CAROLINA: Black Mts, 27 MAY [no year but probably 1906], 1 male (AMNH). (**New Distribution Record**). Formerly known from Michigan to Massachusetts to Virginia.

Apion (*Xixias*) *hahowdeni* Kissinger
new species

Type Series. Holotype. Female. MEXICO: Oaxaca: 8 km S Suchixtepec, Rio Molino, 2200 m, 19 VI 1974, H & A Howden; M00135 det-Kissinger; (HAHC).

Diagnosis. Coloration and form similar to *Apion herculanum* Smith. Elytral interval 2 widened and prominent near posterior 1/3 of elytra where remainder of *herculanum* group has interval 2 flat.

Description. Figures 1 - 3. Measurement data on table 1. Female. **Body form**: Moderately slender. **Coloration**: Derm dark brown. Vestiture conspicuous, fine, off-white, tan, or plumbeous in color; elytra with basal and apical regions of lighter scales separated by transverse darker band; disk of prothorax with off-white scales that become tan on sides; elytral intervals 1-3 in basal half with off-white scales similar to those on prothorax, with transverse band of mostly plumbeous scales on intervals 2-5. Posterior 1/2 of metepisternum with single row of scales. **Rostrum**: At base not sulcate or carinate, in apical half glabrous, polished; in side view moderately curved, with sides parallel from base to apex; in dorsal view expanded at tip. Anterior part of dorsal margin of scrobe angulate. **Head**: In profile dorsal margin flat above posterior margin of eye; subcephalic ridges short, low. **Prothorax**: From side dorsal surface nearly flat; punctures moderately deep, 0.02 to 0.03 mm in diameter. **Elytra**: interval 2 widened and elevated prominently just behind middle in region of the transverse dark band, interval 4 more distinctly convex in this region; with one sensory setae each on intervals 7 and 9.

With the exception of the elytral character, *hahowdeni* is similar to *Apion idiastes* Kissinger. Couplet 10 in the key to the species of *Ixias* of North and Central America (Kissinger, 1968, p. 42) should be modified as follows.

10. Elytral intervals 2 and 5 nearly uniform in width in posterior 1/2 11.
    Elytral intervals 2 or 5 widened or narrowed in posterior 1/2 10a.

10a. Elytral interval 2 on declivity about 1/2 as wide as before declivity, abruptly narrowed; elytral interval 5 wider at middle of declivity than before, produced into low prominence UMBONIFERUM Fall

Elytral interval 2 widened and elevated prominently near middle HAHOWDENI Kissinger, new species

This species is named in honor of the collectors, Henry and Anne Howden.

Apion peculiare species group

Ten species belong to this group; eight (*americanum* Wagner, *basirostre* Sharp, *clarki* Kissinger, *cretaceicolle* Sharp, *lebasii* Gyllenhal, *matricum* Sharp, *peculiare* Wagner and *xanthoxyli* Fall) occur from southern Texas to Brazil, two (*kissingeri* Ferragu and *martinezi* Marshall) occur in the West Indies. The larvae of 3 species develop in seeds of the plant family Rutaceae; this may be a unique host plant in the Apionidae. The males of 7 species have been dissected to provide genitalic data; *A. cretaceicolle* Sharp, *A. kissingeri* Ferragu and *A. matricum* Sharp were not dissected.

Apion nigrosparsum Suffrian, included by Kissinger (1974) in the *Apion peculiare* species group, is excluded from *Xixias* because it lacks the prerequisite endophallic and parameroid structures; the species may be near the *annulatum* group of the *Apion* subgenus *Coelocephalapion* Wagner.

Apion americanum Wagner. The male characters of this species were not given in Kissinger (1968) and are as follows. **Male characters:** Legs not modified. Median lobe of aedeagus in profile with sides at apex produced slightly on ventral margin (Fig. 12); in dorsal view sides nearly parallel from base to orifice, rounded to moderately broad apex (Fig. 11); endophallus with sclerite 515 long. Tegmen parameroid lobe moderately long, broad, membranous, with 4-5 macrochaetae 16-27 long (Fig. 10); free ring of basal piece fused with tegminal plate; basal plate flat medially. Recent captures include COSTA RICA: San Jose P., 2 km S Colon, 1100m, 16 FEB 1984, H & A Howden; one male (HAHC). PANAMA: CZ: Madden Forest, 14 MAY 1978, CW & LB OBrien & Marshall; one male, one female (CWOB, DGK). Barro Colorado Is, APR-MAY 1973, swept under story, H Wolda; 1 female (CWOB). Evidence not presented here indicates that the same or a closely similar species occurs in South America but the populations show variation in the shape of the apex of the median lobe in profile and in the length of the macrochaetae. Some specimens from Panama have a darker discal spot because the scales are finer on intervals 1-4 and allow more of the integument to show through, however the color of the scales is not changed.

Apion basirostre Sharp. See Fig. 9 for lateral outline of head of male. The male characters of this species were not given in Kissinger (1968) and are as follows. **Male characters**: Legs not modified. Median lobe of aedeagus in profile with apex not produced; in dorsal view sides gradually expanded from base to orifice, broadly rounded to blunt apex; endophallus with sclerite 400 long. Tegmen parameroid lobe moderately long, broad, membranous, with 6 macrochaetae 12-61 long; free ring of basal piece fused with tegminal plate; basal plate flat medially. PANAMA: CZ: Barro Colorado Is, 14-19 AUG 1979, UV trap 3 m, H Wolda; 1 male (CWOB). Three specimens (USNM) from Buenaventura, Valle, possibly country of Columbia (ex seeds Xanthoxylum) apparently are this species; an anomaly of unknown signficance is the fact that tarsomere I is distinctly longer than wide unlike the single specimen from Panama.

Apion lebasii Gyllenhal. The male characters of this species were not given in Kissinger (1968) and are as follows. **Male characters**: Legs not modified. Median lobe of aedeagus in profile with sides at apex produced slightly on dorsal margin (Fig. 14); in dorsal view sides nearly parallel from base to orifice, rounded to narrowly rounded apex; endophallus with sclerite 455 long. Tegmen parameroid lobe moderately long, broad, membranous, with 4-5 macrochaetae 43-82 long (Fig. 13), may envelope the median lobe; free ring of basal piece fused with tegminal plate; basal plate flat medially. PANAMA: Pta Paitilla, 15 MAY 1970, HA Hespenheide; 2 specimens (HAH, DGK).

Apion matricum Sharp is included tentatively in the subgenus because the male has not been dissected. PANAMA: CZ: Barro Colorado Is, 22 VII 77 HA Hespenheide. Madden Forest mi 2.5, 7 IV 73 HA Hespenheide (HAH, DGK). UV trap Weir Trail, 13 AP 76 H Wolda (CWOB).

Apion peculiare Wagner. This species has very high subcephalic ridges, a feature not described by Kissinger (1968) and unique in the subgenus. The male characters of this species were not given in Kissinger (1968) and are as follows. **Male characters**: Legs not modified. Median lobe of aedeagus in profile with apex not produced; in dorsal view sides nearly parallel from base to near orifice, broadly expanded around orifice, broadly rounded to broad apex (Fig. 16); endophallus with sclerite 550 long. Tegmen parameroid lobe moderately long, broad, membranous, with 12 macrochaetae 43-97 long (Fig. 15); free ring of basal piece fused with tegminal plate; basal plate flat medially. COSTA RICA: Cartago, Turriabla, 650m, 25 FEB 1980, H & A Howden; one female (HAHC). HamburgFarm, Reventazon, Ebene Limon, 15 AUG 23, F Nevermann; one female (USNM). (**New Distribution Record**). PANAMA: CZ: Barro Colorado Is, 29 MAY 1977, 2 JUNE 1979, HA Hespenheide; 20 specimens (HAH, DGK). The species was previously known from Panama and Brazil.

Apion xanthoxyli Fall. MEXICO: Oaxaca: 14km NW Diaz Ordaz, 2600m, 15 VI 1979, H & A Howden, in lichen on trees; one female (HAHC). 10 mi N Miltepec, 26 VII 1974, Clark, Murray, Ashe, Schaeffer; one female (TAMU). (**New Distribution Record**). The species was known previously from Texas and Veracruz.

Apion (*Xixias*) *clarki* Kissinger
new species

Type Series. Holotype: Male. MEXICO: Morelos: 4.4 mi E Cuernavaca, July 6-8, 1974, Clark, Murray, Ashe, Schaffner (USNM). **Paratypes**: 5, same data, 3 (TAMU), 2 (DGK).

Diagnosis. Coloration and form similar to *Apion xanthoxyli* Fall but with 8 raised, rounded, prominent areas on each elytron; intervals 2, 4 and 6 each with 2 areas in posterior 1/2, intervals 3 and 5 each with 1 near basal 1/3 (Fig. 4). All other members of the species group with elytral intervals of uniform height.

Description. Figures 4 - 8. Measurement data on table 2. **Body form**: Robust, in profile dorsal margin of elytra gibbose. **Coloration**: Derm dark brown. Vestiture conspicuous, dense, consisting of coarse scales off-white, light tan, or brown in color; much of elytra including interval 1 (sutural) with light colored scales, elytra also with vague wedge-shaped area of darker scales widening out from first prominence on interval 2 to interval 5, the dark area edged anteriorly with off-white scales, the raised elytral nodules with darker scales. **Rostrum**: Moderately curved; in basal half with coarse, moderately dense punctures; apical 4/5 virtually glabrous, apical half nearly cylindrical, polished. **Head**: Frons sculpture obscured by 7-8 rows of scales; in profile dorsal margin declivitous above posterior margin of eye; subcephalic ridges moderately low. **Prothorax**: Conical, sides constricted just before apex; in profile dorsal surface slightly convex; punctures 0.03 mm in diameter. **Elytra**: Intervals 2, 4 and 6 with raised areas as described in diagnosis; striae 6-9 evident in area above coxa 3. **Male characters**: Legs not modified. Median lobe of aedeagus in profile with sides at apex nearly parallel (Fig. 8); in dorsal view sides slightly diverging from base to orifice, broadly, roundly narrowing to moderately broad, parallel-sided apex (Fig. 8); endophallus with sclerite 575 long. Tegmen parameroid lobe moderately long, broad, membranous, with 5-6 macrochaetae 53-86 long; free ring of basal piece fused with tegminal plate; basal plate flat medially.

The species is distinct from all others in this species group (and indeed from all *Apion* from the New World) by the pattern of tubercles on the elytra. However, in this subgenus, *Apion umboniferum* Fall has interval 5 widened and somewhat prominent on the declivity. From Brasil, *Apion* (*Bothryopteron*) *binodosum* Wagner has middle of the elytra with interval 3 widened and raised into a prominence. Together with *A. hahowdeni* Kissinger, these may be the only New World *Apion* with prominences on the elytra.

A. clarki has a number of characters in common with *A. martinezi* Marshall and *A. xanthoxyli* Fall: (1) the rostrum exhibits little sexual dimorphism; (2) the posterior part of the frons above the eye is declivitous; (3) the scale pattern on the elytra is made up of light and dark, broad scales; (4) the elytra have a transverse band of darker scales; and (5) the lower lateral part of the prothorax has oval-shaped scales. *A. martinezi* exhibits a trait not seen elsewhere in the *peculiare* group: elytral striae 6-9 are obliterated and the scales in this region do not indicate striae. The three species either were reared or else are associated with the same host plant genus, *Zanthoxylum*.

Couplet 7 in the key to the species of *Ixias* of North and Central America (Kissinger, 1968, p. 41) should be modified as follows.

7. Frons flat above posterior margin of eye; elytra lacking distinct median band of dark scales, intervals 2 and 4 with dense, elongate areas of white scales at basal 1/3 and behind middle; Panama to Brazil . . . . LEBASII Gyllenhal
   Frons abruptly declivitous above posterior margin of eye; elytra with distinct transverse band of dark scales near middle . . . . 7a.

7a. Striae 6-9 apparent on flanks of elytra . . . . 7b.
   Striae 6-9 not apparent on flanks of elytra; Puerto Rico MARTINEZI Marshall

7b. Elytral intervals nearly flat throughout; Texas and Mexico XANTHOXYLI Fall
   Raised areas on elytral intervals 2, 4, 6 near middle and on superior part of declivity and on intervals 3 and 5 near basal 2/5; Mexico . . . . CLARKI Kissinger, new species

This species is named in honor of Dr. Wayne E. Clark who stated (*in litt*) that a potential host plant, *Zanthoxylum* sp., occurred at the collection site.

Literature Cited

Kissinger, D. G. 1963. The frequency of genera of a particular size in three families of phytophagous beetles. Sys. Zool. 12: 15-19.

Kissinger, D. G. 1968. Curculionidae subfamily Apioninae of North and Central America. Taxonomic Publ., South Lancaster, Mass. 559 p.

Kissinger, D. G. 1990. Apionidae from North and Central America. Part 1. Notes on the classification of the *Apion* subgenus *Trichapion* Wagner with description of new species from the United States of America. (Coleoptera). Insecta Mundi 3(4): 271- 287.

TABLE 1. Measurement data for *Apion hahowdeni* Kissinger. M = male; F = female; B = both sexes. N is the number of observations included in mean and standard deviation. Definition of measurements as in Kissinger (1989). All measurements are in microns (0.001 millimeters).

Character	Range	Mean	Standard Deviation	N
Body Length (B)	2318	2318	0.0	1
Rostrum Length (F)	795	795	0.0	1
Length of Metarostrum (F)	182	182	0.0	1
Mesorostrum Width in profile (F)	146	146	0.0	1
Mesorostrum Width from Above (F)	184	184	0.0	1
Rostrum Width at Tip from Above (B)	91	91	0.0	1
Frons Width (B)	155	155	0.0	1
Prothorax Length (B)	548	548	0.0	1
Prothorax Width at Base (B)	622	622	0.0	1
Prothorax Width at Middle (B)	622	622	0.0	1
Prothorax Width at Apex (B)	512	512	0.0	1
Elytra Width at Humeri (B)	914	914	0.0	1
Elytra Width (B)	1152	1152	0.0	1
Elytra Length (B)	1596	1596	0.0	1
Femur I Length (B)	622	622	0.0	1
Femur I Width (B)	201	201	0.0	1

TABLE 2. Measurement data for *Apion clarki* Kissinger. Male; F = female; B = both sexes. N is the number of observations included in mean and standard deviation. Definition of measurements as in Kissinger (1989). All measurements are in microns (0.001 millimeters).

Character	Range	Mean	Standard Deviation	N
Body Length (B)	2508-2584	2542	38.8	6
Rostrum Length (M)	969	969	0.0	1
Rostrum Length (F)	877-1018	945	67.7	5
Length of Metarostrum (M)	128	128	0.0	1
Length of Metarostrum (F)	128-160	147	13.8	5
Mesorostrum Width in profile (M)	192	192	0.0	1
Mesorostrum Width in profile (F)	164-196	179	11.9	5
Mesorostrum Width from Above (M)	246	246	0.0	1
Mesorostrum Width from Above (F)	237-255	242	8.0	5
Frons Width (B)	182-201	194	7.7	6
Prothorax Length (B)	695-777	737	36.4	6
Prothorax Width at Base (B)	841-914	874	26.9	6
Prothorax Width at Middle (B)	841-914	874	26.9	6
Prothorax Width at Apex (B)	585-622	597	19.1	6
Elytra Width at Humeri (B)	1206-1298	1251	43.5	6
Elytra Width (B)	1426-1492	1452	25.4	6
Elytra Length (B)	1748-2013	1868	108.6	6
Femur I Length (B)	786-850	818	27.0	6
Femur I Width (B)	283-310	295	9.2	6