

MARSHAL C. HEDIN

1996-1998



Keuffel & Esser Company

82 0020

Weatherproof Field Book

"Rite in the Rain" All-Weather Paper
32 Leaves

4⁵/₈" X 7"

CURVE FORMULAS

$$T = R \tan \frac{1}{2} I$$

$$T = \frac{50 \tan \frac{1}{2} I}{\sin \frac{1}{2} D}$$

$$\sin \frac{1}{2} D = \frac{50}{R}$$

$$\sin \frac{1}{2} D = \frac{50 \tan \frac{1}{2} I}{T}$$

$$R = T \cot \frac{1}{2} I$$

$$R = \frac{50}{\sin \frac{1}{2} D}$$

$$E = R \text{ ex. sec } \frac{1}{2} I$$

$$E = T \tan \frac{1}{2} I$$

$$\text{Chord def.} = \frac{\text{chord}^2}{R}$$

$$\text{No. chords} = \frac{I}{D}$$

$$\text{Tan. def.} = \frac{1}{2} \text{ chord def.}$$

The square of any distance, divided by twice the radius, will equal the distance from tangent to curve, very nearly.

To find angle for a given distance and deflection.

Rule 1. Multiply the given distance by .01745 (def. for 1° for 1 ft.) and divide given deflection by the product.

Rule 2. Multiply given deflection by 57.3, and divide the product by the given distance.

To find deflection for a given angle and distance. Multiply the angle by .01745, and the product by the distance.

GENERAL DATA

RIGHT ANGLE TRIANGLES. Square the altitude, divide by twice the base. Add quotient to base for hypotenuse.

Given Base 100, Alt. $10.10^2 \div 200 = 5.100 \div 5 = 100.5$ hyp.

Given Hyp. 100, Alt. $25.25^2 \div 200 = 3.125$, $100 - 3.125 = 96.875 = \text{Base}$.

Error in first example, .002; in last, .045.

To find Tons of Rail in one mile of track: multiply weight per yard by 11, and divide by 7.

LEVELING. The correction for curvature and refraction, in feet and decimals of feet is equal to $0.574d^2$, where d is the distance in miles. The correction for curvature alone is closely, $\frac{1}{2}d^2$. The combined correction is negative.

PROBABLE ERROR. If d_1, d_2, d_3 , etc. are the discrepancies of various results from the mean, and if $\sum d^2$... the sum of the squares of these differences and n = the number of observations, then the probable error of the mean = $\pm 0.6745 \sqrt{\frac{\sum d^2}{n(n-1)}}$

$$32.09.375$$

$$109.46.462$$

MINUTES IN DECIMALS OF A DEGREE

1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'	21'	22'	23'	24'	25'	26'	27'	28'	29'	30'	31'	32'	33'	34'	35'	36'	37'	38'	39'	40'	41'	42'	43'	44'	45'	46'	47'	48'	49'	50'	51'									
10167	10333	10500	10667	10833	11000	11167	11333	11500	11667	11833	12000	12167	12333	12500	12667	12833	13000	13167	13333	13500	13667	13833	14000	14167	14333	14500	14667	14833	15000	15167	15333	15500	15667	15833	16000	16167	16333	16500	16667	16833	17000	17167	17333	17500	17667	17833	18000	18167	18333	18500	18667	18833	19000	19167	19333	19500	19667	19833	20000

96-069 CO: Saguache Co., Hwy 285 @
Russell Lakes SWA Elev. 7500'

7 August, 1996 - collecting in cottonwood
litter hdb adjacent to grass pastureland.
♂ H. kluxeni collected, ♀ seen.
H. cuspidatus

96-070 CO: Gunnison Co., vic Avery Peak
near Gothic Elev. 12,000' 8 August, 1996
- collecting in large basin below Avery Peak,
all above timberline. Most productive
spider habitat - loose rocks, "scree" on
slopes - found 3 ♂, ♀ Tarbellus in such
hdb. Also found ♀ Sitticus lower on trail
in opening adjacent to talus field.

96-071 CO: Gunnison Co., Gothic vic. Judd
Falls Elev. 9800' 9 August, 1996
- looking for H. kluxeni in sage / rocky openings
amongst aspen forest. None seen. Found ♂ ♀ Holtz
in small, less rocky, openings - spiders
disappointingly sparse.

96-072 UT: Summit Co., Blacks Fork River
@ jct. East/West Forks Elev. 8900' 11 August, 1996
- collected single ♂ H. kluxeni on sticks adjacent to
dry lake on sage flats - typical forest edge.
No others seen over ~ 1 hour search.

96-073 UT: Duchesne Co., Murdock Mtn,
near Hwy 150 Elev. 10800' 11 August, 1996
- 2 antimimics (gnaphosids) collected in grassy,
rock clearing of forest. No saltfields seen
in good habitats?

96-074 UT: Duchesne Co., North Fork Duchesne
River, vic. Holes Canyon Elev. 7,400'
12 August, 1996 - collecting on gentle
slope of sage / pinyon hdb w/ small rocks,
grass. H. kluxeni fairly common - collected
a total of 7 imm ♀, 6 ♂, 1 adult ♂.
Again, curious that most spiders sub-adult.

96-075 UT: Duchesne Co., Hwy 35, ~ 3 mi. NW
of Utrahn along Duchesne River Elev. 6000'
12 August, 1996 - beeting in roadside
habitat, mostly large sage. Collected
adult ♂, Phidippus, 3 Pelesine? (1 ♀ adult),
3 imm. ♀, 4 ♂, ♂ H. festus - most collected
beeting low sage. One H. festus collected
on ground.

96-076 UT: Duchesne Co., Hwy 191
Q. Spring Hollow, SW Duchesne
Elev. ~7500' 12 August, 1996

- bedding in canyon bottom of sage/juniper/
tall grasses. Collected 2 ♂♂ *H. festus*
in sage; 1 ♂♂, 2 ♀♀ *Metaphidippus* only
in *Juniperus*; 3 ♂♂ *Synagelasma*
on tall grasses only. Did not
grand search. (Some Hollow Q. area)

96-077 UT: Emery Co., Ferron Canyon, ~
5 mi. W Millsite Reservoir Elev. 6400'
13 August, 1996 - collecting in early
a.m. in cottonwood stream bottom
hab. Collected 3 ♀♀, 1 imm. *Pellenes*
on rocks of gravel bed. Some spiders
may be *H. ustulatus*? (*no, all *Pellenes*)

96-078 UT: San Pete Co., Monticello S.E. of NF,
Ferron Cyn Road (FR 022) vic Willow Lake
Elev. ~9500' 13 August, 96 coll w/ P. Abbott
- collecting in open sage / open grove habitats
H. festus very common (4 ♀♀, 7 ♂♂) *H. sonori*? less
common (2 ♂♂, 1 imm ♀). perhaps not in
the best *sonori* habitat?

96-079 UT: Sevier Co., Hwy 24, 1 mi. S
of SGT w/ Hwy 119, S of Sigurd
Elev. 6200' 13 August, 1996

- bedding in sage/juniper/oak habitat
Found 2 ♀♀ *H. transvillius* on sage, nothing
on other plants. (*probably *H. ustulatus*.)

96-080 UT: Sevier Co., Fishlake NF, Johnson
Valley Reservoir Elev. 8800' 14 August, 1996
- collecting on NW side of reservoir on
sage hillside w/ spruce/aspen. Collected
single imm ♀ *H. sonori* (vic Reflection Spring)

96-081 UT: Sevier Co., Fishlake NF, Hwy 25,
N end of Fishlake Elev. 8800'

14 August, 1996 coll w/ P. Abbott
- collecting on NW edge of Fishlake in
sage flats adjacent to aspen grove.
H. festus very common (7 ♀♀, 8 ♂♂); *H. sonori*
less common, only collecting 3 ♂♂,
3 imm ♀ in ~ 2 hrs of searching.
No obvious microhabitat differences
between these species - *sonori* not
more prevalent in any particular
microhabitat.

(96-082) UT: Beaver Co., mile 14 E of
Beaver on Hwy 153, Tushar
Mountains Elev. ~8,200' 14 August, 1996
coll w/ P. Abbott - collecting on
relatively steep sage/pinyon-juniper slope
on north side of highway. Scorpions
very sparse, collected just 5 m. and
14, 1 p ♂ H. Sensum in oven 1 hour
of collecting. Again, most spiders
Sub-adult. (try via Lousy Jim Creek)

(96-083) UT: Kane Co., Hwy 89, 10.3 mi.
N jct. w/ Hwy 9 Elev. ~5,700'
14 August, 1996 - collected ♂
Hesbs in cottonwood litter adjacent
to small stream

(96-084) UT: Kane Co., ~3 mi. S Hwy 9
LD Ranch, near "Poverty Flat"
Elev. ~5,000' 15 August, 1996
- in open pinyon/juniper habitat w/
montane. Found 4 Phidippus under
large stone in west. Also collected
bright red mottled @ night -
walking on ground.

(96-085) AZ: Santa Cruz Co., Ruby Road, vic.
Summit Motorway Elev. ~5,000' 23 Sept., 1996
- collected H. Sensum adults on dry
hillside adjacent to road - open, grassy
habitat

(96-086) AZ: Santa Cruz Co., Pajaro Mts.,
Sycamore Canyon Elev. 4000 ft 23 Sept., 1996
w/ Wayne - General scorpion collecting in/
near stream-bottom. Collected 4 Gylloidea,
Marpissa, Thiodina, Metaphidippus, various
Habronattus (eg conjugens, hollisi, Sensum,
pyralis) - Beating, ground-sending.

(96-087) NM: Catron Co., Gila NF, 1.1 mi. E of
Gilita Canyon on small farm road off of Forest
Service Rd 159, vic. Mogollon Elev. ~7,800'
1 Sept., 1996 - spiders collected on trail
in pine forest - rocky, some litter in
middle of road. All immature Habronattus,
species uncertain - coarctus, clypeatus groups.
(collected by P. Abbott & friends)

96-088

AZ: Santa Cruz Co., vic. Atascosa
 Lookout Elev. 6000' 19 Nov., 1996
 - in piñon / juniper / oak woodland habitat
 - unseasonably warm, ~80°F. Collected
 imm. ♀ Pellaea sp. on bare ground w/
 Loose rock. Collected ♂ Phidippus
osotus? from dragline out of aligatore
 juniper tree-top.

96-089

AZ: Maricopa Co., Maricopa Mtns.,
 adjacent to No. Maricopa Mtns. Wilderness,
 Butterfield Trail Elev. 1400 ft.
 28 Nov., 1996 - collecting on
 desert flats immediately adjacent to
 rocky hillside. Saguaro / mesquite / creosote
 habitat - essentially barren ground
 w/ small rocks. Collected 2 ♂,
 2 imm. ♀ Hustulatus.

97-001

AZ: Cochise Co., Paige Creek Canyon, North
 of Little Rincon Mtns., Elev. ~4000'
 19 January 1997 - collected adult
Hustulatus (mostly ♀♀) on barren, rocky
 gentle slopes - some limestone. ♂♂'s dark.
 Most ♀♀'s ground.

31.92272 - 109.96776

97-002

AZ: Cochise Co., Coronado NF, Dragon
 Mtns., Cochise Stronghold Campground
 Elev. ~6000' 2 February, 1997 - collected
 mostly penultimate Helypsetus in open,
 rocky woodlands of aligatore juniper,
marzamita, etc. Looked for H. geminatus in
 oak bottomland litter - too early?

97-003

AZ: Pima Co., Santa Cruz River, 1 mi.
 N Avra Valley Road bridge, near I-10,
 vic. Rillito Elev. 2000' 2 March, 1997
 - collecting adjacent to river bed in mesquite /
 tamarisk - many adult ♂♂ / ♀♀ Helypsetus. In
 streambed next to small flowing water -
 tall grass - many adult Helypsetus, mostly ♂♂,
 some penultimate ♂♂. Single ♂ H. geminatus
 adjacent to stream in debris pile.
 Looking specifically for H. geminatus, but
 no luck in many various habitats. Perhaps
 wrong time of year?

- Weaver Habitat!

32.41839

- 11.19471

32.85604 -113.25071

97-004

A2: Maricopa Co.,
Sentinel, Hwy. I-8 Rest Area
Elev. ~500 ft. 7 March, 1997

- collecting w/ Wayne, E. Heberts, P. Abbott,
P. Gerba. Collected many Hesperatus
in vic. of dry-up, shallow depression -
many in debris mound large mesquite.
Wayne collected ♂ Hicranopsis in
thicket in bottom of depression
w/ many large mesquite - rather
"closed" area.

97-005

A2: Yuma Co., Mohawk Mtns @ Hwy 1-8,
Exit 54 North Elev. 400 ft. 7 March, 1997

- collected ♀/♂ Hicranopsis : habitat
seems to be intermittent riparian areas
in desert - not too wet, not too
dry. Species tends to stay in
shade, very skittish. Saw others
under Prosopis. Also collected
Helophidius mainly beating mesquite.
but no H. longicollis. ♀ Hicranopsis
on low vegetation.

~32.78825 -113.76330

97-006

A2: Yuma Co., 1 mi. N of County 3rd St
Avenue 52 East, ~5 mi. N I-8, Gila River
Elev. 250 ft. 7 March, 1997 - collected adjacent
to river - Hesperatus most common next to H_2O in
vegetation. Hesperatus slightly higher up - in
grass. Hicranopsis / Hicranopsis in thick
thicket, other larger bushes - most on sticks
off ground. No H. tarsalis in grass - too
setty? Szysanus / Sarindia beaten off
bushes on higher ground.

97-007

A2: Cochise Co., Wilcox Playa, WP Wildlife Area,
off Kansas Settlement Road Elev. ~4,000 ft.
22 March, 1997. Collected 2 immature Hesperatus -

97-008

A2: Cochise Co., Sunizona, Hwy. 191 Elev. ~4,200
22 March, 1997. Collected 2 ♂/♀ Hicranopsis
on open hillside of acacia, agave, opuntia,
seeded mesquite. ♀ Hicranopsis seen!!

97-009

A2: Cochise Co., Gila Monster Canyon, Swisshelm
Mountains Elev. ~6,000 ft. 22 March, 1997. Collected ♂/♀
Hesperatus on dry slopes of w-hills - mostly
open, grassy habitat w/ many Aesculus, Opuntia -
31.61944 -109.53725

97-010

A2: Santa Cruz Co., Lower Miller Canyon, 1 mi. W of Hwy 92, on Millen Cyn. Rd. Elev. 5000' 23 March, 1997.
- collected *H. conjugens* in open oak litter habitat adjacent to dry streambed 31.42.143 - 110.26744

97-011

A2: Santa Cruz Co., Miller Canyon Trailhead, Huachuca Mtns. Elev. 5900'.
23 March, 1997. Collected single *H. conjugens* in thick oak litter @ parking lot. Searched ~ 1 hr for others, but saw none.

97-012

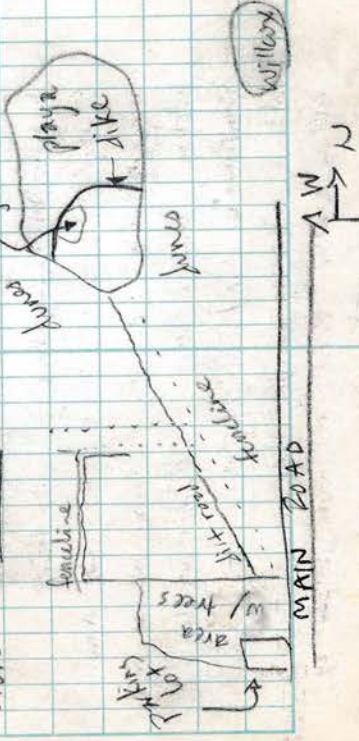
A2: Santa Cruz Co., Pajarito Mts., Sycamore Cyn. Elev. 9000' ft.
9 April, 1997. Collecting w/ E. Heberts, G. Bodner, P. Cochran. Nightingale 75-80°F. Collected from ca 107°-33° AM.

♀ *H. conjugens* in grassy slope / *H. conjugens*, *Whitnobia* shagbark along streamside trail.
Whitnobia ♂ - one from grass overlooking stream, another on rocks @ streamside.
Penultima ♂ / ♀ *H. conjugens* on oak litter, shaded N-facing slope. Many ♂♀ *H. conjugens* several along trail in rocks, sticks, etc. Others on oak, grass slope.

(32.14195 - 109.7569)

97-013

A2: Cochise Co., Wilcox Playa @ Wilcox Playa Wildlife Area, Knolls Settlement Road. Elev. ~ 4100' ft. 12 April, 1997.
- looking for *H. tuberculatus* - Wilcox Playa is westernmost known locale for this species.
Juana!! Found small patch of sparse grass on the playa proper - surrounded by dried-up mud flats. Collected 3 adult ♂♂, 4 ♀♀ - all tending towards rubbed. *Spidens* most active in am. ~ 10:00 - all ♂♂, then all ♀♀. On mud/grass - tending to seek cover in mud cracks. Habitat flooded @ other times of year. Also saw several ♀♀ in adjacent grassy areas on playa edge - not obviously *H. tuberculatus*, perhaps *H. kneri* - *H. conjugens* collected on litter near trees in vicinity of parking lot. Map to A2 for *tuberculatus*.



* 97-014 thru 97-030 collected on trip to Texas w/ W. Haddison & E. Heberts

97-014 TX: Jeff Davis Co., Davis Mtns.

State Park Elev. / see WPM

Coord. 23 April, 1997

- habitats surrounding campground consist of

oak / juniper woodlands, sparse rocky

substrate. In oak litter of small bushes

collected Hsugillatus ♂♂♀♀ - fairly

common. Not @ dense oak litter @

Hesperomys. In open leaf litter w/

grasses collected H. "canon city" -

undescribed species known only from

Canon City, CO. Perhaps an eastern

So. Rockies slope species? Need to

look in obvious habitats in NM.

97-015 TX: Jeff Davis Co., Davis Mtns., mi.

N McDonald Observatory on Hwy 118

Elev. wpm Coord. WPM 23 April, 97

- more Hsugillatus, H. "canon city" in similar

habitats. Also collected dendrophthorus Pelagius

Sabinomys on jun / pinon, P. farcutor ♂ on

oaks, P. calceator ♂ also on oaks.

All collected w/ beating sheet.

97-016 TX: Jeff Davis Co., Davis Mtns.,

McDonald Observatory Elev. WPM

Coord. WPM 23 April, 1997

- more Hesperomys @ slightly higher elevation. Also

Psabinomys ♂♂ on oaks / junipers in mature Pinus,

Sassafras sp. beating.

97-017 TX: Terrell Co., Pecos River @

Chandler Independence Creek Presence (Const.)

Elev. wpm Coord. WPM

24 April, 1997

- trans-pecos dwarf juniper / limestone habitat w/

viperian vegetation. Salted-rich habitat! Hesperomys

very common in oak litter near stream. Hesperomys

imm ♂♂ in various sandy bbs. H. tringulus on

large rocks in dry habitat - but very windy day.

♂ Hesperomys on rock in open hab. Price!

Hesperomys - seems to be a dry habitat beast -

both ♂♂ found adjacent to (or under) various

large bushes (including mesquite). Somewhat

like Hesperomys in habits. Also collected

many other salts, including Hesperomys,

Psabinomys, Sassafras, Metaplethrus (Klaus?),

Pelagius, Pellinus

* A nice place to spend some time collecting.

97-018 TX: Val Verde Co., Texas River
Lake Amistad, Hwy 90 Elev. wpm
Coord. wpm 24 April, 1997

- collecting in non-native rushes adjacent
to low lake. H. fortis & H. mexicanus
found - difficult to collect in
grassy habitat.

97-019 TX: Starr Co., Falcon Lake JP
Elev. wpm Coord. wpm 25 April, 97

- beating H of Myiagallus (Lake Hawk),
Psaltriparus ♂♂ & ♀♀, Metzgeria chirac,
Scolecophagus ♂, Peromyscus,
Microtus imm / Thiodira imm

- on ground H. fortis many ♂ & ♀,
H. fortis, H. fortis imm /
H. fortis ♂ & ♀ 94

H. fortis post

97-020 TX: Hidalgo Co., Benzon - Rio
Grande Valley JP Elev. wpm
Coord. wpm 25 April, 1997

- Pollens longimanus, Cheliferoides,
Marpissa, Thiodira, Habrocastrum,
Platygyptus

- Habrocastrum desertorum, H. fortis,
H. fortis, H. mexicanus,
H. fortis, H. fortis

97-021 TX: Hidalgo Co., Lake Edinburgh
Elev. wpm Coord. wpm 25 April, 97

H. fortis
Menemerus bivittatus

97-022 TX: Starr Co., mi. N of
Rio Grande City on Rd # 3167
Elev. WPM Coors. WPM 26 April 97

- Ammodramus, Hedelectus

Pellentes

97-023 TX: Kenedy Co., Armstrong, Hwy 77
S of Kingsville Elev. WPM
Coors. WPM 26 April 1997

- Ammodramus

- Hedelectus

- Hedelectus

97-024 TX: Pecos Co., mi. NW of
Fort Stockton on Hwy 285 Elev. WPM
Coors. WPM 27 April 1997

Sitticus

Hedelectus

97-025 TX: Reeves Co., Lake Toyah,
Hwy 285 S of Pecos Elev. WPM
Coors. WPM 27 April 1997

- Ammodramus, Sitticus

97-026 TX: Hudspeth Co., Guadalupe Lakes
on Hwy 180/62 Elev. wpm
Coord. wpm 28 April, 1997

- Hecognatus
Sitticus
imm coc group?

97-027 TX: Hudspeth Co., mi. W of
Guadalupe Lakes on Hwy 180/62
Elev. wpm. Coord. wpm 28 April, 97

- Hecognatus?
Hemoglen
Pellens

97-028 TX: El Paso Co., Hanco Tanks
State Historic Park Elev. wpm
Coord. wpm 28 April, 1997

Helyptus (northern form)
Hklauseni

97-029 NM: San Juan Co., Chuska Mtns, J of
Washington Pass Elev. 9000 ft. Coord.
36°4'20"N, 108°51'53"W 1 June, 1997
- collecting at hillside edge of large, park-like
meadow opening - in debris of fallen tree
w/ grass. Collected ♂, 2 imm ♀ Haltanus.
In rocky ridge edges, meadow sides
collected 3 ♂, ♀ Hef. fuscatus - most on
small rocks in open areas.

- Pondwora fine forest, sandstone
outcrops.

97-030

NM: San Juan Co., Chuska Mtns.

Tehuita Lookout Elev. 9,000' Coord.

38° 9' 16" N, 108° 53' 10" W 1 June, 97

H. altus ♂♂♀♀ relatively common

in grass near moister areas -

ponderosa pine forest. H. cf. festus

♂♂♀♀ very common in various

habitats - open, rocky ground, forest

litter w/ sticks. Observed ♂♀

interaction - ♂ chasing ♀, who

continued to move away from

♂. ♂ when within less than 1" from ♀,

did "bounce" part of courtship

sequence, then 1st legs held

in, above head. No ♀ response,

no further courtship.

97-031

NM: San Juan Co., Chuska Mtns., S of

Tehuita Lookout Elev. 9,000' Coord.

38° 8' 11" N, 108° 34' 19" W 2 June, 1997

collecting edge of small, shallow lake

in dry meadow, dirty habitat. 3 *Pellaea*,

1 ♂ *Haltia* collected. *Haltia* in

somewhat grassier area.

97-032

NM: San Juan Co., Chuska Mtns., S

of Tbadlerna Elev. 8,000' Coord.

2 June, 97 36° 12' 7" N, 108° 53' 53" W

- collected ♂ *Helymorus* in oak / brush /

piñon habitat. A bit hot.

- Also, ♂ *Helymorus* in clearing near

road, ~1/2 mi closer to Tbadlerna

97-033

NM: McKinley Co., Chuska Mtns.,

road from Tbadlerna L.O. to Hatch, where it crosses

main branch of Red Willow Wash Elev. 8,200'

35° 53' 20" N, 108° 49' 25" W 3 June, 97

- *Cercobites* on sandy bank of small stream.

97-034

NM: McKinley Co., NE of Gallup, Red

Mesa Canyon Elev. ca 6,500 ft. 3 June,

1997 - collected ♂ *Tenebrionus* on

rocky outcrop on large rock above ground

97-035

NM: Catron Co., Hwy 32, 2.5 mi. N

Quemado Lake Rd. just N of Largo Creek

Elev. ~7,900' 4 June, 1997

- 2 ♂, 3 ♀ *H. klausneri* in cottonwood levee / stick

litter adjacent to stream

97-036

NM: Catron Co., Hwy 32, 11 mi. N Hwy 120

Apache Creek Elev. ~7,500' 4 June, 1997

- 2 adult ♀ on oak leaf litter in open,

rocky piñon-juniper habitat w/ few oaks,

Ponderosa pine.

(97-037) NM: Calaveras Co., Hwy 180, 2.3 mi. N Alma
Elev. ~5000' 4 June, 1997. Collected at Hillhouse
in grassy area & roadside picnic area.

(97-038) NM: Grant Co., Hwy 78, 2.1 mi. E of AZ
State Line Elev. 4 June, 1997. Collected ♀
H. silvatica in oak/pinyon savannah - bird,
small rock soils. (~33.1128 -109.02502)

(97-039) CA: Siskiyou Co., 2 mi. N Mt. Shasta
City on Hwy (A10) Elev. ~4200' 1 July, 1997
- collected ♂ & ♀ H. oregonensis in pine/
oak litter of open pine forest w/
manzanita & small oaks

(97-040) CA: Shasta Co., 10 mi. W Lake Britton,
vic. Indian Creek Elev. 4000' 2 July, 1997
collected 4 ♂, 2 ♀ H. oregonensis in oak clearings
associated w/ clearcuts in pine/douglas fir
forest. Also ♀ Dendroica under bush.

(97-041) CA: Shasta Co., Shasta Lake @
Bailey Cove Natl. Rec. Area. Elev. 1,000 ft.
3 July, 1997. ♂ & ♀ H. klausneri collected
in short grass @ old lake edge,
not close to H₂O. Not very
common.

(97-042) CA: Shasta Co., Lassen Volcanic Natl.
Park @ Nobles Emigrant Trail Pulloff, milepost
60 of Hwy (89) Elev. 6000' 3 July, 1997
collected 3 ♂, 2 ♀ H. americanus on pine stick
litter of open pine forest w/ small
herbs / grasses widely scattered. Habitat
adjacent to large lava flow.

(97-043) CA: Shasta Co., Lassen Volcanic NP,
vic. Kings Creek Picnic Area Elev. 7400'
3 July, 1997 6 ♂, 7 ♀ (some immature) H. sansoni
collected in open habitat of pine forest
adjacent to small stream meadow.
Ground w/ scattered herbs, many small
sticks, rocks - fairly dirty. More closer
to wet meadow. ♂ specimens w/ dark first legs,
dark face, no colored stripes, H. kuboi-like. cheliceral
and dygous covering; cream-colored palpi.

(97-044) OR: Jackson Co., Hyatt Lake BLM
Recreation Area Elev. ~5,000' 4 July, 1997
collected 2 ♂, ♀, 3 imm. H. ^{Kuboi} ~~sansoni~~ in debris piles
adjacent to lake shore - washed-up from previous
higher lake levels. Fairly dry habitat w/
grassy forest openings nearby. Collected
imm. H. juncos in similar stuff. H. kuboi ♂
like Lassen specimens, but with pale, fringed
1st femur.

97-045 OR: Klamath Co., Crater Lake Natl. Park, Discovery Point Elev. 7100'

6 July, 1997 Looking in open grass habitats adjacent to snow fields - mostly small rocks, scattered conifer debris, some herbs. Surprised to find *H. americanus* (1♂, 1♀, 9♀/imm) - 4 expected *H. ansoni* @ this elevation.

97-046 OR: Klamath Co., Crater Lake NP, vic. Llao Rock Elev. ~8,000' 6 July, 1997 Collected 3♂, 1♀, 8♀♀ *H. americanus*

In open rocky habitats along lake rim. Most common in patches of grass associated w/ snow fields.

♂'s look like "standard" *americanus*, but w/ blue-green iridescent elytra - basically pure red 1st femur - bundled white cheliceral hairs, red palpi. Also 3 collected ♂ *Dendrophthoe* - cf. *Terralonus*?

97-047 OR: Klamath Co., Crater Lake NP, Primice Castle Turnout on Rim Drive Elev. ~7500' 6 July, 1997. More spiders, presumed to be *H. americanus*, in open pine forest - grassy clearing habitat. Most on small sticks. 4 p♂, 2♀, 1 imm♀ taken.

97-048 OR: Klamath Co., Crater Lake NP, Grayback

Drive vic. Grayback Ridge Elev. 7000' 6 July, 1997 - more *H. americanus* (♂, 2 imm♀) in open, rocky pine forest

97-049 CA: Trinity Co., Trinity Alps Wilderness Area, Long Canyon Trail, below Gibson Peak Elev. 2000m 7 July, 1997 (Gouington Mill Quad) collected 10♂, 1p♂, 3♀, 3 imm. *H. bulbipes*

In open, sparse herbaceous sloping habitat of montane meadow - just out of wet meadow in drier microhabitats.

Q50-76

lookout Elev. 6000' 30 September,

Pellentes	crandelli	, find	none
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perhaps in "Hysteria beast" (night)

Pelegrina ¹⁸⁹³ Phidippus conatus,

Memory Paraphidippus and Phidippus

Ako Evagnis under log. / Thomsid

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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NM: San Miguel Co., Santa Fe NF, Holy

Doctor Creek's) 23 September, 1997

on divide between drainages. Found some

Some what limited. Found the brachytrus

in oak leaf litter along vidgetop -

nice campground - no people.

N of Pecos Elev. 7000 ft, 2.3 September, 97.

large granitic intrusion directly adjacent to highway.

fissure cave closest to highway. Spiders

collect all individuals seen (3 collected, ~

in gratto #1. No spiders collected in fissure

band	checking	of	webs	night	w/out
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9
10	10	10	10	10	10

webs found further up slope, in talus

taken of dd webs) - fresh. Many smaller

* (Some seltids also collected)

N
+ E
V
S

grof
P
good
vine

vine
ell)

plus

97-053

CO: Rio Grande Co., Monte Vista

Elev. 7650' 25 September, 1997

- collecting adjacent to city park on E side of town, Hwy 160. Cottonwood litter habitat along railway - found copulating pair of *H. aspidetis*, ♂ only collected. Also *Xysticus* ♂.

97-054

CO: Rio Grande Co., 1.4 mi SW jct Hwy 160/149 @ South Fork, Hwy 160 @ Beaver Creek Rd NE Access Elev.

26 September, 1997 - collecting in small fissure cave in granite outcrop along N-side of Trout Creek, vic. confluence w/ South Fork Rio Grande River. Found *Hypochilus* !!!

* total room dimensions ~ 12 ft x 30 ft
Spiders in lampshades along walls, roof - deep (~20 ft) in fissure room (cf. twilight zone of cave). Many spiders also in breakdown of room, in back portion of room. Collected 3 ♀♀ (at least 2 adult) & adult ♂. Many (~6) others seen, most adult. Much other habitat apparently available in vicinity, (e.g., many granite bluffs).

97-055

CO: Montezuma Co., Mesa Verde NP, Chapin Mesa, Cliff Palace Parking Lot Elev. 7600' 27 September, 1997
- collected immature *Helyperatus* (including p♂) in piñon/juniper habitats, w/ large scrubs.

97-056

MEX: Sonora, Alamos Micowave Tower Elev. 18-19 September, 1997

97-057

MEX: Sonora, El Cuchijagui, vic. Alamos Elev. 600' feet 20 Sept., 1997

97-058

AZ: Maricopa Co., Maricopa Mtns., adjacent to No. Maricopa Mtns. Wilkersons, Butterfield Trail Elev. 1400 ft.
29 Nov., 1997 - collected 2♂/♀ *Hustulatus* on small rocks in Saguaro/creosote cholla flats. See also 96-89 collections.

97-059

AZ: Santa Cruz Co., Canoa Rd @ McDowell Cyn. Road Elev. ~3000' N 31°50'42.2", W 110°58'7" 12-31-97 - collected 2♂, ♀ *Hustulatus* on small rocks in cholla, acotillo, mesquite flats.

98-001

AZ: Pima Co., Rail-X Road Elev. 3030' N 32°30'43.2", W 110°, 55°55'6" 1 January, 1998 - collected 2♂, 4♀ *Hustulatus* on small rocks of s-facing slope in hilly desert habitat (cholla, quartz, mesquite)

98-002

AZ: Santa Cruz Co., Pajarito Mtns., Sycamore Cyn., Elev. 4000' ft 12 January, 1998 - collected ♂ *Hustulatus* on rock rubble of stream floodplain - near hillside

98-003

AZ: Pima Co., Waterman Mtns., SW of Pump Station Road Elev. ~3000'
8 March, 1998 - collecting in low Sonoran desert - habitat w/ creosote flats, uplands of saguaro, acotillo, cholla - lots of Encelia. Collected 2♂, ♀ *Hustulatus* on rocky areas in flats - "copper form" of *Mariposa* form. Also 2♂, 2♀ *Hustulatus* in saddle of uplands - small rocks w/ some herbs - Adult ♂ *Metzgerodipus* on Blarade - dead branch; Subadult *Phidippus* on jumping cholla in flats.

98-004

Mex: Baja California Sur., San Jose del Cabo Airport Elev. 900 ft. 11 March, 1998 - imm ♂ *Hypsiglena* (adult ♂ seen), ♂ *Pedusa* sp. collected in wetland grass patch in front of airporthouse.
* (spent evening @ 2-room "Little Martin" in small town of Los Barriles.

98-005

Mex: BCS, 15 km N Los Barriles, 23°40'08"N, 109°40'45"W Elev. -59 ± 6 ft on 12 March, 1998 - collecting in a.m. in thorn scrub habitat directly adjacent to beach (less than 1 km). Subadult *H. agilis* group (probably *Hemiphysalis*) on various litter sticks in thorn flats. Also, imm *Hemiphysalis*? - More interesting things on

rocky hillside - 2♂/2♀ / several immature *Hemiphysalis* group members (cf. *Hemiphysalis* - very light)

(98-005) - (cont) Found in small, stabilized areas w/ short grass, small granite pebbles. Habitat fairly disturbed & this particular site. Also found ♂ Hirsuti on dead, fallen branch. Clearly w/ lime green stripe on LI, shiny bristrous. Unusual scale patterns on cephalothorax & abdomen, more Hiranius-like.

(98-006) Mex: BJS, Hwy. 1 - Km 143, N 23.76723°, W 109.99707° 355 ± 73 m 12 March, 1998. Pellaea sp. on barren "rusty" granite along roadside - 1 ♂ adult (several more just down road).

(98-007) Mex: BJS, Hwy. 1, Km 161 N 23.80844°, W 110.09843° 362 m ± 100 m 3-12-98. - Lysanurus immatures breeding; Metaphidippus viti ♂ & ♀ as well; still in thorn scrub (GDF) habitat.

(98-008) Mex: BJS, of Pichilingue N 24.21765° W 110.30057° 67 m ± 66 (sea level) 3-12-98. - collected 2 ♂, 2 ♀, 2 ♂ Hammophilus on sandy beach edge - where small pebbles build-up just in from water's edge. Most spiders on bleached-out coral "pebbles" - even though spiders themselves are very dark. Collected several individuals over ~15 min time span (ie spiders very common).

(98-009) Mex: BJS, of Punta Los Tules, N 24.22300°, W 110.59678° Elev. 71 m ± 78 m 3-13-98. - beating creosote in low elevation desert - vic wash; collected Metaphidippus china imm. Hizlia group, Saltius, small beetle-like Lamprophana (imm. Sassan).

(98-010) Mex: BJS, of San Carlos, N 24.80120° W 112.10637° Elev. -25 m ± 102 3-14-98. - collecting adjacent to mangrove, on sandy substrate w/ dried mangrove leaves & Hicoretus group member (cf. pyrrhix) very common - many ♀♀, imm ♂♂, 1 ♂ adult; also collected Hizlia group member on various sticks, etc (Sesuvium).

(98-011) Mex: BJS, Isla Magdalena @ Punta Magdalena, N 24.63358°, W 112.44098° Elev. -46 m ± 97 m 3-14-98. - on beach w/ small pebbles, lots of shell debris - collected many Hicoretus group species (not like 98-008 collection). Most in zone just above moist rocks - although it appears that spiders move up/down beach w/ response to tidal fluctuations? Also collected Cocetus group member on hillbills behind town - small-medium sized granite, sparse vegetation (not herbaceous). 2 ♂, 2 ♂, several ♀♀. Habitat like that expected for Hicoretus (collected by J. McNetem).

98-012 Mex: BJS, Ciudad Constitucion, 14 March, 1998
 Elevation
 - p³ Haeratus group found in VAN area.
 City in again travel area.
 98-013 Mex: BJS, cf Cosme, Playa San Cosme, Elevation
 N 25.57190° W 111.16350°
 15 March, 1998 - ♂ Pellaea (?), ♀ Hustulatus
 on gravelly volcanic flat adjacent to rocky shoreline - on raised beach.
 98-014 Mex: BJS; Agua Verde Fish Camp, N 25.51408° W 111.07250°
 3-15-98 Elevation. Sea level
 - collecting on beach, in area of small to medium-sized rocks accumulated in layers * (rocks bigger than those @ Pichilingue ye Isla Magdalena). collected p³, ♂ Haeratus, 24, ♂ Hemaphysalis in obvious syntopy - collected & seen on adjacent rocks in same rock pile.
 98-015 Mex: BJS, ~ 2.1 km N Agua Verde, N 25.51567° W 111.07925° Elevation
 Sea level
 (3-15-98) Haeratus group members collected on larger rocks w/ leaf litter adjacent to sandy wash. Several ♂♀ Hemaphysalis on small gravel pebbles associated w/ sandy washes. Cryptic on pebbles - ♂♀ w/ shiny reddish 1st femur, white elytra, but w/ pointed abdomen like ustulatus - p³

98-016 Mex: BJS, ~ 30 km N Loreto, Elevation 12m I - 3-16-98
 N 26.12444° W 111.42519°
 Pellaea sp. collected on lower gravelly belt along roadside - sparse grass
 98-017 Mex: BJS, ~ 50 km N Loreto, N 26.37428° W 111.59101° Elevation 204 ± 85m
 3-16-98
 - collecting in "desert pavement" habitat in flora w/ artem, mesquite, foguaria, cholla, etc. Pellaea in "liverleaf" areas in thickening Hustulatus form on more stabilized areas of gravel - on rocks from line - quarter-sized - collected several ♂♀, 2 ♂♂. Mottled pattern w/ brown-bluish colorations. Lone ♀ Haeratus group (?) member, also on rocks.
 98-018 Mex: BJS, ~ 5 km S Milagro (vic. Isla), N 26.85902° W 111.91349° Elevation
 Sea level
 - Hemaphysalis (2 ♂♂) collected on large dense field just south of point. ♂♀ better from Haplospirus; other ♂ taken off of dead plant material in shallow depression. Many imm / ♂♀ Dendroplantes zygoballoides beaten from Haplospirus. imm Hemaphysalis seen on rocky beach / other imm Haplo in Chernopod area - Not collected.

(98-019) Mex: BJS, ~38 km S Santa Rosalia,
N 27° 04' 34" W 112° 09' 26" 92m ± 150m
3-16-98 - 200, 240 ft Hust. lites collected
on stabilized pebbles in flat desert -
form like 98-017 site.

(98-020) Mex: BJS, 7.2 km N Santa Rosalia
on Hwy 1. Elev. ver level 3-16-98
1 ♀, 1 ♂ collected in fist-sized gravel
on beach. Perhaps 2 species?

(98-021) Mex: BJS, 163 km W Viscaino Inlet,
N 27° 44' 98" W 113° 09' 67" 85m ± (Elev.)
3-17-98 - in stabilized dune old dirt
track w/ rudimentary stone debris, somewhat
stabilized, shallow slope. Pellets ♂, ♀♀?
pinheads. Perhaps a ? *Hebranthus* in collection.
Also, *Chidomys* (sand snake) captured, pictures
taken. - ♀♀ - see 98-023 ♂♂
(7.6 km NW Viscaino Inlet)

(98-022) Mex: BJS, 80.6 km W Viscaino Inlet,
N 27° 45' 12" W 114° 14' 22" 74m ± 55m 3-17-98
- imm dundly collected in wet on Ensenada, Izapa,
desert wash, (1 m chira ♀)

(98-023) Mex: BJS, 48.3 km W Viscaino Inlet,
N 24° 47' 60" W 113° 02' 26" Elev. ver level (3-17-98)
2 ♂♂ *Levinsinus* collected on stabilized
dune w/ *Mesembryanthemum* dead
material. 3 ♂♂'s with ♀♀'s collected @
98-021.

(98-024) Mex: BJS, ~10 km N Santa Rosalia
- sea level (3-17-98) - ♂♂ collected
in large beach gravel (*Hammophilus*). See
98-020 ♀♀.

(98-025) Mex: BJS, 29.4 km S Loreto, Hwy 1,
Elev. ver level 3-18-98
Pellets collected in dirty roadside area
w/ small rocks

(98-026) Mex: BJS, ~30 km S Loreto, Hwy 1,
N 25° 45' 46" W 111° 30' 38" Elev. ver level
3-18-98 *Hammophilus* ♂♂, immatures collected
on hillside of small volcanic rock (v. quartz-
sized), w/ sparse grass, shallow slope.
Collected in A.M., relatively cool.

(98-027) Mex: BJS, Los Viejos, J of
Todos Santos Elev. - ver level 3-18-98
2 imm *Hebranthus* collected on Yuma/
buffle grass litter in stabilized thicket
scrub just inland of beach front -
study granitic substrate.

(98-028) Mex: BJS, La Laguna trailhead, San Juan
del Aseradero ~400 meters
3-19-98. flat? sloping TDF adjacent to arroyo -
includes 3' Pellets, *Hammophilus* in litter of flats,
H. diversicollis in sloping litter habitats -
fairly dirty > 3' sand ♂♂, imm ♀.

(98-029) Mex: BJS, Trail to La Laguna,
Sierra de La Laguna N 23.52885°
W 110.02625° Elev. 940 m ± 89 3-19-98

- Hesperornis? collected in grassy flat adjacent
to small stream, rocky shallow estuary.
other immatures on litter / ballooning.

(98-030) Mex: BJS, trail to La Laguna,
Sierra de La Laguna N 23.54606° W 110.01380°
Elev. 1517 m ± 77 ~ 3-19-98

Eggs on Araucaria tuberculata @ higher
elevations. Some immatures might be A. gaus.
♂ Hirundo collected on oak (including
A. debia), medium leaf litter. bizzare
rubber ♂ also collected in similar
hab. - (Tenebrionus sp.)

- BAJA TRAIL RECOUNT: fairly dry in south, although
El Niño year farther north (good in Visceño).

Hesperornis group dominating, either on
beach in open, in vegetation associated w/
H₂O (including estuaries), or day inland
sites. H. raminus group also prevalent on flat,
open desert habitats. H. divaricatus in

far south TDF - no obvious Hesperornis numbers
farther north in mountains (eg. Sierra de la
Agente). Interesting to collect other
Pacific side islands.

(98-031) AZ: PIMA Co., egg, Organ Pipe NM,
Bull Pasture trail, Elev. 3400',

5 April, 1998 - collected ♂ H. hirsutus on
small rock alongside trail, steep, rather
rocky terrain. Form interesting in that
much of background sculpture is brown.

(98-032) AZ: Santa Cruz Co., vic Atascosz Peak,
Elev. ~ 6200' 9 April, 1998.

2 ♂ H. hirsutus collected; huge numbers of
H. hirsutus collected w/ Heberts.

(98-033) Mex: Baja Norte, Sierra San Pedro Nayar,
road to "Miles St. Ranch", S. San Mateo
N 31° 14.901' W 115° 35.557' Elev 3706 ft.

26 April, 1998 - collecting in pinon/juniper
habitat w/ manzanita, yucca, barrel cactus, etc.
found H. divaricatus (w/ modified 3rd petiole) in
flatter, grassy areas w/ small oak / pinon litter.
Also H. oregonensis on open slopes w/
manzanita litter. H. hirsutus on hillside

in litter around scrub (including manzanita)
collected ♂ Heberts, 2 ♀ H. hirsutus in
sandy weedy - Heberts in small
rocks @ edges. H. hirsutus group
in same stuff - did not reach for
eggs. - various Heberts collected
(beaten) from Bas, sunipers, Acrostaphylos.

98-034 Bas: Hwy 3, ~ Km. 75

31° 44' 35.5" W 115° 58' 43.2" ELEV. 3883 ft
4-26-98 - 2579 Pellaea (w/ chapparal) collected on roadside - wet depression edge - dirt.

98-035

Bas: road to Laguna Honda, foothills

Santa Lucia, N 31° 53' 11.6" W 116° 05' 08.7"

Elev 4060' 4-26-98 - Horegenensis

collected on litter on CA live oak adjacent to stream.

98-036

Bas: Santa Lucia, of Laguna Honda.

N 31° 53' 40.5" W 116° 00' 8.94" Elev. 4713'

4-27-98 - habitat of Jeffrey pine / Artemisia in open flats, surrounded by chapparal hills w/ live oaks in washes, small canyons - collected HKawini in sparse grass openings near pines.

Pellaea (unmarked) in openings of coarse granite adjacent to chapparal. Stragler

Hicnagleyi in Artemisia litter - dead material.

H. elegans in all habitat types - Horegenensis seen

(not collected) in oak litter.

98 Hustulatus on small rocks in

hardpan granite openings w/in

chapparal - no living litter ground cover.

No 98's seen. Marchenka Kim Rivers

98-037 BN: Hwy 3, E of Ensanadre, Elev. 2500'

N 31° 53' 18.5" W 116° 19' 21.3"

4-27-98 - Hicnagleyi, H. hirsutus, Pellaea (unmarked) 578' collected

in coastal chapparal habitat - mostly leaf litter.

98-038 BN: road to Sierra San Pedro Martir,

of San Blas N 30° 57' 9.71" W 116° 03' 8.99"

Elev 290' 4-28-98 - ♀ Horegenensis

(probably Hicnagleyi) collected in riparian grass habitat.

98-039 BN: El Saborito, campground & beach

N 30° 19' 0.64" W 115° 49' 48.8" ~ sea level 4-28-98

- Hicnagleyi (♂♀) - "unmodified" - in litter of trees

planted in yards, etc. HKawini? ♂♀ in grassy area w/ palm litter. ♀♀ Horegenensis group

in dead plant material. on high stabilized dune → no Hustulatus seen, although the locality = "Arroyo Socorro" - Griswold.

98-040 BN: La Bocana, mouth of Rio

Santa Tomas N 31° 32' 16.0" W 116° 39' 6.25"

sea level 4-29-98 - collecting on beach / river mouth.

♂ Hicnagleyi in grass / litter adjacent to mangrove, other ♂♀ seen. Hicnagleyi

♂ on sphenoclitra in high stabilized dunes of beach. Horegenensis ♂♀ seen on

upland - not collected. Good travel is good

habitat (grassy sand) - 400 windy!!

14 May, 98 - fly from Tucson to Dallas - Mexico City w/ WPM y G. B. Baker. met in Mexico City by Tila Teraz, from UNAM, Inst de Biología - staying w/ * Acuña, herpetologist & UNAM, (Aurelio Ramírez-Bautista) preparing for trip. collected 3 ♀ * *H. mexicanus* y *H. fallax* on lawn, *fallax* on drive edges w/ litter.

15 May, 98 - left L.A. Mexico City 9 am, traveling 2 hours Puebla, then south to Cd. Oaxaca. Traveling on new toll roads. Very nice, fast. Collected 1 ♂ *H. mexicanus* (G.B.) in limestone hillsides w/ *Jojoba* / *Opuntia* - very dry. Lots of interesting desert / TDF diversity in cold. Continuing from Oaxaca to Tehuantepec arriving @ 8:30 pm - winding mountain road, wonderful cactus forest / TDF / pine oak habitats. * *H. mexicanus* include AZ group + T1/2. * students Fernando Alvarez & Jose Luis Castelo y students - drove SW to Salina Cruz in A.M. collecting on beach in grassy stuff, just inland in mesquite / grass openings. Collected 5 ♂ * *H. blinks* y * *H. blinks*, *H. blinks* 1 pale, 1 unpigmented. Back-tracked to Tehuantepec, then W for ~ 12 km to Puente de Las Tejas - riparian area surrounded by TDF, slight hills. *H. cambridgei* ♂ +

17 May, 98
H. mexicanus (wpm) of stream. * *H. mexicanus* ♂ collected in leaf litter w/ sticks in slightly rocky TDF hilllocks - to shade w/ more litter than surrounding habitats. spiders collected after waiting in habitat - not active, but occasionally on sticks above litter. *Corythalia* also on litter. Traveled E from here to Acajag, Chiapas. Collected *H. blinks*, *Sitticus*, ~ 3 sp. *Corythalia* in hills above town.

18 May, 98 Traveled from Acajag back to Tepic, then E towards Tuxtla Gutierrez. Collected in mountains, circa Chahuatillo *Habronattus blinks* / *H. fallax* in various habitats. *H. blinks*, *Corythalia* sp. common. Also collected *Nyctelia* y *Zygoballus*. Continued E to Chiapa de Corzo for night.

19 May, 98 Continued E-SE from de Corzo towards San Cristobal de las Casas. Collected 1 *H. mexicanus* in grassy litter. Also collected *Aspilota* in pine oak, *Aspilota*, *Aspilota* forest. Most of surrounding forests heavily impacted. Drove back thru Tuxtla, then to Arriaga. Traveled Biosphere Reserve just N of Arriaga. Stayed night in Tonala, Chiapas.

20 May, 98' Traveled from Tonala ~ straight west towards Pacific, on road towards Pt. Arista. At roadside ~ f. collected Huastecus in understory dense leaf litter. Tons of Cerythralis also on ground. Other interesting salts included Rietzonia, Synemosyna, Paradoemus. Hawks in more open litter habitats. Continued to playz just N of Pt. Arista collected Hagilis gump nester (cf cognate) in short beach vegetation. Also Hearnbridge, Hawks in mesquite litter, Huastecus in dense litter just inland. Traveled S to Boca de Cielo - mangrove habitat. Huastecus, Hearnbridge, Hawks collected. Bentley collected immatures of interesting heliophane genus, perhaps undescribed genus. From here we back-tracked to Tonala ~ Tehuantepec.

21 May, 98' On Highway 200 in morning, from Salina Cruz to Acapulco. First stop at a pristine wash in TDF, ~ 20 km NW Salina Cruz. More Hive here, including undescribed ♀♀. Continued NW thru nice TDF. Collected Hearnbridge in roadside grasses. Traveled on, stopping & interesting backwash Laguna Colorado

21 May, 98' Collected (undescribed?) Huastecus member (cf huastecus) in low Salicornia many ♀♀. Hive? also found in litter. Just down road in marshy area with collected Hearnbridge. Drove on, habitat becoming more disturbed closer to Pochutla. Continued on to St. Domingo, ~ 50 km SE Pt. Escandido. Collecting since the playz & a Tortuga protection camp. Hearnbridge on beach just inland (~ 300 yds), in dry, short grass field (goat field) - swarms of Huastecus / Hawks + hybrids? Most specimens closer to Exotectus - Staged old in Tula to Escandido.

22 May, 98' Traveled just NW to Cacabotepec, cf beach resort. Hearnbridge in playz vegetation. Huastecus ♀ (cf Colorado) in grassy opening in inland wet habitat. Hawks in litter. Interesting large Sittas on rocks adjacent to ocean. Continued NW to Pindapa Nacional, then NE on road crossing Sierra Madre towards Pithia. Collected Hearnbridge, Hagilis in low scrubby forest, 1 Hearnbridge along small stream, Hawk / Hearnbridge ~ 3300 in nice oak/pine litter w/ rocks, ~ primitive. Disappointing to see these species here. Staged ops E Pithia de Guerrero.

23 May 98

Continued towards Tlaxiaca, Hwy 125.
Collected all H. fallax + imm Americans in wooded area
hillside habitat. before "La Laguna". - Pacific Monarch
Continued past Laguna, just over crest into
Balsas drainage - collected cf. nice stands of
Adenostoma (?) w/ large oaks. Unidentified! Habronethes
here, most in edge leaf litter of oaks -
many ♂♂♀♀ collected. looks to be in benito zone
area. Also collected Americans in old meadow, 2
w/ Euphorbia (w/ bright orange palm + chip/leaf)
in oak leaf litter. Stopped again in riparian
area of small stream - H. fallax + Sithus
on rocks. Past Tlaxiaca we stopped @
cypress-lined stream w/ grassy slopes (shallow)
adjacent. Collected interesting Habronethes ♀♀
(probably banksi group), but no ♂♂ stopped
again @ int Hwy 125/190, the "Yucunda"
Microondes. Habitat @ top fantastic oak/
small cypress / tree Nahuiz. Disappointing
to get only Haltius + H. fallax - beetles w/
very little success. Drove S to Oaxaca.

See Night

24 May 98

Early start - driving N towards
Mexico via Coate road. First stop roadside
on nice manzanita hillside w/ open rocky substrate,
some small grasses. Only fallax + altius.
Next stop @ lower deviation open first
limestone near w/ scattered cacti, small

scrubs - slightly disturbed. Collected interesting
Plebe (including adult ♂), Habronethes ♂♂,
H. fallax, and instar of interesting-looking
beetle, possibly 3rd by date ?? stopped
again just before Rio Calapa, in
dry forest, ~TDF. Nothing but fallax.
Stopped @ Rio Calapa. Beautiful columnar
cactus forest on steep hillside above
river. Only fallax on hills, Cambridgei
in riparian stuff. Almost certainly
additional species in dry forest - wrong
time of year. Drove on to Rio Tiro,
~5 mi (8 km) SW @ type locality of
Habronethes. Nahuiz near "the summit" @
suggested in type description. Habitat
open meadow (treed / grazed) surrounded by
pine forest w/ dense grass and oaks.
Late in day - no Habronethes. Light
return. Drove to Mexico, staying o/n
a Avallies house again.
25 May 98 In Cd. Mexico, spider cave.
26 May 98 Drove E in A.M. to Ixta Popo Volcano Park
sampled in fir + pine / both grass habitats up to
3000' meters. NADA! Came back down, then
traveled N towards Puebla, viz Texcoco.
Collected ♂ Habronethes in open dirt hill
outside of Puebla - imm + Haltius? in grass.
Staying o/n in very nice little town of Actopan.

27 May, 98' Drove NW from Actopan towards Ixmiquilpan - stopped in mixed mesquite, yucca, barrel cactus, fonquiere desert - very dry - Tylosurus, Sepsaria, Phidippus, Peckhamia. Continued past Ixmiquilpan on road to Tlamanalcala - past Rio Tula stopped in AG area - grassy mesquite w/ nearby irrigation: Hirsutiatus, Hemibrycon, Hemibrycon, Hemibrycon - bitter dueller = rumb. Continued on road N to P.N. de los Marmoles. Stopped first at La Huanzama - large pine w/ large-leaved oak: Tylosurus + Hemibrycon. Backtracked to limestone slide near along road - Hemibrycon only. Backtracked even further to pure piñon pine / juniper habitat - Hemibrycon (sparse). Drove back to Mexico via Toluca - o/s @ Arcellio's.

28 May, 98' Spider day in Mexico City.

29 May, 98' Left Mexico @ ~ 5 pm, traveling W towards Jalisco. Thru Toluca, Morelia, stayed o/s @ Petecuarzo - decent hotel on pizza.

(5-4-98) Velvia

Heeliformis / disjunctus	1♂	BN: S San Matias	(5-6)
" MCH 98-038	2♂	"	(7, 8)
" 033	3♂	"	(9, 10)
"	4♂	"	(11, 12)
"	5♂	"	(13, 14)
"	6♂	"	(15, 16)
Heel / div MCH 98-038	1♂	BN: El Socorro	(17, 18)
"	2♂	"	(19, 21)
"	3♂	"	(22, 23)
H Kawini MCH 98-036	2♂	BN: of Laguna Huanan	(24-26)
"	1♂	"	(27, 28)
"	1♀	"	(29)
H Salingeri MCH 98-038	♀	BN: San Telmo	(30, 31)
Pellana MCH 98-034	♀	BN: Hwy 3-Km 75	(32)
"	♂	"	(33)
" MCH 98-036	♂	BN: of Laguna Anson	(34, 35)
Marchon	♂	"	(36-37)
(5-13-98) Velvia			
Hongillus WPM 98-014	W234♂	AZ: St. Teresitas	(1-5)
"	W235♂	"	(6-9)
Helyperates	♂	"	(10, 11)
H Trisalis MCH 98-039	1♂	BN: El Socorro	(12-14)
H Kawini " 98-036	5♂	BN: of Laguna Anson	(15-18)
Hongillus WPM 98-014	W234♂	St. Teresitas	(19-20)

Photo Log: 10-23-96 Velvia Film

H. zebranus ♂	(W142)	Mex: Xochitlaco	(1-6)
H. zapotecanus ♂	(W145)	Mex: San de Huautla	(7-10)
H. cambridgei ♂	(W144)	Mex: Ajuchitlan	(11-17)
H. samsoni ♂	96-068	Mosca Pass	(18-23)
" ♂	96-082	Beaver	(24-26)
H. zebranus ♂	W142	body	(27-28)
H. zapotecanus ♂	W145	"	(29)
" ♀	Estacion	Chiemisch	(30, 31)
H. cambridgei ♂	W144	body	(32, 33)
" ♀	Ajuchitlan	"	(34-)
11-20-96 (Velvia)			
H. samsoni ♂	96-082	Beaver	(23)
H. zebranus ♂	96-056	Homo Lake	(24, 25)
Pelegrinus ♂	96-076	Spring Hollow	(26)
Sidusa ♂	Bea Lyn	"	(27)
Tenebrionus ♂	Avery Peak	(96-070)	(28, 29)
" ♂	Grand Canyon	(30, 31)	
" ♂	"	(32-34)	
Pellonus sp ♀	Fern Canyon	(35)	
H. samsoni ♀	96-082	Beaver	(36, 37)
4-15-97 (Velvia)			
H. pygillus ♂	97-012	Sycamore Cyn	(1-6)
H. halli ♂	"	"	(7-14)
H. zebranus ♂	"	"	(15-20)
H. geonini ♂	97-011	Miller Cyn	(22-26)
H. osseus ♂	97-012	Sycamore Cyn	27, 28
H. tuberculatus ♂	97-013	Willow Flage	29-→

Photo Log: 7-11-97 (Velvia Film)

H. zebranus ♂	97-045	Discovery Point	(14-16)
" ♂	97-046	Long Rock	(17)
" ♂	"	"	(18)
" ♂	"	"	(19)
" ♂	97-042	Nobles Lassen	(20)
" ♂	"	"	(21-22)
" ♂	"	"	(23)
H. samsoni ♂	97-044	Hymn Lake	(24, 25)
" ♂	"	"	(26, 27)
" ♂	97-043	Mt. Lassen	(28, 29)
" ♂	"	"	(30)
" ♂	"	"	(31)
H. bulbipes ♂	97-049	Long Gray Trail	(32)
" ♂	"	"	(33)
" ♂	"	"	(34, 35)
" ♂	"	"	(36)
" ♂	"	"	(37)
(7-28-97) Velvia			
H. zebranus ♂	WPM 97-	FL: Miami	(1-6)
" ♂	"	"	(7, 8)
H. samsoni ♂	MCH 97-044	Hyatt Lake	(9)
" ♂	MCH 97-043	Kings Creek	(10, 11)
H. zebranus ♂	97-042	Nobles	(12)
" ♂	97-047	Rumice Castle	(13, 14)
E. is	U of A	"	(15)
H. pygillus ♂	GB VII-4-97	palm canal	(16)
S. t. ♂	GB VII-5-97	vic camp	(17-20)
H. osseus ♂	"	"	(21-23)
" ♂	"	"	(24-26)
" ♂	WPM 97-018	Salt Lake	(27-30)
H. californicus ♂	97-016	Fl. Stockton	(31-→)

10-2-97 (Velvia)

H. dossonus ♂	WPM 97-	A2: Hwy 78 (1-4)
Houspidatus ♂	MCH 97-053	Monte Vista (5-11)
Hefestus ♂	MCH 97-051	Holy Ghost (12-17)
Tylogonus? ♂	" 97-052	Windy Bridge (18, 19)
Hypochilus ♀♀	MCH 97-054	South Fork (20-27)
Hindipes ♂	WPM 97-012	Armstrong, TX (28-29)
Horegonius ♂	H BOR 7 GL	— (30, 31)
H. regalis ♂	#2-45MX-105MX	(32)
Horegonius ♂	H BOR 15 GL	— (33 →)
(4-14-98) Velvia	*(frames 1-10 belong to WPM)	
Hocetus ♀ (Hill)	MCH 98-011	w227 ♂, ♀ Mag Hill (11-13)
" (Brush)	MCH 98-011	w223 ♂, ♀ Mag Brush (14-16)
Harepius	MCH 98-026	w229 ♂, ♀ S Loreto (17-18)
"	MCH 98-005	w228 ♂, ♀ Los Barriles (19-21)
Hoc group	MCH 98-010	w226 ♂, ♀ San Carlos (22, 23)
Hammuhilus	MCH 98-008	w224 ♂, ♀ Pichilingue (25, 26)
Hdivanicatus	MCH 98-028	w10 ♂ La Laguna - low (28)
Hhrisatus	MCH 98-005	w232 ♂ Los Barriles (29-30)
"	" 98-030	w233 ♂ La Laguna - hys (31-32)
"	" 98-031	w1 ♂ Organ Pipe (33, 34)
Hhrimaculatus	G B Edwards	♀ FL SW Archer (35 →)
(4-14-98) Velvia		
Hef signatus	MCH 98-019	w27 ♀, S St. Rosalia (1-3)
"	MCH 98-017	w215 ♂, ♀ S Mulege (4-6)
"	MCH 98-015	w221 ♂, ♀ N Agua Verde (7-8)
"	" 98-023	w220 ♂, ♀ Uscaino (9-11)
"	G Bodner	w222 ♂ Libertad, son (12)

(4-14-98) Velvia

Pharinas	WPM 97-0??	♀ NM: Sapillo (13, 14)
Dendryphantus	MCH 98-018	♂ ♀ 5 Km S Mulege (15-18)
Pellencus	MCH 98-006	♂ Km 143 (19, 20)
"	" 98-021	" Viscaino (21)
"	" 98-025	♂ ♀ Loreto (22-23)
Hoc group	MCH 98-011	w227 ♂ Mag - Hill (24-26)
"	"	w223 ♂ Mag. Beach (27-30)
"	MCH 98-010	w226 ♂ San Carlos (31, 32)
Hdivanicatus	MCH 98-028	♂ La Laguna - low (33, 34)
"	"	♂ " (35 →)
(5-1-98) Velvia		
Hbellatus	DEM 98-010	1 ♂, 2 ♂ CA: Sac (1-5)
Hschlagui	MCH 98-040	♂ BN: La Bocana (6-12)
Htarselis	MCH 98-039	♂ BN: El Saculito (13-15)
"	"	2 ♂ " (16)
Hkawini	MCH 98-036	♂ BN: cf Laguna Hanson (17-8)
"	"	4 ♂ " (19)
Hiconglei	MCH 98-033	♂ BN: S San Mateo (20-22)
Horegonius	MCH 98-035	♂ BN: Juvet foothills (23-25)
Helgens	MCH 98-036	♂ BN: cf Laguna Hanson (26-28)
Pellencus	MCH 98-037	♂ BN: E Ensenada (29, 30)
Hdivanicatus	MCH 98-028	♂ BN: La Laguna - low (31-33)
Hca/div	MCH 98-037	♂ BN: E Ensenada (34 →)
(5-4-98) Velvia		
Hca/div	MCH 98-040	♂ BN: La Bocana (1-2)
"	MCH 98-036	♂ BN: cf Laguna Hanson (3-4)

↓ see 2 PAGES Behind

Video Log - MCH TAPE # 3

97-013	H. tuberculatus	♂ 1 w/ ♀ H. tub.	good -
~~~~~ end of TAPE # 3 ~~~~~			
TAPE # 4			
97-013	H. tuberculatus	♂ 2 w/ ♀ 1, 2 H. tub. H. pug	weak - incomplete
"	"	♂ 3 w/ ♀ 1	good -
97-008	H. hexanus	♂ 1 w/ H. hypoleucis ♀	bad
"	H. hexanus	♂ 1	snippet
"	H. hexanus	♂ 1 w/ H. hexanus (Moksha)	- bad
"	"	2♂	"
"	"	3♂	"
"	"	4♂	"
"	"	5♂	almost
97-007	H. hexanus	♂ 1 w/ H. hexanus ♀ 1 (97-007)	OK
"	"	2♂	bad
"	"	3♂	OK
"	"	4♂	OK
"	"	5♂	bad
97-012	H. hexanus	♂ 1	bad
97-005	H. hexanus	♂ 1 H. hexanus ♀ / H. pug ♀	OK
97-008	H. hexanus	♂ 1 H. hexanus ♀ / H. pug ♀	OK
97-008	H. hexanus	♂ 1 H. hexanus ♀	contribution
97-002	H. hexanus	♂ 1	"
97-009	H. hexanus	♂ 1 H. hexanus ♀	bright
97-008	H. hexanus	♂ 1 w/ 13	bad
97-006	H. hexanus	♂ 1 w/ 13	snippet
97-016	H. hexanus	♂ 1 w/ 13	bad
97-012	H. hexanus	♂ 1 w/ 13	bad

# TAPE # 4

MCH 97-030	H. hexanus	♂ 1	various ♀♀	OK
"	H. hexanus	♂ 1	"	"
S. Master - Colo	H. hexanus	♂ 1	H. hexanus ♀	nice
"	"	2♂	1♀ / 2♀	pretty good
"	"	3♂	" 3♀	nice
MCH 97-042	H. hexanus	♂ 1	Grayback - CLNP ♀	good
"	"	2♂	Lao Rock - CLNP ♀	OK
MCH 97-046	H. hexanus	♂ 1	" - ♀ 3	good
"	"	2♂	" 3, 4♀	nice
"	"	3♂	" 4, 5♀	nice
MCH 97-045	H. hexanus	♂ 1	Lao Rock 5♀ /	OK
MCH 97-048	"	♂ 1	Grayback Drive ♀	excellent
MCH 97-039	H. hexanus	♂ 1	MT Shrestha ♀	good
MCH 97-044	H. hexanus	♂ 1	Kings Creek 1♀ / Lao Rock ♀	OK
"	"	2♂	Lao Rock 5♀	nice
MCH 97-043	H. hexanus	♂ 1	" / Kings Creek 3♀	nice
"	"	2♂	Kings Creek 3♀	OK
"	"	3♂	" 4♀ / Lao Rock ♀	good
"	"	4♂	Lao Rock ♀	nice
"	"	5♂	" ♀	* perfect
MCH 97-049	H. hexanus	♂ 1	Long Gray Tr. ♀ 1	OK
"	"	2♂	"	OK
"	"	3♂	" 2♀	OK
"	"	4♂	"	OK
"	"	5♂	"	OK
"	"	5♂	3♀	OK
"	"	6♂	1♀	OK
"	"	7♂	"	"

# TAPE #4

WPM #97-0	H. brunneus	1♂	H. brun 1♀	Copulation
"	"	2♂	" 2♀	start
end of TAPE #4				
TAPE #5				
WPM #97-0	H. brunneus	2♂	H. brun 1♀	some
WPM 97-016	H. calcaratus	♂	H. calcar 1♀	OK
MCH 97-051	H. festus	♂	(Holy Ghost p. / American 97.0474) ♂	not much
" 97-053	H. nigrus	♂	(f. s. s. 97.044 ♀)	not much
MCH 98-010	H. pyrrhox	1♂	(1♀ same sp. end 97 to 2♀)	good (complete?)
MCH 98-011	H. nigrus	1♂	(to 3♀ sp. / 4♀)	decent
"	"	2♂	(4/5 ♀ sp.) - ♂ in poor shape	
MCH 98-011	H. amorphus	1♂	(1♀ sp. / 2♀ / 3♀)	good to 3♀
"	"	2♂	(3♀ sp.) - not much, bit	biting
MCH 98-026	H. nigrus	1♂	(2♀) - long distance winging	
"	"	2♂	"	same
MCH 98-017	H. signatus	1♂	(1♀)	NADA
"	"	2♂	(1♀ / 2♀)	1♀ - snipnet 2♀ - good
MCH 98-015	H. signatus	1♂	(14/2♀)	~ something
" 98-019	"	1♂	(1♀)	- snipnet
"	"	2♂	"	- good
MCH 98-023	"	1♂	(14/2♀)	OK
MCH 98-005	H. nigrus	1♂	(1♀ 98-005)	NADA
"	"	2♂	(1/2♀ / dead ♀)	long dist. stuff
MCH 98-026	"	1♂	(1♀ - same)	- good
"	"	2♂	"	- long dist.
"	"	3♂	(3♀ - sp.)	- nice
"	"	4♂	"	- OK
"	"	5♂	"	- not much

# more MCH TAPE #5

MCH 98-008	H. amorphus	1♂	(2♀)	started (♂ killed)
Edwards! Kelly	H. calcar		(♀ sp.)	something
MCH 98-028	H. nigrus	1♂	(14 sp.)	nice
"	"	W231♂	"	OK
GS Bodner - libated	H. festus	W222♂	(1♀ 98-017)	good
MCH 98-005	H. nigrus	W232♂	(98-005♀)	NADA
MCH 98-028	H. nigrus	1♂	(98-010♀)	good
MCH 98-008	H. amorphus	2♂	(sp. 2♀)	- start
" 98-014	"	W225♂	(98-020 1♀)	- complete
MCH 98-010	H. pyrrhox	1♂	(1♀ sp.)	- mid/lake
MCH 98-011 (best)	H. amorphus	1♂	(1♀ sp. / 2♀)	- complete
"	"	2♂	(2♀)	- good

# END OF TAPE #5

# MCH TAPE #6

MCH 98-036	H. nigrus	1♂	(1, 2♀ sp.)	good
"	"	2♂	(2♀)	"
"	"	3♂	(best to 1♀ - 1♀)	good
"	"	4♂	(1♀)	nice
MCH 98-039	H. nigrus	1♂	(2♀ Kawaii)	OK (1)
"	"	2♂	(♀ Kawaii)	"
MCH 98-036	H. nigrus	5♂	(14/2♀ best)	nice
" 98-039	H. nigrus	1♂	(♀ Kawaii)	good
DRM 98-010	H. nigrus	1♂	"	mid stages
MCH 98-040	H. nigrus	♂	(1♀)	early/mid
" 98-005	H. nigrus	2♂	(1♀)	flagging
MCH 98-028	H. nigrus	3♂	(♀ Kawaii)	not much
" 98-036	H. nigrus	♂	(- / San Martins ♀)	OK

TAPE #6

MCH 98-040	Heel/div	♂	(El Secorillo 14)	nice
" 98-037	"	♂	(" 2♀)	OK
" 98-039	"	1♂	(El Sec 1♀)	"
"	"	2♂	(various)	NADA
MCH 98-033	"	1♂	(El Sec 1♀)	nice
"	"	2♂	(" / Sam Mat ♀)	decent
"	"	3♂	"	NADA
Edwards: Kelly	Hori/2	2♂	(Hirascinus 2♂ / H2Hawes)	OK?
DRM 98033	Hagerimoi	1♂	♀ ssp.	OK
"	"	2♂	"	good
MCH 98-010	Hagerike 4	2♂	♀ ssp	good 2nd
" 98-011 (H11)	Hagerapsius	♂	98-010 ♀	weak
MKoptan - Durango	Hsuillatus	1♂	♀ 98-044 ellows	not much
MCH 98-043	Hamerx Kubai?	M003 ♂	♀ ssp	good (fuplith)
"	"	M004 ♂	98-045 ♀	good
TAPE #8			* see Mexico 98 notes *	
MCH 98-043	Hamerx Kubai?	M005 ♂	98-045 ♀	OK
"	"	M006 ♂	♀ ssp	good
"	"	M007 ♂	"	✓
MCH 98-050	Hustulatus	M019 ♂	MD18 ♀	good
"	"	M021 ♂	"	nice
"	"	M022 ♂	"	"
"	"	M023 ♂	"	"
WPM 98-050	Htixcaltans	M002	imm ♀ ssp / 98-043	OK
"	"	M001	various ♀s	✓

Photo Log - using dual flash @ +1.7  
(results good!)

Velvia (G-13-98)

Hocala	(Edwards: Kelly)	2♂	Ocala NF	(3-7)
Hagerimoi	DRM 98033	2♂	No. A2	(8-11)
"	"	♀	"	(12-13)
Hsuillatus	M. Kaplan	1♂	Mex: Durango	(14-18)
Hsuillatus	MCH 98-004	1♂	CADO Airport	(19-24)
Hocacatus g	MCH 98-010	2♂	BS: San Carlos	(25-28)
Hocacatus	WPM 98-070	1♂	Jal: (Hemelz Est	(29-30)
"	"	2♂	"	(31-34)
"	WPM 98-065	1♂	SAL: Los Yesos	(35-)
Velvia (G-3-98)	- using dual flash @ +1.7			
Pharies sp.	MCH 98-044	♂ ♀	CA: Beuca GK	(1-4)
Hameris	MCH 98-046	♂	CA: Panther Meadows	(5-7)
Htixcaltans	WPM 98-087	♀	A2: Yuma Nat Area	(8,9)
Philippus	WPM 98-080	♀	CA: Midway well	(10,11)
Htixcaltans	"	♂	"	(12-16)
Htixcaltans	WPM 98-050	mod ♀	Mich: Carapan	(17-20)
Htixcaltans	MCH 98-045	♂	CA: WB - lower trail	(21-22)
" ?	"	♂	CA: WB - lakeside	(23-24)
Huillap	"	♂	CA: WB - fell field	(25-26)
Hameris ?	MCH 98-043	1♂	CA: Bunny Flat	(26-31)
Htixcaltans	"	2♂	"	(32-)

Photo Log

Velvia (9-9-98)	- dual flash @ +1.7	
Htlaxcalanus	WPM 98-058	Mick: Carapan (1-7)
Htlaxcalanus	WPM 98-063	A2: Mohawk (8-10)
Htlaxcalanus	MCH 98-043	CA: Bunny Flat (11-13)
"	"	" (14-17)
"	"	" (18-21)
"	"	" (22-24)
"	"	" (25-28)
Htlaxcalanus	MCH 98-045	CP: WB-lower (29-31)
Htlaxcalanus	"	"-fellfield (32-)
Velvia (9-9-98)	- dual flash @ +1.7	
Htlaxcalanus	MCH 98-046	CA: Panther Meadows (1-3)
"	"	" (4-8)
"	"	" (9-12)
"	"	" (13-15)
"	"	" (16-20)
"	"	" (21-25)
"	"	" (26-28)
Htlaxcalanus	WPM 98-058	CARAPAN (29-)
Velvia (10-16-98)	- dual flash @ +1.7	
Hustulatus	MCH 98-050	NM: White Sands (19-25)
"	"	" (26-)

Velvia (11-3-98) - dual flash @ +1.7

Hustulatus	MCH 98-052	M025 ♂	BCN: El Barranco (1-3)
"	"	M026 ♂	" (4-7)
"	"	M027 ♂	" (8-12)
"	"	M028 ♀	" (13-14)
Hsignatus	MCH 98-051	M029 ♀	BCN: Caricita (15-16)
"	"	M030 ♂	" (17-21)
"	"	M031 ♂	" (22-24)
Hustulatus	MCH 98-050	M032 ♂	NM: White Sands (25-27)
"	"	M033 ♂	" (28-29)
Phidippus	"	♀	" (30-32)
"	"	♂	" (33-)
Velvia (11-6-98)	- dual flash @ +1.7		
Tetragnatha	Ang D. Ficus		(1-7)
Lycosids	MCH 98-050	NM: White Sands (8-?)	
Phidippus	WPM 98-088	CA: Midway well (9-18)	
Hustulatus	MCH 98-052	M034 ♂	BCN: El Barranco (19-20)
"	"	M027 ♂	" (25-26)
"	"	M025 ♂	" (27-)
TAPE #8 Video Log			
MCH 98-051	Hsignatus	M030 ♂	98-051 M029 ♀ Nice ✓
"	"	M031 ♂	" " ✓
MCH 98-052	Hustulatus	M025 ♂	98-052 M028 ♂ Opulent
"	"	M026 ♂	" " OK
"	"	M027 ♂	" " Nice

- see 1998 → field book for confirmation

CAMERA LUCIDA - expand stage

- eyepieces in lucide - small subjects require large (6.7) mag eyepiece
- for series of subjects, try to use same eyepiece. Make sure to take SCALE.
- can also A mag by changing setting on tube (A, B, C).
- lights: use additional source + ep illumination
- tape down paper for drawing / focus on paper w/ tube focus
- SCALE: Micrometer slide / stage micrometer
- > pencil (#2 + 1 harder) - for outlines
- > paper (cognille - good for stippling; acid-free hot press water-color for line-drawing)
- > softer pencils for fill (black pencil crayons)
- > .03, .01, .005 micron pens (untaped)
- draw outline w/ hard pencil; cover bold outline w/ .01 micron pen (very light stippling - no pen initially)
- on cognille, use black pencil crayon to highlight
- * white paint for areas. > draw highlights such that light source appears from upper-left.
- > .05 micron to darker features / white paint over black to "bring out" higher structures > outer edge of structures.

# TRIGONOMETRIC FORMULAE



## Solution of Right Triangles

For Angle A,  $\sin A = \frac{a}{c}$ ,  $\cos A = \frac{b}{c}$ ,  $\tan A = \frac{a}{b}$ ,  $\cot A = \frac{b}{a}$ ,  $\sec A = \frac{c}{b}$ ,  $\csc A = \frac{c}{a}$

$\tan A = \frac{a}{b}$ ,  $\cot A = \frac{b}{a}$ ,  $\sec A = \frac{c}{b}$ ,  $\csc A = \frac{c}{a}$

$\sin A = \frac{a}{c}$ ,  $\cos A = \frac{b}{c}$ ,  $\tan A = \frac{a}{b}$ ,  $\cot A = \frac{b}{a}$ ,  $\sec A = \frac{c}{b}$ ,  $\csc A = \frac{c}{a}$

$B = 90^\circ - A$ ,  $a = b \tan A$ ,  $c = \frac{a}{\sin A}$

$B = 90^\circ - A$ ,  $a = c \sin A$ ,  $b = c \cos A$

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$B = 90^\circ - A$ ,  $a = b \tan A$ ,  $c = \frac{a}{\sin A}$

## REDUCTION TO HORIZONTAL

Horizontal distance = Slope distance multiplied by the cosine of the vertical angle. Thus slope distance = 319.4 ft.  $\cos 5^\circ 10' = .996$ . From Table, Page IX,  $\cos 5^\circ 10' = .996$ . Horizontal distance = 319.4 ft.  $\times .996 = 318.09$  ft.

Horizontal distance also = Slope distance minus slope distance times  $(1 - \cos \text{vertical angle})$ . With the same figures as in the preceding example, the following result is obtained.  $\cos 5^\circ 10' = .996$ .  $319.4 \times .004 = 1.31$ .  $319.4 - 1.31 = 318.09$  ft.

When the rise is known, the horizontal distance is approximately: the slope distance less the square of the rise divided by twice the slope distance. Thus: rise = 14 ft.  $14 \times 14 = 302.6$ .  $302.6 \div 2 = 151.3$ .  $319.4 - 151.3 = 168.1$  ft.

Horizontal distance = 302.6 ft.  $302.6 \div 2 = 151.3$ .  $319.4 - 151.3 = 168.1$  ft.