

24 August 1992

TO: Provost J. Cerny
Chair RFS Planning Committee
Office of the Provost for Research
Graduate Division
Sproul Hall

RECD GRADUATE DIVISION

Date: 8-25-92

FROM J. A. Powell 

Bill Lidicker suggested that I send you a copy of the enclosed survey of Lepidoptera (moths and butterflies) species at the Richmond Field Station.

This cursory survey is based on several brief visits during February- June. It enumerates about 70 species, which I estimate to be about 40% of a potential resident fauna. I was surprised to find five or six species that we had not known to occur in the East Bay previously, which suggests that the remnant coastal prairie and salt marsh area ought to be preserved for further study.

The proximity and ownership status enable realistic visits to RFS during a lab session; such sites are virtually lacking for courses in organismal biology.

cc: W. Lidicker, Jr.

RICHMOND FIELD STATION LEPIDOPTERA

Jerry A. Powell

Dept. Entomological Sciences, University of California, Berkeley

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The following list records about 70 species, members of 24 families, of moths and butterflies that were observed at the University of California, Richmond Field Station (RFS), Contra Costa Co., CA, February to June, 1992. Observations were made during 12 daytime visits of 1.5-2.5 hrs each, by J. A. Powell or Y.-F. Hsu. Larvae, leaf mines, or galls were recorded for 31 species (44%), adults only for the remainder.

Based on the number of butterfly species observed, 17 (13 probably resident, mostly feeding on weedy plants), I estimate that 160-200 species of moths inhabit RFS. A thorough inventory would depend in large part on nocturnal sampling by ultraviolet lights, through all seasons over a several year period. Such a census in a site the size and configuration of RFS, however, would include an unknowable number of vagrant species, attracted to the lights from outside the Station.

Larval hostplant relationships. -- Among 66 species thought to be resident at RFS, larvae or larval mines of 31 (48%) were discovered; larval foods of 29 others can be extrapolated with confidence, based on knowledge from other populations; likely hostplant associations were observed at RFS for 3 of the remaining 6. Hence, larval foods of 91% are accounted for, 95% including those projected from adult-plant associations.

While obviously not completely inventoried, this appears to be a relatively depauperate lepidopterous fauna, considering the known flora (100+ plant species). This phenomenon could be predicted from the architecture of the plant community and the disproportionate representation of exotic plants. In general, trees support the largest numbers of phytophagous insects, followed by shrubs, larger forbs, and annual herbs and monocots with the fewest. For example, at the Antioch National Wildlife Refuge in eastern Contra Costa County, there are 110 native plant species in the perturbed community, and these harbor 35 species of butterflies and at least 134 species of smaller moths (microlepidoptera), contrasted with 17 and 34, respectively, known at RFS. At Antioch, about half the microlepidoptera feed on 7 species of woody plants, only four of which have generic counterparts at RFS, and oaks and willows support 31% of the small moths. At RFS, only Baccharis fills a dominant role of the woody superstructure, harboring 8 species (12.5% of the resident Lepidoptera). At least 32 of the resident species (48%) are generalist feeders and/or depend upon weedy plants at this site, or are detritivores.

Rare and biologically significant species.-- At least six species of smaller moths are noteworthy, their populations representing new records for the East Bay area and/or providing potentially new larval hostplant associations.

1. Coleophora species.

We reared this moth from case-bearing larvae on Aster. I have not seen the species previously. Specimens will be sent to J.-F. Landry at Ottawa, who is currently studying the group.

2. Heliodines species near sexpunctella Walsingham.

This is the first known occurrence of Heliodines in the East Bay area. The taxonomic status is under study by Y.-F. Hsu; the larval biology is unknown.

3. Eucosma conspiciendana (Walsingham)

This species has been taken at lights in the East Bay (Orinda), but adults taken in close association with Aster at RFS provide the first clue to the larval biology. I hope the south field of the coastal prairie can be preserved so that the colony can be studied next season.

4. Phaneta corculana (Zeller)

This species was described originally from Vancouver Island and has remained poorly known. It has been recorded in more boreal parts of California but not in low coastal areas previously. Adults were associated with Wyethia, which provides the first suggestion of its larval biology.

5. Phaneta minimana (Heinrich)

One adult of this tiny tortricid was taken from Artemisia californica, which presumably was planted on the railroad bed bordering the salt marsh, a hostplant association that has been recorded for minimana elsewhere. This species was described from San Diego originally and has not previously been recorded north of Monterey County.

6. Anatralata versicolor (Warren)

This diurnal moth has a wide range in the mountains, from British Columbia to the Sierra Nevada, mostly at higher elevations. We have two recent records in serpentine grasslands in Alameda and San Mateo counties, and now in coastal prairie at RFS, perhaps a relict of once more extensive occurrence at low elevations. The adults were taken in close association with Wyethia, the first indication of a hostplant relationship for this or related genera.

LIST OF THE OBSERVED LEPIDOPTERA

(Abbreviations: e=exotic species, n=ative; r=resident, v=vagrant; ad=adult observed, la=larvae or larval mines, galls observed; II-VI, February to June. Larval collections designated by lot numbers, e.g. 92B7= collection 7 in February, 1992. *=association with exotic or weedy larval hostplant.

NEPTICULIDAE

Stigmella heteromelis Wilkinson & Scoble n, r
ad: la: mines *Heteromeles arbutifolia* (abandoned II, 92B..)

HELIOZELIDAE

Coptodisca saliciella (Clemens) n, r
ad: VII, diurnal; la: leaf miner on *Salix lasiolepis* (92F10)

TINEIDAE

Amydria sp. n, r
ad: IV la: detritivore, likely in mammal burrow

GRACILLARIIDAE

Cremastobombycia sp. 1 n, r
ad: III la: leaf mines on *Grindelia humilis*, II, III, VI
(92B7, 92C10, 92F14)

Cremastobombycia sp. 2 n, r
ad: IV la: mines leaves of *Baccharis pilularis*, III, VI
(92C8.1, 92F13)

Marmara sp. n, r*
ad: la: mines stems of *Rubus* (abandoned II, 92B)

BUCCULATRICEIDAE

Bucculatrix variabilis Braun n, r
ad: IV, nocturnal la: mines first, then feeds externally, on
Baccharis pilularis, II (92B4, 92D44).

Bucculatrix sp. n, r
ad: VI la: likely a skeletonizer on *Artemisia californica*

BLASTOBASIDAE

Hypatopa sp. n, r
ad: IV, V la: feeds in dry seed of *Rumex*, II (92B2)

COLEOPHORIDAE

Batrachedra salicipomonella Clemens n, r
ad: VI, VII, nocturnal; la: in *Salix* leaf galls caused by the
sawfly, *Pontania californica* (Tenthredinidae), IV, VI (92D60,
92F12).

Coleophora baccharella Landry ms n, r
ad: VIII; la: case bearer on *Baccharis pilularis*, II, III,
IV, VI (92B4.1, 92C80, 92D43, 92D61, 92F13)

Coleophora sp. 2 n, r
ad: IV; la: case bearer on *Aster*, III (92C5)

GELECHIIDAE

- Aristotelia argentifera* Busck n, r
 ad: V, nocturnal; la: tip webber on *Baccharis pilularis*
 (92D43).
- Chionodes ochreistrigella* (Chambers) n, r*
 ad: V, VI, VII, nocturnal; la: external feeder on *Rumex*
crispus, IV, VI (92D65, 92F7).
- Chionodes* sp.? n, r
 ad: VI la: unknown
- Gnorimoschema baccharisella* Busck n, r
 ad: la: stem gall maker on *Baccharis pilularis*, abandoned II,
 immature III (92B3), V (92E236).
- Gnorimoschema ?subterranea* Busck n, r
 ad: la: stem gall maker on *Aster*, III, IV, V (92C6, 92E236)
- unplaced sp. 1 n, r
 ad: la: leaf tier on *Grindelia humilis*, III (92C9, 92C25)
- Scrobipalpula psiliella* complex n, r
 ad: IV, nocturnal; la: tip borer in *Gnaphalium*, III (92C11).

PLUTELLIDAE

- Plutella xylostella* (L.) e, r*
 ad: VI la: external feeder on *Lepidium* & other weedy
 crucifers

HELIODINIDAE

- Heliodes* sp. n, r?
 ad: IV, diurnal; la: unknown

SESIIDAE

- Synanthedon bibionipennis* (Boisduval) n, r*
 ad: V, VI, diurnal wasp mimic; la: stem borer in *Rubus*

TORTRICIDAE

- Epiblema strenuana* (Walker) coastal strand race n, r
 ad: III, VI la: stem borer in *Ambrosia chamissonis* (92F15)
- Epinotia columbia* (Kearfott) n, r
 ad: IV, V, nocturnal; la: tip tier on *Salix lasiolepis*, III
 (92C26).
- Epinotia infuscana* (Walsingham) n, r
 ad: IV; la: stem borer in *Lupinus arboreus*, III (92C23)
- Eucosma conspiciendana* Heinrich n, r
 ad: V, assoc. *Aster* la: probably a root borer in *Aster*
- Phaneta corculana* (Zeller) n, r
 ad: IV, assoc. *Wyethia*; la: stem borer
- Phaneta minimana* (Heinrich) n, r
 ad: VI la: possibly twig borer in *Artemisia californica*
- Acleris hastiana* (L.)
 ad: VII la: leaf tier on *Salix lasiolepis*, VI (92F11)
- Argyrotaenia citrana* (Fernald) n, r
 ad: II, III, IV, assoc. *Baccharis*, multivoltine, nocturnal
 la: general feeder
- Clepsis peritana* (Clemens) n, r
 ad: IV, multivoltine, nocturnal la: general feeder,

especially on low herbs
Platynota stultana (Walsingham) e, r
 ad: III, IV, V, VI, multivoltine, nocturnal; la: general
 feeder, found on *Wyethia* at RFS (92E237).

CRAMBIDAE

Anatralata versicolor (Warren) n, r
 ad: IV, diurnal, assoc. *Wyethia*; la: unknown
Dicymolomia metaliferalis (Packard) n, r
 ad: V, VI, nocturnal; la: scavenger, case-bearer
Diastictis fracturalis (Zeller) n, r
 ad: IV; la: in terminals of *Gnaphalium*
Hellula rogatalis (Hulst) e, r*
 ad: VI la: leaf miner first, then external feeder on
Lepidium
Pyrausta subsequalis (Guenee) n, r*
 ad: II, III, IV, V la: stem borer of Asteraceae
Udea profundalis (Packard) n, r*
 ad: III, IV, VI la: leaf tier, general feeder on herbs
Uresiphita reversalis (Guenee) e, r*
 ad: II, III, VI, nocturnal but flies readily during the day
 upon disturbance; la: colorful, exposed caterpillar on
Cytisus monspessulanus (92F16) and *Lupinus*, at RFS on *L.*
arboreus (92B8)

PYRALIDAE

Phycitodes mucidellum (Ragonot) n, r
 ad: V la: feeds in flower heads of Asteraceae

PTEROPHORIDAE

Emmelina monodactyla (L.) e, r*
 ad: V la: external feeder on *Convolvulus arvensis*, IV, V
 (92D108, 92E43)
Oidaematophorus grandis (Fish) n, r
 ad: VII, VIII, nocturnal; la: stem borer in *Baccharis*
pilularis, III- VI (92C7, 92F8)
Platyptilia williamsi Lange n, r
 ad: III la: on *Gnaphalium*, II (92B10)

GEOMETRIDAE

Elpiste marcescens (Guenee) n, r
 ad: III, IV, VI la: external feeding inchworm on *Baccharis*
pilularis
Perizoma custodiata (Guenee) n, r
 ad: III, IV, VI la: external feeder on *Salicornia*?
Synaxis truxaliata complex n, r
 ad: VI, nocturnal; la: stick mimic inchworm on *Baccharis*
pilularis

ARCTIIDAE

Estigmene acres (Drury) n, r*
 ad: nocturnal la: general feeder, found at RFS on
Melilotus indica, V (92E238).

NOCTUIDAE

| | | |
|---------------------------------|---|-------|
| Autographa californica (Speyer) | | |
| ad: III, V | la: cutworm, general feeder, on Melilotus indica at RFS, IV (92D62). | n, r* |
| Caenurgina erechtea (Cramer) | | |
| ad: IV | la: reported on grasses and other herbs | n, r |
| Leucania oregona Smith | | |
| ad: V, nocturnal | la: reported on grasses | n, r |
| Spodoptera exigua (Hubner) | | |
| ad: V, nocturnal; | la: general feeding cutworm, at RFS found on an unidentified monocot, IV (92D65). | e, r* |
| Undetermined species | | n?, r |
| ad: | la: in terminal of Grindelia humilis, IV (92D64). | |

HESPERIIDAE

| | | |
|------------------------------|--------------------------------|-------|
| Hylephila phyleus (Drury) | | |
| ad: IV | la: lawn grass | e, r* |
| Paratrytone melane (Edwards) | | |
| ad: IV | la: Poaceae | n, r |
| Polites sabuleti (Boisduval) | | |
| ad: IV, V | la: Poaceae (native, weedy) | n, r |
| Pyrgus communis (Grote) | | |
| ad: IV | la: leaf tier on Malva (weedy) | n, r* |

PAPILIONIDAE

| | | |
|------------------------|--|-------|
| Battus philenor (L.) | | |
| ad: IV | ; la: on Aristolochia | n, v |
| Papilio zelicaon Lucas | | |
| ad: III, V, VI | la: external feeder on Foeniculum vulgare, | e, r* |
| IV (92D..) | | |

PIERIDAE

| | | |
|----------------------------------|--------------------------|-------|
| Pieris rapae (L.) | | |
| ad: II, III, IV, V, VI | la: external feeder on | e, r* |
| Brassicaceae | weedy | |
| Colias eurytheme Boisduval | | |
| ad: III, IV, V | la: on Fabaceae | n, v |
| Euchloe ausonides (Lucas) | | |
| ad: IV, oviposition on Brassica; | la: exposed, on Brassica | n, r* |
| inflorescence | | |

LYCAENIDAE

| | | |
|--------------------------------|--|-------|
| Lycaena xanthoides (Boisduval) | | |
| ad: V, VI | la: external feeder on Rumex leaves | n, r* |
| Strymon melinus Hubner | | |
| ad: VI | la: general feeder on buds and flowers | n, r* |

NYMPHALIDAE

| | | |
|---|----------------|------|
| Danaus plexippus (L.) | | |
| ad: overwintering aggregations in Eucalyptus, | II, occasional | n, r |

| | | |
|---|------------------------------------|-------|
| individuals III, IV; (winter resident but not breeding at RSF) | la: external feeder on Asclepias | |
| <i>Junonia coenia</i> (Hubner) | | n, r* |
| ad: II, IV, V, VI | la: on Plantago | |
| <i>Vanessa annabella</i> Field | | n, r* |
| ad: III | la: leaf tier on Malva | |
| <i>Vanessa atalanta</i> (L.) | | n, v |
| ad: II | la: on Urtica and weedy Parietaria | |
| <i>Vanessa cardui</i> (L.) | | n, v |
| ad: IV, V, VI, migrant | la: generalist | |

SATYRIDAE

| | | |
|---|------------------|------|
| <i>Coenonympha californica</i> Westwood | | n, r |
| ad: IV, VI | ; la: on Poaceae | |