

TWO NEW *DIORYCTRIA* FROM CALIFORNIA (LEPIDOPTERA: PYRALIDAE: PHYCITINAE)

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ABSTRACT.— Two new species of *Dioryctria* in the *zimmermani* group are described from California. *Dioryctria westerlandi* n. sp. (type locality, Placer Co.) occurs in the yellow pine forest plant community of montane California (1600-2286m elevation), from the Warner Mts. to the San Jacinto Mts., where Jeffrey pine (*Pinus jeffreyi*), its presumed hostplant, occurs. *Dioryctria fordii* n. sp. (type locality, Kern Co.) occurs in the foothill woodland plant community on both sides of the Central Valley and in the Kern River drainage (442-914m elevation), where gray pine (*Pinus sabiniana*), its presumed hostplant, occurs. Adults and male and female genitalia are illustrated for both species.

KEY WORDS: Central Valley, Coast Ranges, *Dioryctria fordii* n. sp., *Dioryctria westerlandi* n. sp., foothill woodland, habitat, Nearctic, North America, Pinaceae, pines, San Bernardino Mountains, San Jacinto Mountains, Sierra Nevada, Transverse Ranges, Warner Mountains, yellow pine forest, USA.

Specimens of two particularly large and distinctive California *Dioryctria* have been accumulating in collections for nearly 30 years. Although neither species is commonly collected, two persons, making repeated collections at single localities, have obtained large samples consistent enough to permit characterization at this time, and in order for them to be included in a forthcoming fascicle of *The Moths of America North of Mexico*. Both new species described here belong to the *zimmermani* group of *Dioryctria*; the male and female genitalia of both are very similar to those of other members of the *zimmermani* group, and do not appear to possess any useful diagnostic features. However, the forewing color and maculation of both species, combined with their large size, are excellent features to use to separate the new species from other members of the *zimmermani* group, as well as from all other *Dioryctria*. Although some specimens of the two new species may resemble each other, they are allopatric as far as known: one occurs in Yellow Pine Forest virtually throughout California, while the other is restricted to Foothill Woodland at lower elevations. The common and scientific names of plants follow Hickman (1993).

Dioryctria westerlandi Donahue & Neunzig, sp. n.

(Fig. 1, 3-5)

Type locality: Ward Creek, 2 mi. S of Tahoe City, Sierra Nevada Range, Placer Co., California, elev. 6,250 ft. [1905m] [635 Twin Peaks Drive, Tahoe City, about 800m west of Lake Tahoe].

Diagnosis.— *Dioryctria westerlandi* has a forewing length that averages about 15.5mm. The inner half of the median area of the forewing is mostly black and brownish-red and the outer half of the median area is a strongly contrasting white; there is a distinct patch of reddish-brown scales distad of postmedial line.

Description.— Forewing length: 13.5-18.5mm. **Head:** frons and vertex white, washed with pale reddish-brown and with dark brown patch near eye; labial palpus clothed with mixture of white and dark brown to black scales; maxillary palpus simple, same color as labial palpus. **Thorax:** collar and dorsum white washed with pale reddish-brown, with a few dark brown to black scales. **Forewing:** base white with black and brownish-red patch, and dark brown to black, indistinct to distinct streak at costa; subbasal area with large patch of intense brownish-red; antemedial line narrow (except near costa), bordered proximally and distally by black scales (these black scales forming broad costal patch basad of antemedial line); medial area with scattered black scales along costa and subcosta, and with large, mostly black patch below subcostal area near antemedial line (this patch with some pale, whitish scales at inner half adjacent to black scales outlining antemedial line); entire patch followed distally by group of pale brownish-red scales and large group of mostly white scales; discal spots brownish-white with very

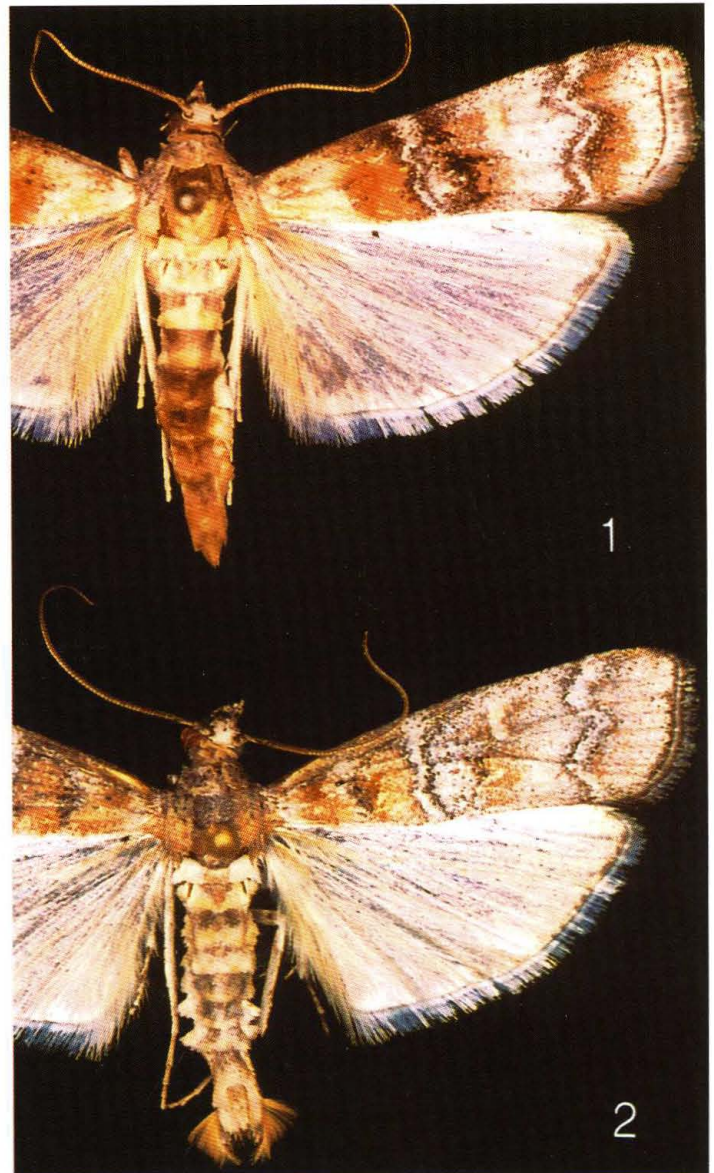


Fig. 1-2. Adults: 1) *Dioryctria westerlandi* sp. n., male holotype. 2) *Dioryctria fordii* sp. n., male paratype (San Luis Obispo Co., Rinconada Trailhead, 2,100 ft., Santa Lucia Mts., D. C. Ferguson, 25 Aug 1992, USNM).

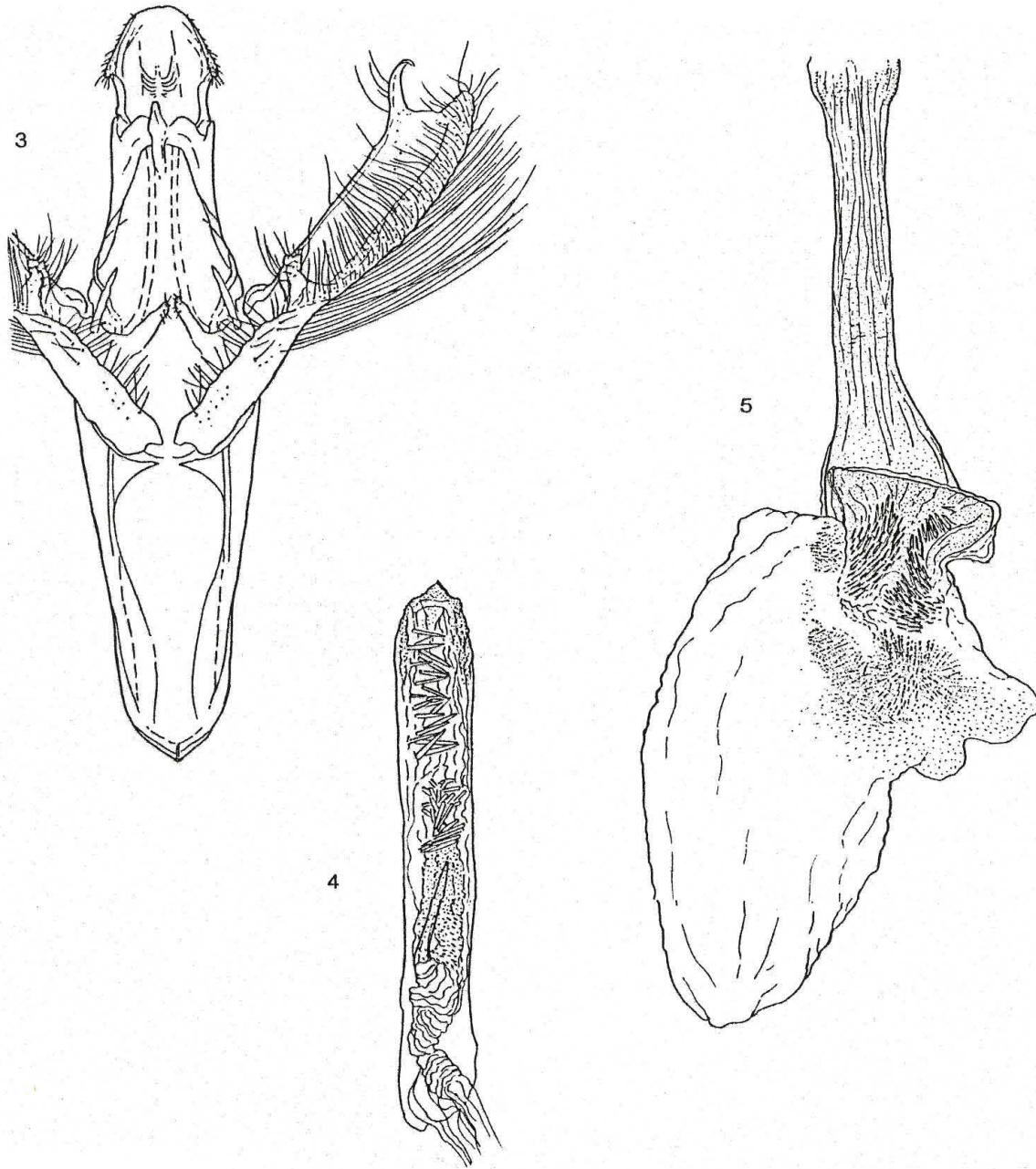


Fig. 3-5. *Dioryctria westerlandi* sp. n.: 3) male genitalia (aedeagus omitted); 4) aedeagus; 5) female genitalia (ductus bursae and corpus bursae).

few brownish-red scales; postmedial line white, distinct, edged proximally by thin black line, and distally by patch of black followed by reddish-brown scales; outer half of terminal area with contrasting group of white scales; raised patches of scales at base, subbasally, following antemedial line, at discal spots and postmedially (patch at base small, and postmedially group very weakly formed). *Hindwing*: brownish-white. *Male genitalia* (Fig. 3-4): with uncus constricted at base; valva with distal part of costa produced into a slender hook, and with a small spine-like distal element from lower, outer angle; vesica with large, solitary spine and clusters of smaller spines. *Female genitalia* (Fig. 5): with sclerotized part of ductus bursae distinctly longer than corpus bursae; ductus bursae sinuate in dorsoventral plane (waved); pair of spine clusters at junction of ductus bursae and corpus bursae, and additional groups of spines in posterior half of corpus bursae.

Immature stages and larval host(s).— Unknown, but see below for discussion of suspected hostplant.

Material Examined.— *Holotype*: male, California, [Sierra Nevada Range], Placer Co., Ward Creek, 2 mi. S Tahoe City, 6,250 ft. [1905m], Nils Westerland, 1 Aug 1987. Holotype deposited with the Natural History Museum of Los Angeles County (LACM), Los Angeles, California.

Paratypes (35 m, 50 f, total): all California (counties arranged alphabetically): *Alpine Co.*: [Sierra Nevada Range], Woodfords, 5,800 ft. [1768m], 27 Aug 1973, R. Ford, (1 f), LACM. *Kern Co.*: [Transverse Ranges], Mt. Pinos H[igh]w[a]y, 7,480 ft. [2280m], 10 Aug 1996, Kelly Richers, (1 m), KMR. *Modoc Co.*: [Warner Mts.], 6 mi. NW Cedarville, 8 Sep 1963, W. R. Bauer, J. S. Buckett, genitalia slides 1829 HHN, 4498 HHN, (2 f), UCD. *Mono Co.*: Holiday Campgr[oun]d., 1 mi. W Hwy. 395, [0.5 mi. S Tom's Place, elev. 7,500 ft. (2286m)], J. Emmel, O. Shields, 4 Aug 1965 (1 f), LACM. *Placer Co.*: Same location and collector as holotype: 1966: 13 Aug; 1974: 22 Jul, 31 Jul, 2 Aug, 3 Aug, 12 Aug, 16 Aug; 1976: 26 Jul, 28 Aug; 1977: 31 Jul, 19 Aug, 20 Aug; 1978: 31 Jul; 2 Aug, 9 Aug; 1980: 11 Aug, 1 Sep; 1981: 24 Jul, 7 Aug, 10 Aug, 11 Aug, 21 Aug, 23 Aug; 1982: 9 Aug, 21 Aug, 22 Aug, 23 Aug, 24 Aug; 1984: 24 Jul, 1 Aug, 5 Aug, 8 Aug, 10 Aug, 15 Aug; 1985: 10 Jul, 15 Jul, 20 Jul, 19 Aug; 1986: 31 Jul, 6 Aug, 7 Aug, 2 Sep; 1987: 19 Aug, 23 Aug, 30 Aug, 2 Sep; 1988: 1 Aug, 18 Aug, 23 Aug, 29 Aug, 4 Sep, 5 Sep, 6 Sep; 1990: 15 Aug, genitalia slides 4914 HHN, 4915 HHN, (23 m, 41 f), LACM. Same location as holotype: 20 Aug 1980, J. Powell, (1 f), UCB. Kaspian Rec[reation]. Area, 4 mi. S Tahoe City, [elev. ca. 6,250 ft. (1905m)], 5 Aug 1980, D. L. Wagner, (1 m), UCB.

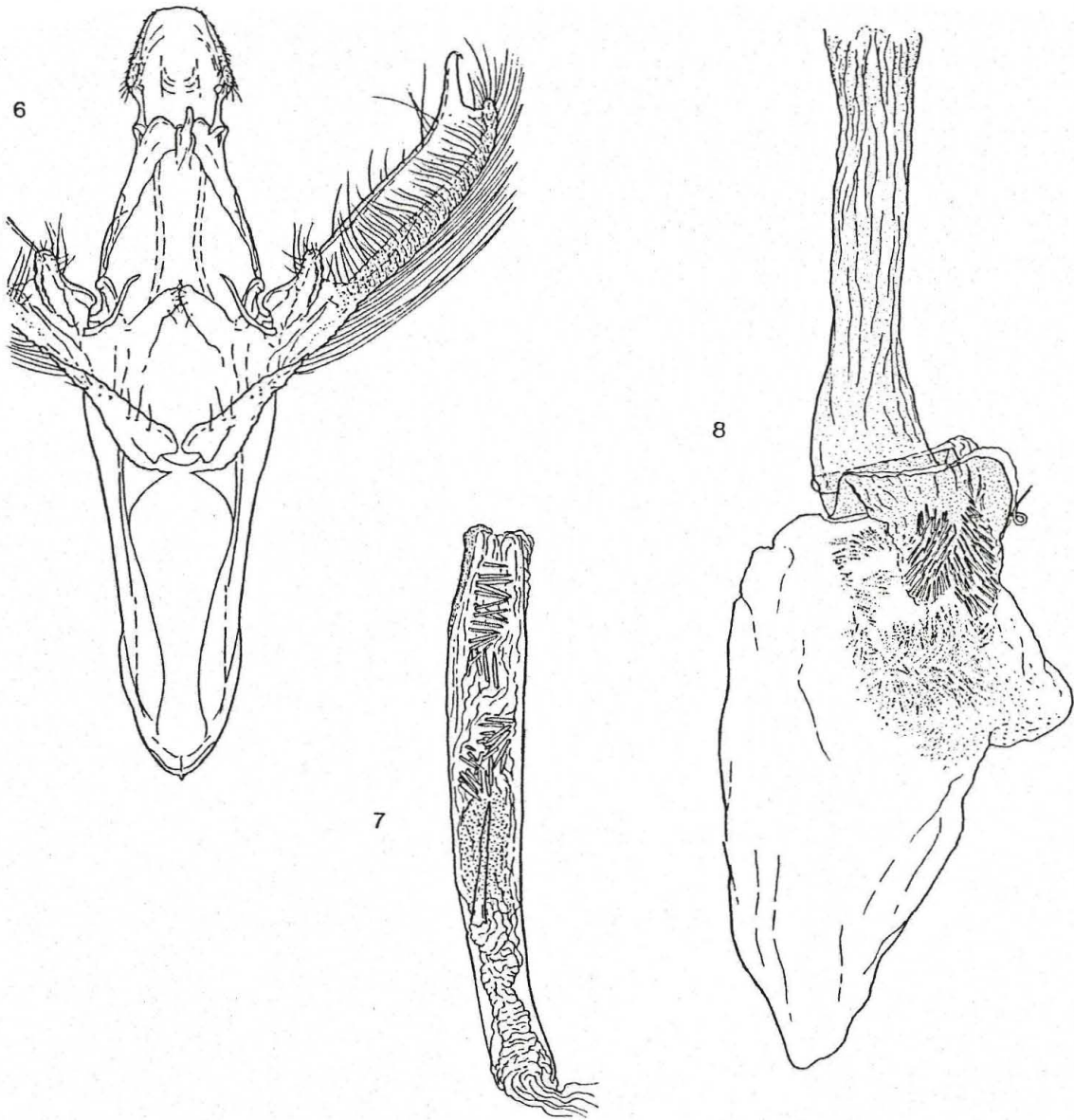


Fig. 6-8. *Dioryctria fordii* sp. n.: 6) male genitalia (aedeagus omitted); 7) aedeagus; 8) female genitalia (ductus bursae, corpus bursae and part of ductus seminalis).

Plumas Co.: [Sierra Nevada Range], Johnsville [elev. ca. 1600m], 7 Aug 1967, 2 Sep 1967, 4 Sep 1967, 9 Jul 1968, 11 Jul 1968, Helena Pini, genitalia slides 1828 HHN, 4236 HHN, 4237 HHN, (5 m, 2 f), UCD, NCSU. Johnsville, 3 Sep 1960, W. R. Bauer, J. S. Buckett, (1 m), UCD. *Riverside Co.*: [San Jacinto Mts.], 3 mi. N Anza, 6,100 ft. [1859m], 5 Sep 1966, D. F. Hardwick, (1 m), CNC. *San Bernardino Co.* [San Bernardino Mts.]: Upper Santa Ana River, 10 Sep 1948, G. H. and J. L. Sperry, genitalia slide 4410 HHN, (1 f), CNC. Big Bear Lake, 6,800 ft. [2073m], 6 Aug 1978, Ron Leuschner, (1 f), RHL. Hanna Flat, 7,000 ft. [2134m], 3.5 air km. NW Fawnskin, 19 Jul 1979, D. L. Wagner, (1 m), UCB. *Tulare Co.*: [Sierra Nevada Range], Kennedy M[ea]d[o]w., [elev. ca. 6,200 ft./1890m], [A. S.] Menke and [L. E.] Stange, 31 Aug 1958, genitalia slides 4918 HHN, 4919 HHN, (3 m, 1 f), LACM.

Etymology.— We are pleased to name this striking moth in honor of Nils August Westerland IV (29 Jan 1906–26 May 1995), who collected the majority of the type series in his back yard. Westerland collected at this locality during occasional visits from his home in Salinas, California, until he and his wife Florence moved there permanently in 1973, after which he operated a black light virtually every frost-free night of the year, collecting thousands of moths annually until he ceased collecting in 1991. He never maintained a personal collection, choosing instead to donate his entire annual catch to the Natural History Museum of Los Angeles County, which has been considerably enriched by his efforts and dedication.

Remarks.— *Dioryctria westerlandi* resembles *Dioryctria albovittella* (Hulst), which also has part of the median area of the forewing whitish, but in *D. albovittella* this area is not as pale, and there is little contrast between it and other areas of the wing. Furthermore, *Dioryctria albovittella* is a smaller moth (forewing length 11.0–12.0mm). *Dioryctria westerlandi* occurs virtually throughout the entire length of montane California, apparently restricted to the yellow pine forest plant community (also known as mixed-conifer forest), from the Warner Mountains in the northeastern corner of the state through the Sierra Nevada and Transverse Ranges to the San Jacinto Mountains in southern California. Specimens have been collected at elevations from 5,250–7,500 ft. [1600–2286m] between 9 Jul and 10 Sep, with the preponderance of collections in August. The dominant conifers in this zone are generally Pacific ponderosa pine (*Pinus ponderosa* Laws.), Jeffrey pine (*Pinus jeffreyi* Grev. & Balf.), sugar pine (*Pinus lambertiana* Douglas), and white fir (*Abies concolor* (Gordon & Glend.) Lindley) (Schoenherr, 1992). The most likely larval hostplant for *D. westerlandi* is one or both of the first two, closely-related, species, as all members of the *zimmermani* group of *Dioryctria* are associated with pines (Heinrich, 1956;

Mutuura and Munroe, 1969), and sugar pine does not occur in the Warner Mts., where two of the paratypes were collected. The type locality is surrounded by a dense conifer forest, with white fir the most abundant species and Jeffrey pine next most abundant (JPD, pers. obs.). There is a single specimen of lodgepole pine (*Pinus contorta* ssp. *murrayana* (Grev. & Balf.) Critchf.) within a 100 ft (30.5m) radius of the type locality; in the general vicinity lodgepole pine comprises only 1-5% of the total conifer stems. At the Kennedy Meadows locality in Tulare Co., although the dominant pine is singleleaf pinyon pine (*Pinus monophylla* Torrey & Frémont), Jeffrey pine occurs along the South Fork of the Kern River that flows through this site (JPD, pers. obs.). The circumstantial evidence thus points to Jeffrey pine as being the principal, perhaps only, hostplant of *D. westerlandi*.

Dioryctria fordii Donahue & Neunzig, sp. n.

(Fig. 2, 6-8)

Type Locality.—Wofford Heights., Lake Isabella, Kern Co., California, elev. ca. 2,700 ft. [823m] [ravine immediately north of 212 Mac Hill Drive].

Diagnosis.—The forewings of *Dioryctria fordii* are pale, with no strongly contrasting maculation, giving the species a distinctive, faded look. Strongly-marked specimens may resemble pale specimens of the allopatric *Dioryctria westerlandi*, but *D. fordii* lacks the reddish-brown coloration distad of the postmedial line found in that species. As with *Dioryctria westerlandi*, it is a large *Dioryctria* with an average forewing length of about 15.0mm.

Description.—Forewing length: 13.0-18.0mm. **Head:** frons and vertex white to yellowish or brownish-white, with dark brown to black patch near eyes and medially just anterior of antennae; labial palpus mostly white with scattered dark brown to black scales (some specimens with some dark brown to black scales grouped into dark patches); maxillary palpus simple, same color as labial palpus. **Thorax:** collar and dorsum white washed with pale reddish-brown and with dark brown to black scales (dark scales abundant on tegula and dorsum). **Forewing:** mostly white, base with a few brownish-red scales; subbasal area with weakly organized, obscure patch of brownish-red; antemedial line band-like, white, bordered proximally and distally by black scales (these scales forming broad, poorly consolidated patch basad of antemedial line); medial area white along costa with peppering of black scales, scattered brown scales near antemedial line followed by patch of pale brownish-red scales and large patch of mostly white scales; discal spots white to brownish-white; postmedial line white, weakly outlined in black (black line distad of postmedial line followed by indistinct cluster of pale brownish-red scales); raised patches of scales at base, subbasally, following antemedial line, at discal spots, and postmedially (patch at base small and postmedial group very weakly formed). **Hindwing:** brownish-white. **Male genitalia** (Fig. 6-7): with uncus constricted at base; valva with distal part of costa produced into a slender hook, and with small spine-like distal element from lower, outer angle; vesica with large, solitary spine and clusters of smaller spines. **Female genitalia** (Fig. 8): with sclerotized part of ductus bursae distinctly longer than corpus bursae; ductus bursae sinuate in dorsoventral plane; pair of spined clusters at junction of ductus bursae and corpus bursae, and additional groups of spines in posterior half of corpus bursae.

Immature stages and larval host.—Unknown, but see below for discussion of suspected hostplant.

Material Examined.—*Holotype:* male, California, Kern Co., Wofford Hts., Lake Isabella, el. ca. 2,700 ft. [823m], 1 Jun 1981, Robert J. Ford. Holotype deposited with the Natural History Museum of Los Angeles County (LACM), Los Angeles, California.

Paratypes (32 m, 34 f, total): all California: *Kern Co.:* Same location and collector as holotype: 1975: 1 Jun, 10 Oct; 1976: 15 Feb (erroneous date?), 24 Jul, 25 Jul, 26 Jul; 1977: 18 Jul, 19 Jul, 20 Jul; 1979: 8 Jul, 24 Aug, 19 Sep, 20 Sep, 21 Sep; 1981: 1 Jun, 3 Jun, 5 Jun, 6 Jun, genitalia slides 4917 HHN (23 m, 29 f), LACM. 2 mi. E Caliente, elev. 1600 ft. [488m], 18 May 1996, Kelly Richers collector, (2 m), KMR. Kern Canyon R[oa]d., elev. 2000 ft. [610m], 13 Aug 1988, Kelly Richers collector, (1 m), KMR. *San Benito Co.:* [Gabilan Range, Coast Ranges], Pinnacles Nat. Monument, 1,450 ft. [442m], D. C. Ferguson, 28 Aug 1992, genitalia slides 4884 HHN, 4885 HHN, (2 m, 1 f), USNM, NCSU. *San Luis Obispo Co.:* Santa Lucia Mts., Rinconada Trailhead, 10 mi. [S]E Santa Margarita, 35° 17' 30" N, 120° 28' 30" W, 2,100 ft. [640m], D. C. Ferguson, 25 Aug 1992, (1 m),

USNM. *Tulare Co.:* 6 mi. N Springville, N. fork Tule River, elev. ca. 1,800 ft. [549 m], Robert J. Ford, 6 Aug 1975, 19 Sep 1979, genitalia slide 4916 HHN, (1 m, 1f), LACM, NCSU. "Tul[a]re. [-] K[e]rn Co.," Along Kern R[iver]., 3000 ft. [914m] [= Headquarters Campground, ca. 4 mi. NW Kernville], 30 Jun 1973, 15 Sep 1973, R. H. Leuschner Coll., (2 m, 3f), RHL.

Additional specimens examined: excluded from the type series: [San Gabriel Mts.], Los Angeles Co., Glendora, mouth of Dalton Canyon, 11 Sep 1975, Robert J. Ford, (1m, 2f), LACM. This locality is on the opposite side of a major mountain range from the other known localities for this moth, and is far outside the normal distribution of gray pine, the presumed host. We must conclude that these specimens are mislabeled unless the occurrence of this moth in the San Gabriel Mts. is confirmed by future collecting.

Etymology.—We name this moth in honor of Robert James Ford (27 Jun 1907–27 Oct 1993), who collected most of the type series. Ford was a Station Superintendent for the U.S. Postal Service in South Gate, California, and an avid avocational moth and butterfly collector who always had an insect net at hand and never went camping without moth collecting gear. He began his collecting career in 1942, helping Lloyd M. Martin discover the rich Lepidoptera fauna of Madera Canyon, Arizona. Perhaps his name is most familiar to lepidopterists, however, by being associated with *Papilio indra fordii* J.A. Comstock & Martin, which he discovered on one of his camping trips. Ford's collection is deposited in the Natural History Museum of Los Angeles County.

Remarks.—*Dioryctria fordii* is only known from the foothill woodland plant community, on both sides of the Central Valley and along the Kern River drainage. Adults have been taken on 15 Feb. (label error?) and between 1 June and 21 Sept., at elevations from 1,450 ft. (442m) in San Benito Co. in the Coast Ranges to 3,000 ft. (914m) along the Kern River upstream of the type locality. To the best of our knowledge, gray, or foothill, pine (*Pinus sabiniana* Douglas) occurs at all known localities for this species, and at the type locality it is the only species of native pine (JPD, pers. obs.). We conclude that gray pine is the most likely hostplant for this species.

ACKNOWLEDGEMENTS

We particularly want to recognize the efforts of non-professional recreational collectors, who obtained the overwhelming majority of specimens of both new species described here and made them available for study. Our thanks to Brian Harris for aid in the preparation of specimens. We thank the following persons and institutions for the loan of specimens. Abbreviations are those used in the text to denote repositories of type material.

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| CNC | Canadian National Collection, Agriculture Canada, Ottawa, Ontario (J. D. Lafontaine, J.–F. Landry) |
| KMR | Kelly M. Richers, Bakersfield, California |
| LACM | Natural History Museum of Los Angeles County, Los Angeles, California |
| NCSU | North Carolina State University, Raleigh, North Carolina |
| RHL | Ronald H. Leuschner, Manhattan Beach, California |
| UCB | University of California, Berkeley, California (J. A. Powell) |
| UCD | University of California, Davis, California (the late R. O. Schuster) |
| USNM | National Museum of Natural History, Smithsonian Institution, Washington, D.C. (M. A. Solis) |

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