

A NEW SUBSPECIES OF *SPEYERIA EGLEIS*
(NYMPHALIDAE) FROM THE PUMICE REGION
OF CENTRAL OREGON

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ABSTRACT. A small-sized *Speyeria egleis* of central Oregon, delimited in its distribution to an area of some 4026 km² (2500 square mi.) extending northeasterly of Crater Lake, is described as a new subspecies, *S. e. moecki*. This region is geologically characterized as one of heavy ash and pumice outfall from the eruption of Mt. Mazama. The new subspecies is distinguished from the more southerly and larger *S. e. oweni* and from the sympatric and superficially similar *S. mormonia erinna*.

Lepidopterists of the Pacific Northwest have long been aware of a distinctive population of *Speyeria egleis* (Behr) in the pumice region of central Oregon (Deschutes and Klamath Counties). This was first noted by Arthur H. Moeck (1957), who took specimens in the Sand Creek region just east of Crater Lake at about 1524 m (5000 ft) elevation. Unofficially known as the Sand Creek type, this small-sized *egleis* was recently illustrated by Dornfeld (1980, Pl. 30, Figs. 3 and 4). Remarkably uniform in phenotype, it is geographically confined to an area of some 4026 km² (2500 square mi.), as shown in the distribution map (Fig. 1). This region is geologically characterized by heavy ash and pumice outfall from the eruption of Mt. Mazama (Crater Lake) about 6600 years ago. Tilden (1963) has given an account of the geological history and ecology of the Sand Creek Basin, but with respect to *Argynnis* (= *Speyeria*) he believed that "no equilibrium in phenotype has been reached by any of the several species." The evidence as it affects *S. egleis* does not sustain this view. Both with respect to the relative uniformity of its distinctive phenotype and the circumscription of its distribution, the "Sand Creek" *egleis* can be readily separated from the *egleis* populations that occur in southern Jackson and Klamath Counties. Those populations are composed of consistently larger butterflies that show affinities with *S. e. oweni* (Edwards) of the Mt. Shasta region. The Sand Creek *egleis* is here recognized as a distinct subspecies. Several hundred specimens have been examined.

***Speyeria egleis moecki*, new subspecies**

Male. Length of forewing (n = 71) 21 to 25 mm (\bar{x} = 23 mm). Dorsal wing surfaces medium orange with the usual pattern of black spots and bars. Moderate basal suffusion and veins of forewing slightly thickened with dark scales. Dorsal hindwing with yellowish patches between the black median band and black postmedian spots. Ventral forewing with yellowish or yellow-orange ground color; brown patches around the

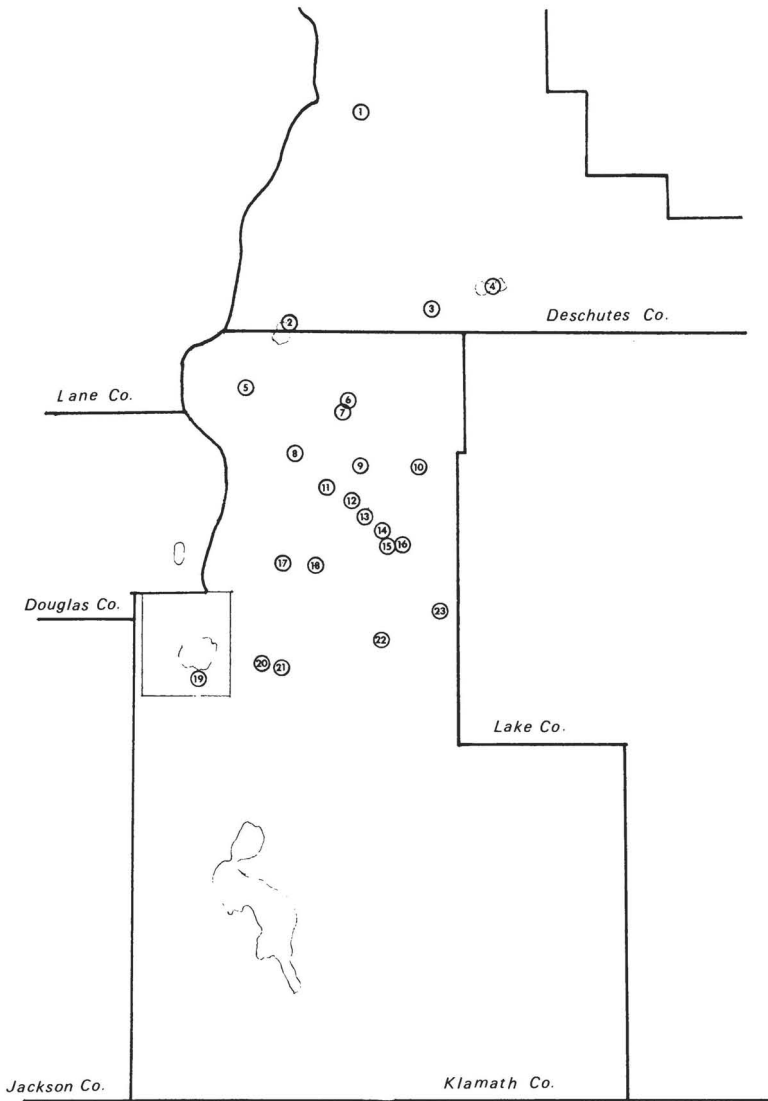


FIG. 1. Distribution of *Speyeria egleis moecki*, n. ssp. Figures in circles identify collection sites.

postmedian spots of the apical region. Ventral hindwing with dark reddish brown or umber-brown disc and a narrow yellowish tan or pale brown submarginal band. Spots usually brightly silvered and narrowly outlined basally with black scales. Median spots usually small, rounded or pointed, and the submarginal spots rounded to flattened. Brown or reddish brown marginal border.

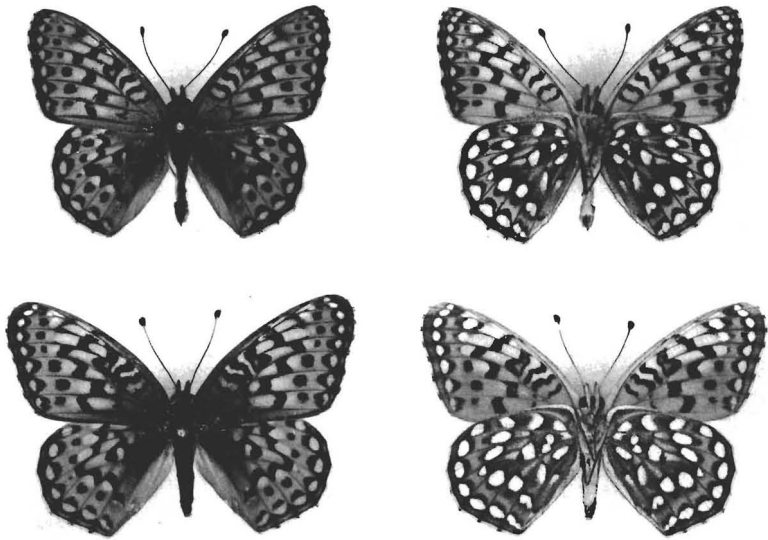


FIG. 2. *Speyeria egleis moecki*, n. ssp. **Above:** dorsal and ventral sides of holotype, male. **Below:** dorsal and ventral sides of allotype, female.

Female. Length of forewing ($n = 54$) 22 to 27 mm ($\bar{x} = 25$ mm). Similar to the male, but veins of forewing not thickened; dark basal suffusion usually more extensive. Ventral forewing strongly flushed with reddish orange toward base of wings, but pale yellow along costal margin (as in male).

The name chosen for this race of *Speyeria egleis* honors the memory of the late Arthur H. Moeck of Milwaukee, Wisconsin. Over a period of thirty summers he and his wife Dorothy systematically covered the North American Continent in search of Fritillaries and, thereby, contributed greatly to our knowledge of these butterflies.

Types. HOLOTYPE: male (Fig. 2), Skookum Mdw., Walker Rim, Klamath Co., Ore., 25 July 81 (P. C. Hammond). ALLOTYPE: female (Fig. 2), same data. Types deposited in the American Museum of Natural History. PARATYPES: 48 males and 33 females. Disposition as follows: one pair each to the U.S. National Museum of Natural History, the California Academy of Sciences, and the Systematic Entomology Laboratory of Oregon State University; 8 males and 4 females to the collection of L. Paul Grey; 17 males and 10 females retained by Paul C. Hammond; 20 males and 16 females retained by Ernst J. Dornfeld.

Records. Figures in parentheses identify numbered loci on map (Fig. 1). DESCHUTES CO.: (1) Three Creeks Mdw., 6/viii/81 (Hammond); (2) Davis Lake, 24/vii/34 (Jewett); (3) 6 mi. E La Pine, 16/vii/61 (Shields); (4) Paulina/East Lakes, 15/vii/59 (Moeck), 16/vii/61 (Shields), 27/vii/75 (Hammond). KLAMATH CO.: (5) Crescent Lake, 23/vii/60 (Newcomer); (6, 7) Gilchrist, Crescent, 29/vii/45, 10/vii/54, 4/vii/56, 28/vii/57, 4/vii/59, 10/vii/60, 2/vii/67 (Dornfeld); (8) Mowich, 11/vii/54 (Dornfeld); (9) Round Mdw., 22/vii/68 (Hinchliff); (10) Cannon Well, 30/vii/61 (Newcomer); (11) South Walker Spg., 22/vii/68 (Hinchliff); (12) Skookum Spg., 23/vii/61 (Newcomer); (13) Skookum Mdw., 23/vii/61 (Newcomer), 17/viii/62, 13/viii/64, 18/vii/66 (Dornfeld), 24/vii/66, 18/vii/69 (Hinchliff), 17/vii/79 (Lattin), 26/vii/75, 25/vii/81 (Hammond); (14) Dempsey Spg., 18/

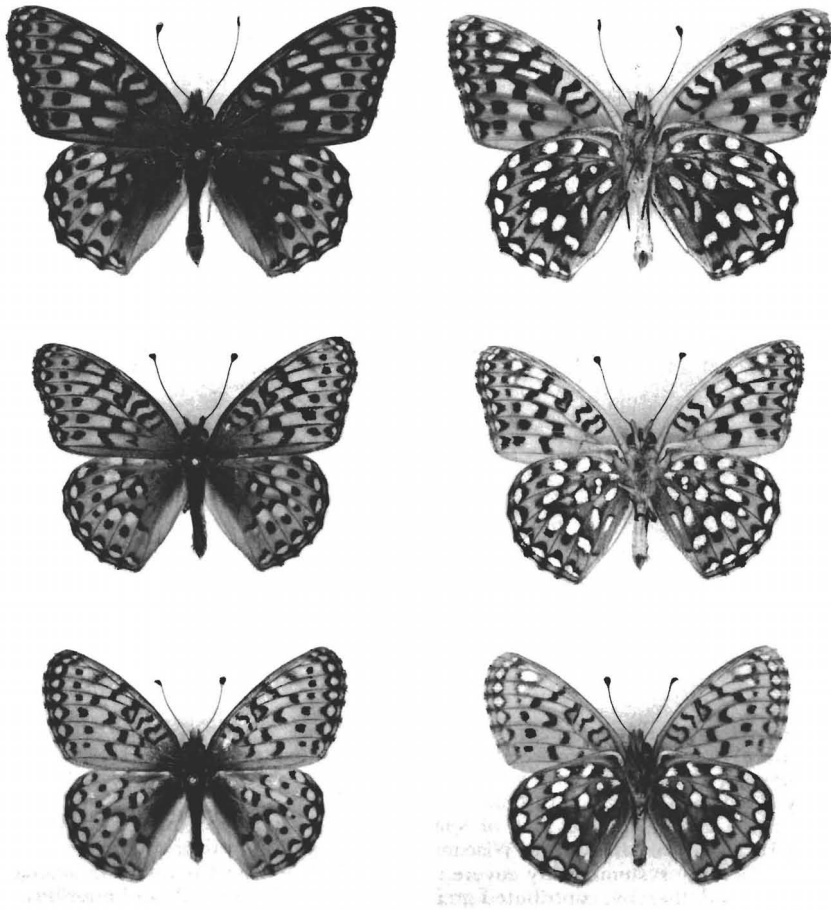


FIG. 3. **Top:** *Speyeria egleis oweni*, male, dorsal and ventral sides; Mt. Shasta, Siskiyou Co., Calif., 23 July 81 (PCH). **Middle:** *S. egleis moeckii*, male, dorsal and ventral sides; Sand Cr. at Hwy. 232, Klamath Co., Ore., 3 July 68 (EJD). **Bottom:** *S. mormonia erinna*, male, dorsal and ventral sides; Skookum Mdw., Walker Rim, Klamath Co., Ore., 24 Aug 72 (EJD).

vii/66 (Dornfeld), 25/vii/81 (Hammond); (15) Huckleberry Spg., 24/vii/66 (Hinchliff), 25/vii/81 (Hammond); (16) Davis Flat, 17/viii/62 (Newcomer), 25/vii/81 (Hammond); (17) Beaver Marsh, 17/viii/62 (Newcomer); (18) 5 mi. E Beaver Marsh, 14/vii/61 (Shields), 13/viii/64 (Dornfeld), 24/vii/66 (Hinchliff); (19) Crater Lake, 8/viii/30, 14/viii/30 (Sculen); (20) Sand Cr. at Hwy. 232, 16/vii/55 (Moeck), 10/vii/62, 25/vii/62, 12/viii/64, 3/vii/68, 20/vi/78 (Dornfeld); (21) Sand Cr. nr. Chinchalo, 22/vii/68 (Hinchliff); (22) 3 mi. E Klamath Fst. Nat. Wlf. Refuge, 25/vii/81 (Hammond); (23) N of Little Yamsay Mt., 27/vii/64 (Perkins).

DISCUSSION

The only race of *Speyeria egleis* that comes geographically close to the newly described subspecies is *S. e. oweni* (Edwards), whose type locality is Mt. Shasta in Siskiyou County, California (Fig. 3). Populations of the *oweni* phenotype extend northward into the Cascades of southern Jackson and Klamath Counties, Oregon, but lie south of the region occupied by *S. e. moecki*. Those populations that extend between Lake-of-the-Woods in southern Klamath County and the south edge of Crater Lake National Park exhibit clinal intergradation between *oweni* and *moecki* with respect to size and coloration. However, the *oweni* phenotype is almost completely excluded from the *moecki* populations of northern Klamath and Deschutes Counties, the region of the heavy Mazama ash fall (Fig. 1).

Speyeria egleis moecki can be readily distinguished from the race *oweni* by its uniformly small size, reduced dark basal suffusion, relatively thinner veins of the male dorsal forewing, and the high frequency of a reddish brown disc color on the ventral hindwing. For comparison, a sample of Mt. Shasta *oweni* included 85 males with a forewing length of 24 to 28 mm ($\bar{x} = 26$ mm) and 34 females with a forewing length of 26 to 30 mm ($\bar{x} = 28$ mm). The sympatric *S. mormonia erinna* (Edwards) is superficially similar to *S. e. moecki* in size and coloration (Fig. 3), but the latter tends to be darker orange above, shows a moderate amount of basal suffusion, and the veins of the male are distinctly thickened with dark scales. *Speyeria m. erinna*, in contrast, is usually pale yellow-orange above, shows almost no basal suffusion, and the veins of the male forewing are completely thin as in the female. In addition, *S. m. erinna* almost always exhibits a greenish tinge along the anal margin of the ventral hindwing that is never present in *S. e. moecki*. Although the adult butterflies of both species fly together, the peak flight period of *S. egleis* usually precedes that of *S. mormonia* by a week or two.

Speyeria egleis is absent from the Oregon Cascade Range north of Deschutes County, but populations of this species do occur eastward in the Ochoco Mountains of Crook County. The latter, however, belong to the Rocky Mountain race *macdunnoughi* (Gunder), which is highly divergent from *moecki* in both size and coloration. The dorsal wing surfaces show a very extensive dark basal suffusion, the ventral disc color is dark black-brown to greenish brown, and the forewing length is 27 to 31 mm in males, 29 to 33 mm in females. Virtually no trace of such *macdunnoughi* influence has been observed in Cascadian *moecki* populations, which suggests that *moecki* is largely derived from the adjacent *oweni* populations of northern California.

The distribution of *S. e. moecki* corresponds very closely with the ash-pumice fields deposited by the eruptions of Mt. Mazama, Mt. Newberry, and the volcanoes of the Three Sisters system. This ash-pumice habitat represents an extremely xeric environment since the volcanic material fails to retain moisture during the summer growing season. As a result the vegetation is dominated by a shrubby forest of lodgepole pine (*Pinus contorta*), with scattered bitterbrush (*Purshia tridentata*) and small tufts of grasses on the forest floor. However, in some areas ground water does come to the surface and produces small creeks, seepages, and wet boggy meadows. A great diversity of herbaceous plants and butterflies are found in these wet areas. *Speyeria egleis* and its larval foodplant, *Viola purpurea* (oviposition observed), are largely confined to the pine forests adjacent to these habitats. Around the upper rim of Crater Lake, however, *S. egleis* and *V. purpurea* occupy open, dry, rocky pumice slopes. *Speyeria mormonia erinna*, by contrast, flies in the wet boggy meadows that support *Viola palustris* and *V. adunca* var. *bellidifolia*, the larval foodplants of this species (oviposition observed).

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