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DIONDA ERIMYZONOPS, A NEW, DWARF CYPRINID FISH INHABITING THE GULF COASTAL PLAIN OF MEXICO

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INTRODUCTION

Among the freshwater fishes of east-central México, which comprise outlying elements of both Nearctic and Neotropical affinities, along with endemic elements (Osorio-Tafall, 1946; Alvarez, 1959; Darnell, 1962; Miller, 1966), the southernmost species referable to the cyprinid genus *Dionda* (at least provisionally) have been perhaps the least well known. It is the purpose of this paper to describe a hitherto unnamed species which we name *Dionda erimyzonops,* because of its general resemblance to a young chub sucker (genus *Erimyzon*); it is one of four species that inhabit the Tamesí-Pánuco river complex which discharges into the Gulf of Mexico at Tampico. It is roughly sympatric with the species we here call *Dionda ipni* (Alvarez and Navarro), on the coastal-plain portion of the Tamesí-Pánuco drainage system, but is allopatric with *Dionda rasconis* (Jordan and Snyder), and another, yet unnamed species, that separately inhabit higher and more western parts of this drainage basin. These three species have been placed in *Notropis,* but we provisionally refer them to *Dionda* (see discussion below).

This study originated in a comprehensive review of the freshwater fishes of northeastern México that was initiated by Hubbs and Myron Gordon in 1930, but has never been consummated. In that project a revision was attempted of all

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species referred to *Dionda* that inhabit the waters of the whole Rio Grande basin and those farther south in México. That revisionary study of the genus has been utilized by other ichthyologists, for example by de Buen (1940) and Darnell (1962:323-325), and in the preparation of two theses not acceptable for systematic nomenclature, namely those by Richard T. Gregg (1956, reproduced by University Microfilms, Inc.), on the fishes of the state of San Luis Potosí, and by Jorge Armando Verduzco Martínez (1972), on the fish fauna of the Río Pánuco. Both of these theses have been of material assistance to us in the present study. One of the mistaken and confusing features of the early work on *Dionda* by Hubbs and Gordon, followed by Gregg, Verduzco Martínez, and others, was the treatment of the species herein called *Dionda ipni* as one or more subspecies of *Dionda rasconis.* Much better material, particularly of nuptial males, has now demonstrated the full distinction of these species.

Dionda erimyzonops, which is evidently confined to low elevations in the Tamesí-Pánuco drainage system, appears to be a relatively compact unit, but the populations that we treat as *Dionda ipni* occur at higher elevations and farther south, not only within the Río Pánuco basin but also in the drainage basins of the Tuxpan, Cazones, Tecolutla, and Nautla rivers. Though having many features indicative of phyletic integrity, the populations here referred to *Dionda ipni* are subject to considerable local variation, which, even though we now have available rather extensive material, seem to defy at present any justifiable local breakdown into species or even subspecies. Additional collecting and analysis are needed, particularly a new appraisal, in light of our current studies, of the isolated population that yielded the types of *Notropis ipni.*

In this contribution we have excluded comparisons with any members of the extensive *Dionda episcopa* complex of northern México, New Mexico, and Texas (cf. Hubbs and Ortenburger, 1929:91). However, we have found no indication that any of the more southern species which we have under current study might be confused with any member of that complex, or with *Dionda diaboli* Hubbs and Brown (1956) of the Rio Grande basin of Texas and (according to Salvador Contreras-Balderas, personal communication, 1964) of Río Salado, a tributary of the Rio Grande in northern México.

We also refrain from any formal evaluation of the admittedly potent evidence that *Dionda,* or at least some of the species

generally assigned thereto, or to *Hybognathus,* might better be referred to the vast complex of *Notropis.* The current trends toward consolidation of genera and subordination of the systematic significance of such trophic adaptations as intestinal length would indeed seem to favor synonymizing *Dionda* in whole or in part with *Notropis. Dionda* (type species *Dionda episcopa*) was long treated as a subgenus of *Hybognathus,* as by Jordan and Evermann (1896:212-214), but was recognized as a distinct genus by Jordan (1924:72), and later by Hubbs and Ortenburger (1929:91), de Buen (1940:21-22), Hubbs and Brown (1957), and others, on the basis of such features as the shorter and less tightly coiled intestine, the stronger dentary bones, the usual retention of a hook on the less elongate pharyngeal teeth, the less silvery color, and the habitat in less silty waters. However, it has long been suspected that *Dionda nubila* (Forbes), because of its general facies and bright colors, is likely phyletically distinct, and indeed Swift (1970) has referred that species to the subgenus *Hydrophlox* of the genus *Notropis,* an action with which we concur. Snelson (1971) then announced his discovery in North Carolina of a species, *Notropis mekistocholas,* which he referred to one of the subgroups of *Notropis* despite the double coiling of its intestine; and he cited other cases of elongated intestines in groups supposed to have a short (single-coiled) gut. A strong case could be made for including "*Dionda*" in *Notropis,* but in the present chaotic state of generic evaluations among American cyprinids, and keeping in mind the similarities of the species occurring in the Rio Grande and southward, we, without undue prejudice, have decided now to retain, at least for those species, the genus *Dionda.*

This decision involves the consideration of another character, namely the presence or absence of the terminal maxillary barbel, which has also very generally been treated as having generic significance. We find, surprisingly, that *Dionda rasconis* and an undescribed species of the genus, respectively inhabiting the Río Frio and the Río Verde upland portions of the Río Pánuco system, predominantly develop at least a trace of one of the barbels, which we do not find in any of the other species referred to *Dionda.* The presence or lack of a barbel as well as the degree of coiling of the intestine has increasingly assumed less obvious and less certain phyletic significance (Gilbert and Bailey, 1972:9-13). For example, maxillary barbels, a supposed criterion of *Rhinichthys,* are invariably or almost always lacking

in certain subspecies of *Rhinichthys osculus* (Hubbs, Miller, and Hubbs, 1974). Cortés (1968) took the not illogical and possibly justifiable step of synonymizing *Hybopsis* with *Notropis*. Without passing judgment on that action, we feel impelled to retain *rasconis* in *Dionda*.

Barbour and Miller (MS) found that the simple or considerably coiled condition of the gut and the presence or absence of maxillary barbels occur within what clearly appears to be a natural unit, the cyprinid genus *Algansea* of the Mexican Plateau. It may be more than a coincidence that the breakdown in the putative generic criteria seems to occur conspicuously toward the southern limit of the family, in México, where some ancient types may be retained.

ACKNOWLEDGMENTS

The late Myron Gordon collaborated in the early stage of this investigation and participated in the collection and study of the first specimens of *Dionda erimyzonops*. We are grateful to Mexican officials and colleagues who have permitted and encouraged our studies of this and other fishes of their country. Rezneat M. Darnell made available his collections of this and other species in the Río Tamesí basin, and José Alvarez del Villar kindly donated paratypes of *Dionda ipni* for our study. The well-executed drawing is the work of Martha B. Lackey, former staff artist of The University of Michigan Museum of Zoology. The National Science Foundation supported the field work of one of us (R.R.M.; GB-4854X) that yielded the type series of the new species.

Dionda erimyzonops, new species
Figs. 1-2

Hybognathus rasconis (misidentification).—Meek, 1904: xxxvi, 50 (Forlón record, in part).

Dionda sp.—Darnell, 1962:324-325, 331-332 (distribution and habitat in the Río Tamesí drainage basin; association with *Gambusia vittata*). Miller and Minckley, 1970:257 (associated fish species in the Río Tamesí basin).

Under the manuscript name of "*Dionda erimyzonops* Hubbs" Jorge Armando Verduzco Martínez, in his thesis dated March, 1972 (Univ. Auto. Nuevo León, Monterrey), entitled "Ictiofauna

del Río Pánuco, Noreste de México," described, on pp. 15-17, 5 specimens of this species from Río Axtla, included a good photograph (Fig. 5), and briefly described the clear-water habitat.

Diagnosis.—A small species of *Dionda* that is one of the smallest of American minnows (the largest known specimen is only 39 mm in standard length and males as small as 21 mm are fully nuptial!), and also one of the most boldly marked: the full-length lateral band is jet-black, and the black marking in the form of an inverted V on the top of the head is intensified by adjacent unpigmented areas; the darkened interradial membranes near the anterior (or outer) edge of the fins become black in breeding males. The lateral line is almost completely straight, instead of being gently downcurved near mid-trunk as it is in related species; as a result, the least distance from the lateral line to the pelvic fin is almost always greater, proportionately, than in other species of *Dionda.* The eye is relatively very large: the orbital length about equals the least interorbital width, instead of being shorter, and nearly equals the postorbital length, instead of being much shorter. The snout is short and its front profile is steeply declivous, and the mouth is relatively straight and steep; as a result, the dorsal and ventral contours of the head are subsymmetrical. The grooves on the inner edge of each arm of the lower lip continue far forward, converging, so that the interval between their tips is only about half as long as either groove. The pattern of male nuptial tubercles is distinctive (see below). The anal rays usually number 9 and the pectoral rays are usually reduced to 12 or 13.

Type Material.—Holotype (UMMZ 193805), a nuptial male 32.4 mm long (S.L.), collected 21 December 1966 by Robert Rush Miller and W. L. Minckley near Ciudad Mante, Tamaulipas, in a canal from Río Mante, a tributary to Río Guayalejo in the drainage basin of Río Tamesí, along with 7 paratopotypes, UMMZ 186495 (20-34 mm). With exceptions noted below, all other paratypes are also deposited in The University of Michigan Museum of Zoology. Those from the Río Tamesí division of the Tamesí-Pánuco complex, all in Tamaulipas, are: 97467-68, Río Guayalejo near Llera (49, 21-29 mm, of which 3 were sent to Isaac Ochoterena of Instituto de Biología at Chapultepec, México, on 29 February 1932); 129680, Río Guayalejo near Forlón (1, 36 mm), preserved after having grown for several months in an aquarium, from a juvenile into a turgidly gravid female; 189277,

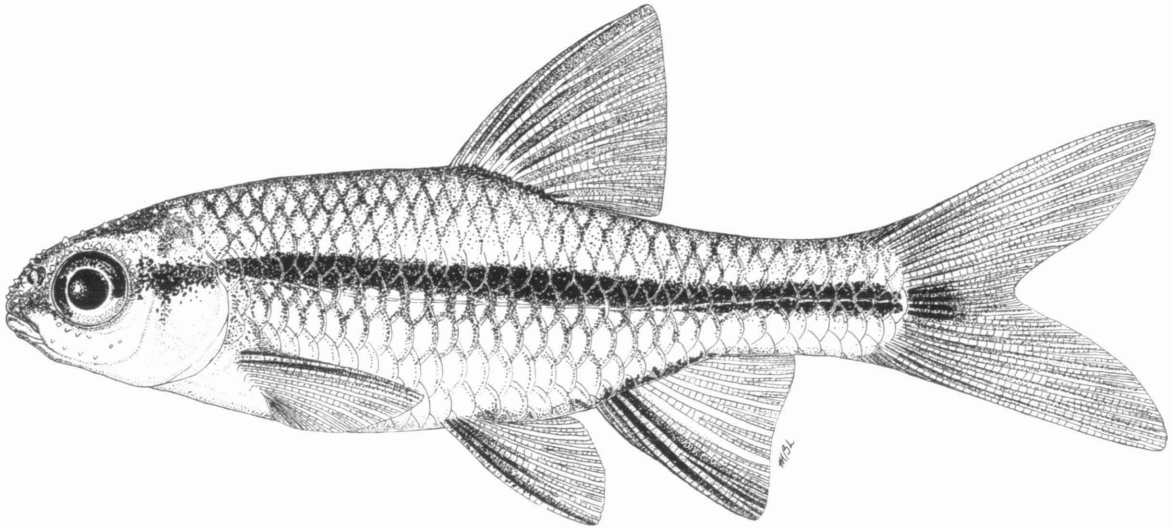

FIG. 1. Nuptial male paratopotype of *Dionda erimyzonops*, 33.5 mm S. L. (UMMZ 186495), taken in canal from Río Mante near Ciudad Mante, Tamaulipas.

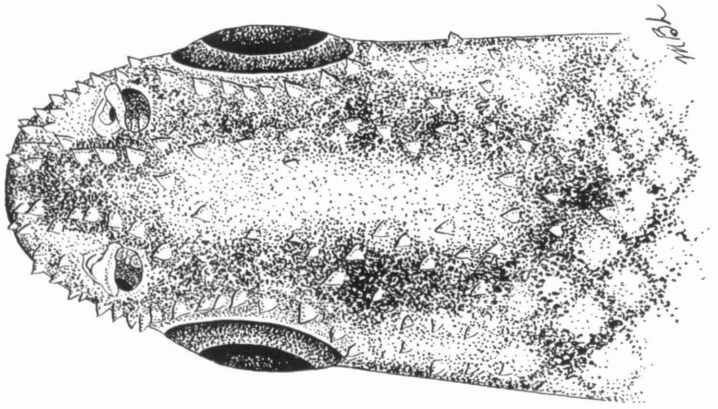

FIG. 2. Dorsal view of head of nuptial male of *Dionda erimyzonops*. Same specimen as shown in Fig. 1.

Río Boquilla at El Limón (4, 23.5-32 mm); 192500, Río Guayalejo at Llera (33, 29-32 mm); 192884, Río Mante at dam (11, 32-39 mm). Those from the Río Pánuco system, in San Luis Potosí, are: 97469, Río Valles at Valles (14, 20-27 mm); 124359, Río Axtla at Axtla (1, 23 mm), and 182557, same location (1, 27 mm).

Three additional and fully typical paratypes, FMNH 16548-50, including a nuptial male, were collected by Meek at Forlón, Tamaulipas, along with *Dionda ipni*. These were misidentified and recorded by Meek as *Hybognathus rasconis,* as is indicated in the synonymy.

Distribution, Habitat, and Associated Species.—The range of *Dionda erimyzonops* is approximated by the data for the type material, and by the introductory statements. Although the paucity of records, particularly for the Río Pánuco division of the Tamesí-Pánuco watershed, stresses the inadequate documentation of the range of the species, we find no indication that it occurs either in the coastal lagoons and stream mouths of the Tamesí-Pánuco complex, or among the mountain areas to the westward where *Dionda rasconis* and *Dionda ipni* hold forth, or in stream systems south of the Pánuco, where, as already noted, *D. ipni* also occurs.

Darnell (1962:324) described the habitat of this species and its association with the rather similarly black-striped *Flexipenis vittatus* (Hubbs) and added the following remark about its

TABLE 1

REPRESENTATION OF *DIONDA ERIMYZONOPS* AND *DIONDA IPNI*[1] IN COLLECTIONS AT THE UNIVERSITY OF MICHIGAN MUSEUM OF ZOOLOGY

Stream System	*D, erimyzonops* Alone	Both Species Together	*D. ipni* Alone
Río Tamesí	5	1	5
Río Pánuco	1	2	9
Total	6	3	14

[1] *Dionda ipni* was taken alone in 1 to 3 collections each from the Tuxpan (2 collections), Cazones (3), Tecolutla (2), and Nautla (1) rivers.

possible segregation from *"Dionda rasconis" (i.e., Dionda ipni)* in the Rio Tamesi system through spawning "in slightly different habitats, either different riffles or different areas of the same riffles." A compilation of the separate and joint representation of these two species in the collections preserved in The University of Michigan Museum of Zoology (Table 1) lends support for the idea that they tend to segregate, even within their common range.

The field data for the type specimens indicate clear water ("turbid, white" once), with some vegetation (generally sparse), bottom usually of gravel, stone, or sand, and current usually swift.

DESCRIPTION

Size and Form (Table 2).—In its very diminutive size and in the attainment of full nuptial maturity by males as small as 21 mm, this species closely matches its cohabitant, an undescribed species of *Notropis* (Hubbs and Miller, in press), with considerable sympatry. They are also very similar in body form and to some extent even in coloration, despite their great disparity in other respects. In *Dionda erimyzonops* the dorsal and ventral contours are about equally and symmetrically curved, suggesting, along with the rather steeply inclined mouth, a midwater habitat. In general appearance this species furthermore seems less frail than the new *Notropis.* The dorsal contour behind the eye is rather strongly convex to the moderate but not abrupt elevation of the dorsal-fin origin, thence weakly concave to upper caudal base. The dorsal and ventral contours

TABLE 2

PROPORTIONAL MEASUREMENTS OF *DIONDA ERIMYZONOPS* IN PERMILLAGE OF STANDARD LENGTH

	Larger Specimens[1]			Smaller Specimens[2]		Larger Fish[3]
	Holotype	6 Males[4]	10 Females	6 Males	10 Females	1 Female
Standard length, mm	32.4	30.7-39.2(33.5)	31.3-35.6(34.0)	25.3-28.7(26.7)	25.4-29.3(26.7)	35.8
Body depth	299	291-329(309)	301-319(310)	279-295(285)	269-303(288)	328
Caudal peduncle depth	136	122-137(133)	115-129(125)	110-132(121)	107-121(116)	113
length	207	195-218(209)	198-221(207)	201-213(210)	201-232(215)	223
Anal origin to caudal base	355	339-355(347)	313-354(338)	338-350(344)	315-352(333)	352
Predorsal length	549	524-549(539)	521-566(538)	509-541(522)	505-542(524)	526
Depressed dorsal fin	295	282-309(293)	255-288(274)	280-300(288)	270-293(279)	232
Pectoral fin length	214	212-231(217)	196-221(209)	218-237(225)	195-235(191)	184
Lateral line to:						
dorsal origin	168	163-179(171)	153-173(165)	150-159(155)	142-160(152)	166
pelvic insertion	170	139-170(153)	140-160(152)	140-158(148)	131-155(146)	162
Head length	287	218-301(288)	270-291(281)	264-282(270)	266-288(274)	275
depth	213	209-221(215)	197-216(205)	199-211(205)	196-211(205)	204
width	150	145-161(150)	144-157(149)	140-158(151)	136-154(146)	149
Snout length	96	87-99(93)	81-95(88)	84-94(87)	79-91(85)	96
Orbit length	102	92-102(97)	90-104(95)	92-101(96)	93-106(99)	92
Upper jaw length	79	71-79(77)	67-81(72)	64-70(67)	68-75(72)	73
Suborbital width	46	36-46(42)	37-45(41)	36-45(41)	36-46(41)	45
Interorbital width	108	99-114(107)	96-112(102)	91-108(103)	94-104(100)	97
Upper lip symphysis	25	18-28(22)	14-22(19)	14-19(17)	14-20(17)	16
Mouth width	71	66-76(70)	62-70(66)	61-72(65)	66-71(68)	69

[1] Based on adults: UMMZ 193805 (holotype); 186495 (4 nuptial males and 2 females), and 192884 (1 nuptial male and 8 females); see text for localities.

[2] Based on stunted adults: UMMZ 97468 (1 tuberculate male) and 97467 (5 unripe males and 10 maturing to mature females).

[3] UMMZ 129680.

[4] Includes holotype.

converge rather sharply behind the dorsal and pelvic fins backward to over the end of the anal base, thence weakly to the posterior part of the caudal peduncle. Just above the front of the nostrils the dorsal contour takes an abrupt downturn to an angle of about 70° with the horizontal. The tip of the short snout is approximately coterminous with the moderately thick upper lip, which lies about level with the space between the lower margins of the pupil and orbit. The lower lip is definitely included within the upper, and both show traces of plications. The concealed end of the maxilla lies approximately directly below the front of the orbit; the mandible reaches to nearly below the front of the pupil. The gape forms an angle of about 35° to 40° with the horizontal. The pair of grooves on the inner edge of the roughly semicircular lower lip are continued forward, converging in a curve rather strongly, so that the intervening distance at their front ends is only half the length of either groove; in this respect *Dionda erimyzonops* approaches *D. rasconis,* but contrasts very sharply with *D. ipni*: in the latter species the grooves are nearly straight and converge slightly to the front ends which are separated by a space about equal to the length of the groove. The eye is almost invariably larger than in other species of *Dionda*: the length of the large orbit about equals the least interorbital width and nearly equals the postorbital length of the head (including opercular membrane). The posterior border of the orbit is approximately half the ocular length nearer the edge of the opercular membrane than the tip of the snout. The rather flat interorbital rises less than the height of the pupil above the eye.

Pharyngeal Arch and Teeth.—For such a small fish the pharyngeal arch is moderately heavy and the teeth are well developed. The lower limb is rather broad and thick, nearly straight for most of its length, but with a constriction in width well below the last tooth, and with its tip slightly angled away from the shaft. The upper limb, constricted and bluntly pointed at its tip, rather evenly increases in width to the apex of the anterior angle that marks the point of separation between the two limbs. The upper and lower limbs are of subequal length or the upper is slightly the longer. The dentigerous part of the arch, elevated anteriorly, is slightly shorter than the toothless portion of the lower limb. The four strong teeth of the main row of each arch are hooked and are provided, especially on the two middle teeth, with well-developed, elongate grinding

surfaces. The dental formula is 0,4—4,0, with no space available on the arch for the development of a second tooth row.

Gill rakers.—Several specimens yield counts of 0-3 + 1-3 rudimentary rakers on the first arch and 0-4 + 10-13 small ones on the second arch.

Intestine and Peritoneum.—As seen from the right side, the intestine forms two tight, almost semicircular loops anteriorly, followed by a looser and more horizontal fold. The peritoneum is black on a brilliantly silvery base.

Fins.—The fins are firm, more pointed than usual in *Dionda,* and relatively large (Table 2), the dorsal almost invariably larger than in other species of the genus. In the usual tightly expanded condition, the posterior margin of the dorsal is essentially straight and vertical, and that of the anal is moderately concave and somewhat sloping. When the fin is fully depressed, the tip of the longest dorsal ray extends well beyond the tip of the last ray; the longest anal ray extends to or considerably behind the last ray. The length of the depressed dorsal equals or nearly equals the interval between dorsal-fin origin and occiput. The dorsal originates vertically over the pelvic insertion, somewhat nearer base of caudal than tip of snout, or nearer the snout tip. The ratio of the measurement of the depressed dorsal into the predorsal length is 1.7-1.9 (mean 1.84) for nuptial males and 1.9-2.1 (mean 1.96) for larger females; and is 1.7-1.9 (mean 1.81) for small nuptial males and 1.8-1.9 (mean 1.88) for smaller adult females. The pectoral fin when depressed fails to reach the pelvic insertion by a distance somewhat shorter to much shorter than the pupil in adult males, even when excessively dwarfed; and by a distance usually somewhat longer than the pupil in adult females. The interval between the insertions of the paired fins is about a pupil length shorter than the head. The pelvic consistently reaches well beyond the anal origin in mature males, to or occasionally moderately beyond that point in adult females.

The usual ray counts are: dorsal 8, anal 9, caudal 19, pectoral 12 or 13, pelvic 8. No obvious regional variation is apparent. Actual counts, with frequencies, are: Dorsal 8 (39), 9 (1)—mean 8.03. Anal 8 (4), 9 (80), 10 (13)—mean 9.09. Caudal 18 (1), 19 (37)—mean 18.97. Pectoral (both sides counted) 12 (26), 13 (41), 14 (11), 15 (2)—mean 12.86. Pelvic (both sides counted) 6 (1), 7 (4), 8 (67), 9 (8)—mean 8.03.

Scales.—The far-anterior lateral-line scales are narrowed and elevated, so that the exposed field is commonly about 3 to 4 times as high as long. The seriation is quite even: on the caudal peduncle two rows intervene between the lateral-line series and the row that definitely lines the peduncular edge, above and below. Especially anteriorly, the pores open in advance of the scale margin. The whole scale is only slightly more than half as long as high, and is nearly oval. The ridges are nowhere sharply angulated, and are moderately spaced on the exposed field, where they regularly cross the radii. Scale counts, with frequencies and means, are: Lateral-line series (excluding scale or scales on caudal fin) 31 (1), 32 (16), 33 (18), 34 (3)—mean 32.61. Dorsal-fin origin to, but not including, lateral line 5 (31), 6 (7)—mean 5.18. Anal-fin origin to lateral line 3 (2), 4 (36)—mean 3.95. Pelvic-fin insertion to lateral line 3 (10), 4 (28)—mean 3.74. Around body above lateral line 9 (2), 10 (6), 11 (26), 12 (3), 13 (1)—mean 10.87; and below lateral line 10 (6), 11 (31), 12 (1)—mean 10.87; total around body 21 (1), 22 (4), 23 (5), 24 (23), 25 (4), 26 (1)—mean 23.74. Circumpeduncular rows above lateral line 5 (36), 6 (1)—mean 5.03; and below lateral line 4 (2), 5 (35)—mean 4.95; total around caudal peduncle 11 (2), 12 (34), 13 (1)—mean 11.97. Predorsal scales 12 (4), 13 (11), 14 (17), 15 (5)—mean 13.62; predorsal rows 11 (4), 12 (19), 13 (14)—mean 12.27.

The squamation of the breast is much reduced (as also in *Dionda ipni* and *D. rasconis*). The region adjacent to the isthmus is devoid of scales as is the strip thence to the pectoral-fin base, except for a few small scales adjacent to the pectoral base in a few specimens. On the region directly between the pectoral-fin bases there are either no scales or only a few more or less rudimentary ones, generally of reduced size.

Vertebrae (including 4 in Weberian complex and the urostylar vertebra).—33 (7), 34 (19), 35 (4)—mean 33.90.

Urogenital Papilla.—In mature females the urogenital papilla contrasts with that of *Dionda ipni*. It is markedly elongated to reach opposite but not beyond the anal-fin origin, and it is much broadened, and smoothly bifid behind.

Nuptial Tuberculation.—As we are finding for other species of *Dionda,* the nuptial tubercles of *Dionda erimyzonops* are distinctive. They are diagnostically few, with a considerable number much enlarged, but less conspicuously so than in *Dionda*

ipni or in *Dionda* sp. (of the Río Verde drainage basin). The largest are those over the head and snout and along the somewhat sharpened ridge on either side of the caudal peduncle. Those on the top of the head comprise: (1) about 10 in a single regular file adjacent to the upper border of the orbit, above the horizontal through the upper margin of the pupil; (2) about 5 to 8 scattered over the pale interorbital area, tending to form two files converging anteriad onto a single median tubercle; and (3) just in front of these, on each side, 4 to 6 forming an even curve lining the narial fossa, and arising on the black V (see description of coloration below). Almost equally large, on each side, are 1 to 4 lining the middle of the front border of the orbit, in a series slightly to widely interrupted from the upper-marginal row, and a few others, in a single series, just below the narial fossa. That series is connected around the front of the snout with its fellow series of the opposite side by one or two rows of tubercles that are more or less completely separated by a smooth strip from the tubercles margining the narial fossa above. Smaller tubercles are scattered between these larger ones and the rostral groove. At highest nuptial development, very minute tubercles are scattered over the lower part of the suborbital region and, in some individuals, over the outer-posterior part of the opercles, and, in an irregular file, along the lower border of the cheek. No nuptial tubercles are evident elsewhere on the opercle, or on either the mandibles or the intergular area.

Anteriorly on the trunk, back to above the front of the pelvic fins, very small nuptial tubercles line the entire free border of the scales of the lateral-line row and the regular row just above and just below, with partial extension onto the scale borders in the next row above and the next row below. A slightly larger, sharp tubercle arises near the middle of the exposed surface of most of the scales of the lateral-line series. About 1 to 3 larger tubercles, broad-based and directed slightly forward, arise from near the middle of the exposed surface of the two even scale rows below the lateral-line series on the caudal peduncle; often with some extension forward on the scales over the anal base. In contrast, the scales of the very even midventral row on the peduncle are essentially devoid of tubercles, except, in some specimens, for some small ones just before the lower base of the caudal fin.

On the pectoral fin a row of minute tubercles extends along the somewhat sharpened upper-outer edge of the first ray,

uniserially except for some expansion and crowding near midlength of the ray; on the following several larger rays the sharp tubercles, about 3 per ray segment, form an even, regularly branched row. The other fins are devoid of nuptial tubercles, except, in some specimens, for very minute ones along the sides of the rudimentary caudal rays.

In mature females, only minute rudiments of the larger head tubercles were discerned.

This description of the nuptial tubercles in *Dionda erimyzonops* was based primarily on 6 nuptial males, 31-39 mm long, from Río Mante of the Río Tamesí system (holotype and paratypes, UMMZ 193805 and 186495). Much more dwarfed nuptial males (1, 27 mm long, UMMZ 97468, from Río Guayalejo of the Río Tamesí system, and 4, 21-24 mm long, UMMZ 97469, from Río Valles of the Río Pánuco system) correspond in general quite well, except that the minute tubercles along the borders of the lateral trunk scales and in some other areas are only incipiently or not at all developed. We suppose that the difference represents the degree of individual development, rather than any regional, genetic differentiation.

Coloration.—A uniquely conspicuous feature in the coloration of *Dionda erimyzonops* is the jet-black lateral band along the side. This starts with a black bar extending, widened backward, from near front of premaxillary groove to front of eye. It is represented on the iris by an anterior and a posterior black blotch or curved bar, neither quite margining the pupil. Then, from eye margin to upper end of gill opening, the band continues as discrete melanophores, in line with the essentially straight lateral line of the body. This band, which varies considerably in width but is usually nearly or quite as wide as the pupil, is thickly beset with superficial melanophores on an underlying, deeply blackened base and extends in full strength from the gill opening to the caudal-fin base. Here it may either be continuous with the basicaudal blotch, or more or less completely separated therefrom by a dorsal and a ventral whitish wedge (Fig. 1). The blotch is more or less frayed out behind by extensions along and between the central caudal rays, for half or more than half their length. In females and young the black lateral band is conspicuously separated from the pigmented scale-pocket margins above by a light streak almost devoid of melanophores, and the lower side below the band is also almost wholly without melanophores. In nuptial and subnuptial males,

however, the scale-pocket margins are more intensely darkened, and extend, with some diminution, across the scale row above the black band, and also across three rows of scales below the band. In some males there are either darkened scale-pocket borders or a single row of discrete spots on the lower edge of the caudal peduncle, but in neither sex is any other special dark streak developed along either the midventral or the middorsal line, except for an intense blackening of the extreme base of the dorsal and anal fins.

Submarginally, on the anterior or upper and lower edge, each fin is darkened, most intensely in breeding males. This is most impressively true of the lower fins (pectoral, pelvic, and especially anal), which are otherwise strikingly devoid of pigment. The dorsal and anal fins are clear of pigment along the front edge near the base. The whole dorsal in males becomes boldly sooty, especially on the membranes. The caudal in the males also becomes darker, particularly along the rays. There is no approach, however, toward the jet-black median blotch or band on the fins that is a diagnostic characteristic of *Dionda ipni.*

Somewhat obscured by the general darkening of the surface is perhaps the most conspicuous feature in the appearance of *Dionda erimyzonops,* from young to adult—namely the color pattern on the top of the head (Fig. 2). This consists of a black inverted V on the top of the snout, continued backward as a pair of well separated, somewhat diverging black or blackish streaks which tend to run together again across the occiput. At the front the arms of the V are boldly blackened, and fuse with a median jet-black blotch on the upper-posterior part of the steeply sloping front margin of the snout. In both sexes the front part of the V is set off laterally, about the nostrils, by an almost totally unpigmented area that bends downward on the snout to separate the median black blotch from the front end of the lateral black stripe. In females, the abruptly pale, unpigmented areas are narrowly united around the front, between the median black blotch and the blackened premaxillary groove, whereas in nuptial males the black blotch tends to be continuous with the darkened groove. The arms of the V are extended backward in the interorbital region by broadening, nearly parallel streaks, separated by a large area that in young and females is nearly devoid of pigment, but in mature males becomes moderately darkened by small melanophores. Farther backward, sometimes after a trace of interruption, the two dark

arms widen, tend to unite narrowly in front, and then, backward, to converge sharply at the occipital line because of the marked broadening backward of the largely pigment-free band above the postocular section of the lateral black band. Posteriorly, the rather heart-shaped parietal area between the subparallel extensions of the dark V tends to be more or less filled in by scattered melanophores, especially in adult males.

Most of the iris is brilliantly silvery, except on the ocular part of the lateral band and on the dorsal rim of the eyeball. The cheeks and opercles are also largely silvery, with almost no melanophores, except for a few in nuptial males. There are also a few melanophores on the subocular rim of the orbit, and there may be a short, narrow, ventral extension of scattered melanophores on either side of the upper end of the preopercle (Fig. 1). There is intensification in the breeding males of the species-characteristic T-shaped blackening of the front of the mandible, just behind the lower lip, and of the narrow intergular region, thence backward halfway to the isthmus. Otherwise, except as heretofore noted, the lower part of the head is virtually devoid of melanophores.

Sexual Dimorphism.—Adult males become markedly distinguished from juveniles of both sexes and from mature females. The nuptial tubercles, described above, become strongly developed in breeding males, whereas in breeding females, only the largest, on the top of the head, become incipiently developed. In breeding condition, the blackening of the body, head, and fins becomes more intensive and more extensive. The dorsal fin on the average is proportionately larger in the adult males, and dimorphism is more notable and more consistent for the paired fins (as is noted above). In proportional measurements (Table 2) males on the average exceed the females in the length of the posterior parts, because the females, as is usual, have larger abdomens. The caudal peduncle averages deeper in males. In other proportions, however, the average difference, as indicated in Table 2, is minimal or inconsistent.

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