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## RESEARCH ARTICLE

# NOTES ON THE DISTRIBUTION OF *HEMIDACTYLIUM SCUTATUM* (TEMMINCK, 1838) IN MARYLAND

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## ABSTRACT

The range of the four-toed salamander, *Hemidactylium scutatum* (Temminck, 1838), is mapped for the state of Maryland. The species is shown to be much more common than previously thought. Widespread claims of range disjunctions within this species are probably exaggerated and based on a failure to search for the species when it is most easily located—nesting females during the late winter and spring. Claims concerning tail autotomy and fragility are also overstated.

**Keywords:** Four-toed salamander, range disjunction, tail anatomy.

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“Eggs will not be found unless the breeding site is directly adjacent to a piece of wooded land, nor will adults be found in woods not adjacent to a suitable breeding site.”—Blanchard (1923)

“John and I must have visited that sphagnum pond a hundred times over the next four years, but we never saw another four-toed salamander there. That is absolutely typical, since *Hemidactylium* is often a one time thing.”—Lazell (1976)

## INTRODUCTION

The four-toed salamander, *Hemidactylium scutatum* (Temminck, 1838), is a small, wide-ranging plethodontid with a distinctive morphology characterized by a prominent white venter

speckled with black markings, a basally constricted tail, and four rear toes. Odd furrows impart a scute-like appearance dorsally and its pond-type larva is unusual for a plethodontid.

The range of this species has usually been considered enigmatic. Neill (1963) called it “egregiously discontinuous” and he singled this species out for extended comment in 1969. The most recent reliable maps (Petranka, 1998; Powell et al., 2016) are similar to Neill’s (1963) and show extensive areas of disjunction. Two additional range maps (Harris, 2005; Green et al., 2013) were carelessly prepared and showed a much more continuous distribution. These authors (Green et al. was based on Harris) mapped the species throughout the states of Alabama and Virginia, nearly throughout the states of Indiana, Michigan and North Carolina, and most of Tennessee. This was contrary to the maps of Minton (1972, 2001), Mount (1975), Martof et al. (1980), Redmond & Scott (1996), Mitchell & Reay (1999) and Beane et al. (2010). Holman (2012) would also qualify but may have been published too recently for inclusion. This notwithstanding, Green et al. still considered *Hemidactylium*’s range “highly discontinuous and disjunct ...” Authorship of *H. scutatum* is also in a state of confusion and has produced at least three differing recent opinions (Fouquette & Dubois, 2014; Crother, 2017; Frost, 2024) and many variations in regional publications.

Specimens cited are in the following collections: Academy of Natural Sciences of Drexel University (ANSP), Carnegie Museum of Natural History (CM), Field Museum of Natural History (FMNH), Florida Museum of Natural History, University of Florida (UF), Museum of Southwestern Biology, University of New Mexico (MSB), National Museum of Natural History (USNM), Natural History Museum of Los Angeles County (LACM), Natural History Society of Maryland (NHSM), Natural History Society of Maryland/Herbert S. Harris, Jr. (NHSM/HSJ), Towson University (TSU) and University of Arizona (UAZ). Because I had only a few vouchered localities for the Eastern Shore, 20 posters on iNaturalist were contacted requesting confirmation of their photographic claims. Ten responded and eight were helpful. I also contacted the custodian of the map data in Cunningham & Nazdrowicz (2018). Data for ten sites in seven counties were requested. No response was received. Specimens I collected were deposited at Towson University.

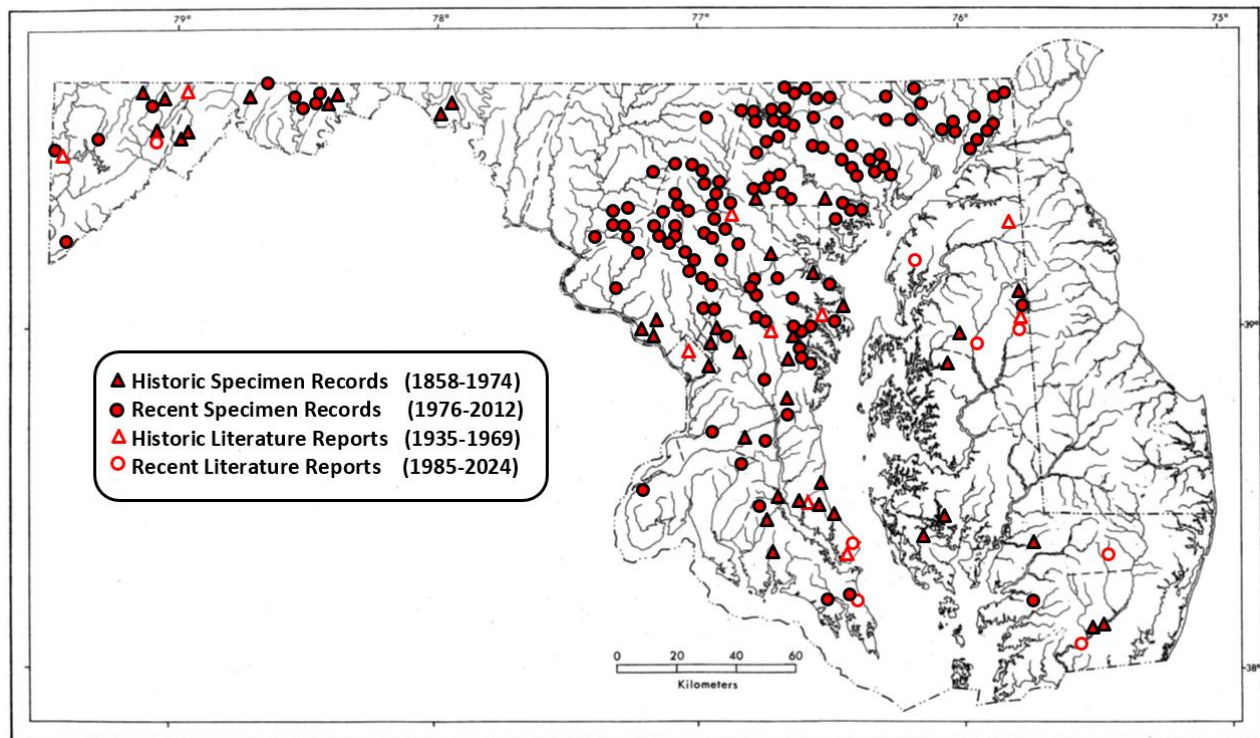
## DISCUSSION

Maryland is considered to be in the continuous portion of *Hemidactylium*’s range (Neill, 1963; Petranka, 1998; Powell et al., 2016), but when discussing this species with Maryland herpers the conversations have always been brief. No one had any experience with *Hemidactylium*, even though some were seasoned field workers. The species was and continues to be an enigma to many, not just in Maryland but throughout its range. This was my experience for my first 307 trips in the Maryland Piedmont and adjacent Coastal Plain, starting in June 1974 and lasting until March 1979. During this period I found the species only twice: an adult female swimming vigorously in a small slough at night at Valley Mill (TSU 2039, 26 March 1978) and a juvenile under a small rotting log in Brooklandville (TSU 2565, 18 March 1979). Both sites are in Baltimore County. On 30 March 1979 a revelation occurred. While working along an unnamed tributary to McGill Run, also in Baltimore County, for no discernible reason I lifted moss bordering a small pool and found nine presumed females, none of which had yet laid eggs. Two were collected (TSU 2653-2654). This immediately triggered numerous memories of such habitats that, although I may have checked them for *Ambystoma maculatum* (Shaw, 1802) and *Rana sylvatica* Le Conte, 1825, had no idea they were precisely the habitat that *Hemidactylium* used for reproduction. After the McGill Run experience, I began to find *Hemidactylium* routinely. Searching potential nesting sites—typically

found along small and medium-sized streams of low gradient in well-wooded areas—for the species throughout the Maryland Piedmont and adjacent Coastal Plain from 1979–2012 I collected the species at an additional 143 localities (141 discrete). I found *Hemidactylium* only seven times in situations that were not associated with nesting females. By contrast, Mansueti (1941) had no reports for a 20-mile (32 km) radius of Baltimore. I located roughly 50 *Hemidactylium* breeding sites within a 20-mile radius of Baltimore, and there were presumably many more sites in Mansueti’s time that have been destroyed. Therres (2018) stated: “During the atlas period, Four-toed Salamanders were found in scattered locations throughout the state.” Figure 1 maps locality records and reports for *Hemidactylium* in Maryland, and Table 1 shows the number of sites (145, 143 discrete) where I collected the species in the Maryland Piedmont and adjacent Coastal Plain. One thousand thirty-nine field trips were made in this area from 1974–2012. My experience with *Hemidactylium* caused me to question the widespread view that this species is notoriously disjunct. Neill’s (1969) and Thurow’s (1997) beliefs that a more favorable climate (Neill and Thurow) and hydrological considerations (Thurow) in the past account for the present-day disjunctions may eventually be shown to have merit in certain portions of the species’ range, but I think the reason is far simpler—few herpers know how to look for them. In Pennsylvania, where the species had been collected at about 80 sites throughout the state (McCoy, 1982), it was nonetheless illegal to collect *Hemidactylium* as recently as 2008 (Koval, 2010). Now, according to NatureServe Explorer (NSE) (accessed 22 November 2024), *Hemidactylium* is viewed as S4 (Apparently Secure) in this state. I suspect it is widespread in Pennsylvania, just as I suspect it is widespread in the other states that border Maryland: Delaware, Virginia and West Virginia. In Arkansas NSE claimed the species is S2 (Imperiled), notwithstanding Saugey & Trauth (1991) and Trauth et al.’s (2004) account of the species, which showed otherwise. An isolated record in Cleburne County, Arkansas (Trauth et al., 2004) indicates that there is still much to be learned about *Hemidactylium*’s distribution in that state. In Rhode Island, NSE viewed the species as S2 (Vulnerable). This is not the case (Raithel, 2019). None of these works were cited by NSE. Indiana and Florida are but two “outlying” states where the species’ distribution is better known than in the past (Casebere & Lodato, 2011; Hill, 2019). In Maryland alone, three species [*Ambystoma jeffersonianum* (Green, 1827), *Aneides aeneus* (Cope & Packard, 1881) and *Glyptemys muhlenbergii* (Schoepff, 1801)] once thought to be to be endangered (CREARM, 1973) have been shown to be much more common than previously believed (Taylor et al., 1984; Thompson, 1984; Thompson & Taylor, 1985). In order to achieve an accurate picture of the distribution of *Hemidactylium*, which possesses the largest range of any plethodontid salamander (Herman, 2013), an extraordinary amount of dedicated field work is still necessary. Authors who think that the mere turning of rocks and logs in woodland—as though *Hemidactylium* was no different than *Plethodon*—is sufficient to draw conclusions regarding the four-toed salamander’s abundance are, I believe, premature in their assessments. There may well be major areas of disjunction with this species, especially in the Mississippi embayment (Conant, 1960), but overall it appears to be exaggerated.

Following Miller (2024), a jurisdiction-by-jurisdiction breakdown of *Hemidactylium*’s distribution in Maryland and the District of Columbia follows.

**Allegany County:** Keller (1945) first reported *Hemidactylium* from “about 2 1/2 miles north [northeast] of Cumberland, on the Bedford Road ...” (USNM 141318, 11 May 1945). Harris (1975) mapped three sites in this county. Keller’s site and another: E Midland: Dan’s Mountain (NHSM 3444-3445, no date) can be accounted for, but one along or near Sideling Hill Creek cannot. The species is currently known from five historic sites and five recent sites.



**Figure 1.** Map of Maryland, Delaware and the District of Columbia, showing locality records and reports for the four-toed salamander, *Hemidactylium scutatum*, in Maryland and the District of Columbia.

**Anne Arundel County:** Cooper (1956) was the first to report this species, listing three sites. Only one of these localities was vouchered: Briarcliff-on-Severn (NHSM 1974, 1 May 1948), but this specimen, in poor condition (DOR), has been discarded. Another site, Priest Bridge, has been mapped herein, and the third has been subsumed by a nearby specimen. Of six localities plotted by Harris, I cannot account for two. Cooper (1956) summarized the beliefs of many when he stated: “Considered uncommon because of its secretive habits.” Smithberger & Swarth (1993) found only one individual in their six-year survey of Jug Bay Wetlands Sanctuary, which consists of 200 hectares. They considered it “Uncommon.” I am poorly acquainted with this area, having visited a small portion of it only once, but I suspect *Hemidactylium* is much more common than Smithberger & Swarth assume. I collected the species at 13 sites from 1983–1990. In addition, I found two unattended clutches of eggs 4.2 km SSW Odenton along the Little Patuxent River on 18 April 1991, but this site is subsumed by specimens.

**Baltimore County:** Mansueti & Simmons (1943) were the first to report *Hemidactylium* from this county: “one mile south of the McDonogh School for Boys ... This locality is about a mile and a half from Baltimore City’s boundary line.” Catalogue data for the specimen (NHSM 640, 3 October 1942) differ: McDonogh School: near Horsehead Branch. This was the first record not just from Baltimore County but for north-central Maryland. It is not possible to be anywhere near McDonogh School and be 1.0 mile (1.6 km) south of the school. Based on unnamed streams in their note (Gwynn’s Falls and Horsehead Branch), the collection site was a short distance upstream from the confluence of these streams. This is roughly 0.75 mile (1.2 km) southeast of the school. Also, the locality is at least 3.0 miles (4.8 km) from Baltimore, not 1.5 miles (0.9 km). On 5 April

1980 I made an attempt to locate breeding sites along Horsehead Branch in this vicinity but found the area nearly impossible to work due to dense vegetation. Harris (1975) overlooked the Mansueti & Simmons locality, and of the four sites mapped by Harris none have documentation. I collected the species at 32 sites from 1978–1986. The unvouchered site on the map is from Woodstock, based on an entry in Robert S. Simmons' catalogue (RSS S28, – April 1945).

**Table 1.** Sites collected by the author in the Maryland Piedmont and adjacent Coastal Plain (nine contiguous counties), 1978–2012.

Month	Sites	Percentage (%)
January	—	—
February	—	—
March	13	9.0
April	95	65.5
May	34	23.4
June	1	0.7
July	—	—
August	—	—
September	1	0.7
October	1	0.7
November	—	—
December	—	—
<b>Totals</b>	<b>145</b>	<b>100</b>

**Calvert County:** The earliest record for *Hemidactylum* in this county is from Prince Frederick (FMNH 93281, 15 April 1928). Another early site, with poor locality data, is St. Leonard Creek (ANSP 27521, summer 1937). Mansueti (1955) first reported this species from this county: Battle Creek Cypress Swamp; no specimens are known from the site. Hardy & Mansueti (1962) characterized the species as “uncommon ... records are spottily distributed.” However, only one site was specified: Mill Creek at Drum Point Road (now Rousby Hall Road), 1 April 1955. Hardy (1972), apparently referring to this site, stated that it was destroyed by road construction and became a muddy stream occupied by *Desmognathus fuscus* (Green, 1818). No specimens of either species are known from this site either. Harris (1975) mapped four localities from this county; I am uncertain what can be accounted for. Norden (2001, 2005) reported the species from the Cove Point area, which he stated was “approximately 900 acres [364 hectares], about 600 [243] of which are undeveloped.” In his 2001 summary, having found only a single individual, he stated that the species “seems to be rare ...” In the 2005 version, having added two more reports from different sources (neither vouchered) he repeated his earlier comment on rarity. In all likelihood, *Hemidactylum* is common at Cove Point.

**Caroline County:** Cooper (1965) included this county, but I could not find evidence for it. Harris (1975) had only one locality for this county, Federalsburg, but there is no documentation in the public domain. Miller (1984) reported a specimen in Richard Highton's collection (lot no. 65-478) from 2.4 km E Goldsboro, but Addison H. Wynn informed me (personal communication, 2025) that the specimen was collected by James E. Huheey (University of Maryland) on the Highton collecting trip in question and retained by Huheey. It apparently never entered a systematic

collection. Specimen documentation is known for two sites in the extreme northern portion of the county: near (SW) Marydel: MD Route 311 (CM 139013, 15 April 1951) and SE Henderson: Jackson Lane (TSU 9813, 26 April 2004). I received confirmation for two sites posted on iNaturalist: Adkins Arboretum, 7 March 2013 and 9 March 2022 (separate posters); and Pelot Bird Sanctuary, 25 February 2022 (separate posters but working together) and 3 April 2022 (one poster). The 25 February date is the earliest reliable date on record. The salamander was found under a log.

**Carroll County:** Miller (1980) provided the first report from this county: near (SE) Millers (TSU 3645, 25 April 1980). Since then, I collected the species at 19 additional sites from 1981–1987.

**Cecil County:** Cooper (1947) was the first to report *Hemidactylium* from this county. He found eight individuals, “seven of which were females containing eggs ...” below Conowingo Dam, 6 April 1947. Cooper, age 18, described the species as “ordinarily quite rare ...” Cooper repeated the locality in 1949. The species was collected at Conowingo at least six times from 1947–1951, once in 1970, and once in 2012. Conowingo was mapped by Harris (1975) and was the only known site for Cecil County at the time. In 2002 White & White wrote: “Uncommon; found in widely scattered, localized populations throughout most of the [Delmarva] peninsula. It is considered uncommon largely because of the lack of suitable breeding habitat.” In 2007 they wrote: “Uncommon to common” and repeated the remainder of the just-quoted passage. This change was due to personal communications from “trusted herpers” (J. F. White, Jr., personal communication, 2013), although where the species was common was not stated. I collected the species at 12 sites from 1984–2012.

**Charles County:** Cooper (1953) was the first to report this species from this county: Cedarville State Forest (various dates) and 1.5 miles (0.9 km) NW Benedict, 16 March 1946. Both sites are vouchered but not catalogued until 1976 or 1977. Harris mapped two additional localities; neither are vouchered. A somewhat interesting observation was noted by Robert S. Simmons in his catalogue for Cedarville State Forest, 7 March 1956: “2 feet [0.6 m] off ground climbing large sedges.” Unfortunately, the time and weather conditions were not recorded, nor whether his observation applied to both individuals he found.

**District of Columbia:** The earliest known specimen for the area under discussion is USNM 4091 and was listed by Cope (1889), but without a date. No specific locality exists; the specimen was catalogued 2 August 1858 and subsequently destroyed (Addison H. Wynn, personal communication, 2024). Three other records for the District exist. There is a specimen with no specific locality (AMNH 32474, presumed date of receipt – May 1929). Another adult is from Blagden Avenue (USNM 95792, 20 March 1935), but this specimen was inexplicably exchanged to Washington College, 5 April 1938. Inquiries as to whether this specimen is extant went unanswered. CM 139011 is from the National Training School, Anacostia River flats, 18 December 1942. This is the latest date the species has been collected, but a search of the collector’s (James A. Fowler) logbook revealed nothing about the circumstances of its capture (Mariana P. Marques, personal communication, 2025). Harris (1975) mapped the Blagden Avenue locality.

**Dorchester County:** The inclusion of this species by Cooper (1965) was probably based on a specimen from Blackwater National Wildlife Refuge in the collection of Robert S. Simmons (RSS

S115, 18 October 1955). The specimen, in poor condition, is in the NHSM and uncatalogued. Only one other locality is known for the county: 1.1 miles (1.8 km) NNE Lakesville (USNM 365609, 19 April 1961). As of 26 December 2024, there were four postings on iNaturalist for this county, two with specific localities and the other two obscured to the point of being useless. None of the four posters responded to my request for confirmation or clarification. As such, all four are rejected.

**Frederick County:** Therres (2018) claimed there were no records from this county; however, Miller (1984) reported two brooders from near Unionville (TSU 5662-5663, 31 May 1983). Miller (1984) was cited in Cunningham & Nazdrowicz (2018). I collected the species at five additional sites from 1984–1986. In commenting on reproduction in Maryland, Therres focused almost exclusively on Virginia and general references, citing only Cooper’s (1953) discovery of eggs “in late March in Maryland” (actually 24 March 1951) from Cedarville State Forest (CSF); county not stated. Overlooked by Therres were additional females with eggs reported by Cooper on 25 April 1949, also from CSF. Concerning the Unionville specimens mentioned above, the eggs of one specimen were in the process of hatching, while those of the other had not. This was stated in Miller (1984). In addition, Miller (1984) noted numerous dates for brooding females in Harford and Howard Counties.

**Garrett County:** *Hemidactylum* was first reported from this county by McCauley & East (1940) for a specimen (USNM 101892, 6 September 1936) collected “south of White’s Knob.” For no discernible reason the specimen was exchanged to the University of Florence, 23 December 1960 (Addison H. Wynn, personal communication, 2024). I was unable to learn if this specimen is extant. Harris (1975) plotted six sites for this county; I can account for three. The two open symbols on the map are for a discarded specimen in L. Richard Franz’s collection from SSE Finzel: Cranberry Swamp, 24 September 1962 (LRF 385), and a specimen I collected 3.5 km SSE Merrill: Pine Swamp, 20 May 1985, but which escaped.

**Harford County:** Cooper (1965) indicated this species occurs in this county, but at the time there was no evidence for it. Similarly, Harris (1975) mapped two sites in this county, neither of which were documented. Miller (1984) reported the first specimens from the county: Jerusalem (TSU 3455-3456, 7 April 1980). I collected the species at 18 additional sites from 1980–2010.

**Howard County:** Cooper (1965) indicated this species occurs in this county, but at the time there was no evidence for it. Harris (1966) provided the first report: Patapsco State Park, which straddles the Baltimore County/Howard County border. He stated: “This salamander is not too common in Patapsco State Park,” but failed to indicate where and which county the species occurred. In 1975 he mapped two sites straddling the park in Baltimore and Howard Counties; only Avalon, Howard County is vouchered (NHSM/HSB 26, 21 March 1959; NHSM/HSB 127, 31 March 1960). I collected the species at 26 sites from 1983–1989.

**Kent County:** This species was first reported from “near Massey” (no date) in Harris (1969) and was mapped by Harris (1975). I requested but did not receive confirmation for a site mapped 3.0 km ESE Massey shown on iNaturalist (accessed 3 January 2025). A second site exists for Chesapeake Farms (McLeod & Gates, 1998), dating from 1992–1993. No specimens currently exist for this county. An especially poor (obscured) site is shown on iNaturalist for either this



county or Cecil County since it is mapped in the middle of the Sassafras River, a boundary between the two counties. The poster thought the locality was in Rock Hall, Kent County, but Rock Hall is 35 km to the southwest. If valid, the date of 21 January (2023) would be the earliest on record. The poster did not respond to my concerns. Five commenters, oblivious to everything, approved this posting and iNaturalist considers it “Research Grade.”

**Montgomery County:** Dunn (1926) first reported *Hemidactylium* from this county based on two specimens: 1.0 mile “above” (upriver) Plummer’s Island (USNM 61130, – August 1918) and Plummer’s Island (USNM 63284, 12 October 1920), yet in two more mystifying “exchanges” this material went to, respectively, Lund University, 14 August 1939, and Amherst College, date unknown, but ca. 1940 (Addison H. Wynn, personal communication, 2025). USNM 61130 is extant and listed on VertNet, but with bizarre locality data (“Idaho”). USNM 63284 cannot be accounted for, and there are no vertebrate collections at Amherst College (Ethan D. Clotfelter, personal communication, 2025). Brady (1937) stated: “One record for the Island [Plummer’s Island] (Nov. 9, 1910). Breeds in ponds in March.” There is no record of a specimen entering a collection. Of four localities plotted by Harris (1975), I can account for two. I collected the species at ten sites from 1983–2006.

**Prince George’s County:** Cooper (1965) indicated that *Hemidactylium* occurs in this county, and Harris (1975) mapped only one site, but I cannot account for it. In 61 trips into this Coastal Plain county from 1976–2012, 46 of which were along low-gradient streams in well-wooded areas, I collected the species at only five sites, one of which was not original. For reasons best left to bryologists, suitable nesting material was scarce.

**Queen Anne’s County:** Miller (1984) reported the only known site in this county: 2.2 km NW Starr for a specimen formerly in Richard Highton’s collection (now USNM 364345, 12 March 1961). On iNaturalist as of 3 January 2025, six sites by three posters were mapped with photographs. All were emailed seeking confirmation, but no one replied. As such, none have been accepted.

**Somerset County:** Nazdrowicz (2009) reported the only specimen known from this county: 5.0 km W Princess Anne (USNM 565980, 18 April 2008). A record for this species from near Fairmount (ANSP 37809, 14 September 2002), also allegedly collected by Nazdrowicz, resulted from a computer error and is not valid (Edward S. Gilmore, personal communication, 2024).

**St. Mary’s County:** Cooper (1965) included this species, but I cannot find the basis for it. Harris (1975) mapped four sites; charitably, two can be accounted for. Van Deusen & Johnson (1980) provided a literature report.

**Talbot County:** Grogan (1974) reported the first and only known locality for this county: 3.0 miles (4.8 km) S Wye Mills: MD Route 662 (NHSM 2773-2774, 12 March 1973), although the distance was overstated by a mile. An earlier, unreported specimen formerly in the collection of Roger Conant exists for 2.0 miles (3.2 km) S Wye Mills (MSB 28180, 18 April 1951). Harris’s (1975) site was presumably based on Grogan’s report. A poster on iNaturalist confirmed the continued presence of *Hemidactylium* at the Wye Mills site based on a photograph from 17 March 2024.

**Washington County:** Probably based on a specimen in the collection of James A. Fowler from 1.0 mile (1.6 km) W Indian Springs (CM 139014, 13 October 1952), Cooper (1965) included this county. Harris (1975) plotted two sites, probably those mapped herein.

**Wicomico County:** Conant (1945) first reported this species from this county but provided no specifics. This was apparently based on specimens from Quantico in the Carnegie Museum (four specimens, three dates). Harris (1975) mapped one site in this county, again presumably Quantico. Grogan (1994) provided a second site.

**Worcester County:** Cooper (1965) included this county probably based on one or both of the following: “below” (SW) Snow Hill: Corker’s Creek (CM 143027, 30 March 1947) and Milburn Landing (USNM 141322, 8 April 1951). These sites do not correspond to the two plotted by Harris (1975). Three posters on iNaturalist confirmed four photographic records for Worcester County: Cypress Park, Pocomoke City, 26 February 2023; Pocomoke River State Park: Shad Landing Area, – March 2024; and near Hardship Branch, between US Route 113 and Pocomoke River, 25 October and 16 November 2024. However, due to symbol crowding only the first site was mapped.

Several statements have been published concerning *Hemidactylium* that are contrary to my experience. Bishop (1919) stated: “With preserved specimens, the greatest care in handling is required to keep body and tail together.” Daniel (1989) reworded Bishop’s comment but did not credit him. Although I always handled *Hemidactylium* cautiously from the moment of collection through preservation and cataloguing, in the course of preparing this article I handled about 250 specimens in the Towson University collection and was not always so fastidious. All are stored in a jumble in a gallon jar and were removed and replaced by hand (carefully, but always several at a time) and this procedure was performed twice. No tails were weakened or broken during examination. Authors with little or no experience with this species have stated otherwise. Pope (1947) claimed: “The tail is readily thrown off ...” [He made the same erroneous statement about *Plethodon cinereus* (Green, 1818).] Martof et al. (1980) and Beane et al. (2010) stated the tail “breaks easily.” Vogt (1981) claimed: “The tail is fragile and easily disjointed at the base.” Bishop (1919) and Dodd (2004) wrote accurately about this subject. Bishop: “Although several individuals were taken in the field with tails in various states of regeneration, the inclination to part with this member was not particularly evidenced in specimens handled in captivity.” Dodd: “The constriction at the base of the tail of this species may facilitate autotomy, but tail breakage does not appear to be more prevalent in this species than in any other terrestrial salamander.” Dodd thought the tail was an important source of nutrients and not cast off lightly. Vogt also claimed: “Only the most patient and ardent naturalists find them ...” and that the species is capable of “lizardlike speed” when uncovered. For those inclined to trust iNaturalist (few posters will vouch for their localities), hobbyists have found their share and there is no reason to believe this did not occur in Vogt’s time. Of the countless brooding *Hemidactylium* that I discovered, only one shot off into the water. Although this does not invalidate Vogt’s comment, his implication that this behavior is common or perhaps widespread is unlikely. Green & Pauley (1987) stated: “When disturbed or exposed the four-toed salamander throws itself into a tight coil, dorsal surface uppermost.” No basis was provided for this assertion, and it does not apply to any of the salamanders I located. I did not witness defensive behavior (coiling, tail undulation) by *Hemidactylium*.

Finally, there are strange statements by Thurow (1997) and Harding & Mifsud (2017) concerning the four-toed salamander's distribution. Thurow stated: "It [*Hemidactylium*] is largely absent, even in the 'continuous' parts of its range (as mapped in Conant and Collins, 1991), and overlooked populations continue to be found." No doubt based on the best available data, Conant & Collins mapped a continuous, if amorphous, range, as well as 24 areas they viewed as isolated. Thurow did not provide any evidence that the continuous part of *Hemidactylium*'s range was fallacious, and the second part of his statement partly contradicted the first. According to Thurow, the overlooked populations somehow do not occur in the continuous portion of *Hemidactylium*'s distribution he viewed as bogus. In addition to citing Smith (1961), who mapped four localities in two counties in Illinois, Thurow cited seven far-flung county records in the literature for the state, suggesting that Illinois itself may well be in the continuous portion of *Hemidactylium*'s range. In addition, over the years new localities have trickled in as a perusal of Herpetological Review will show, although Miller (1984) provided some exceptions. Thurow next claimed: "*Hemidactylium* is one of the smallest North American amphibians, which may help explain why it is rare or absent in many apparently favorable locations with larger salamanders. In glaciated regions *Hemidactylium* is often locally about the only salamander present (but see Daniel, 1989). In unglaciated regions many other species may coexist with it." It is difficult to understand why Thurow raised this subject, especially since it is full of omniscience and contradictions. Again, he provided no evidence that four-toed salamanders are rare or absent in the presence of larger, predatory species; in fact, he demonstrated just the opposite, citing *Desmognathus quadramaculatus* (Holbrook, 1840), *Gyrinophilus porphyriticus* (Green, 1827) and *Pseudotriton ruber* (Sonnini de Manoncourt & Latreille, 1801) at one unglaciated and unspecified locality in Tennessee. His citation of Daniel (1989) was particularly undermining. He listed ten species: six ambystomatids [including "*Ambystoma platineum*" (Cope, 1868)], *Pseudotriton montanus* Baird, 1850 and *P. ruber*, any one of which could easily consume *Hemidactylium*. In my experience, *Ambystoma maculatum* and *P. ruber* commonly occur in the immediate vicinity of *Hemidactylium*, *A. opacum* (Gravenhorst, 1807) less often. Thurow also seems to think that only larger salamanders pose threats to *Hemidactylium*. The best source for eastern US herp distributions at the time of Thurow (1997) was Conant & Collins (1991). Their maps show that numerous larger species occur with *Hemidactylium* in both glaciated and unglaciated areas. These include several species of *Ambystoma*, *Gyrinophilus porphyriticus*, *Pseudotriton montanus* (unglaciated only) and *P. ruber* (limited glaciated), as well as some species of *Desmognathus*, *Eurycea*, *Plethodon* and *Notophthalmus viridescens* Rafinesque, 1820. The more recent range maps of Petranksa (1998) and Powell et al. (2016) and, for example, the detailed maps of McCoy (1982—not cited by Thurow), Klemens (1993—not cited by Thurow), Raithel (2019), and Klemens et al. (2023) show that *Hemidactylium* coexists with larger species. Thurow last asserted: "Note how the Virginia colonies of Wood (1955) are essentially the southernmost occupation of the lowland coastal plains. Vast areas of swamp in more southern coastal plains are unoccupied." Apparently, Conant & Collins (1991) are trustworthy on this point. This is yet another categorical statement that will probably be revised with additional survey work. Means (1992), whom Thurow cited, had already shown there was much to be learned about the distributional limits of *Hemidactylium* on the Atlantic Coastal Plain, although he too called the species "a classic example of disjunction." Since Thurow (1997), Petranksa (1998), Herman (2013) and Powell et al. (2016) have published maps partly refuting Thurow's statement.

Harding & Mifsud claimed: "The spotty distribution of the Four-toed Salamander within the Great Lakes region and elsewhere is undoubtedly related to the scarcity of suitable breeding

habitat.” This was a rash utterance requiring a super-human knowledge of a vast and undefined area, as well as a super-human knowledge of the prevalence of non-reproductive habitat.

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**Appendix. Specimens cited.****Specimens examined**

**Allegany County:** CM 12926; LACM 124435-124436; NHSM 3444-3445; TSU 5194, 5902-5903, 7860-7861, 7862, 8062-8063.

**Anne Arundel County:** NHSM 3434; NHSM/HSB 88; TSU 5286-5287, 5290-5291, 5589-5590, 7749-7750, 8001, 8021, 8023, 8054-8055, 8092, 8205-8206, 8286, 8288-8290, 8391.

**Baltimore County:** NHSM 640; TSU 44, 1548, 1685, 1692, 1793, 2021 (4), 2039, 2532, 2565, 2653-2654, 2767-2768, 2774, 2778, 2800-2801, 2804-2805, 2844-2845, 2880, 2886-2888, 2891-2892, 3441-3442, 3452-3453, 3511, 3619-3620, 3655, 3697-3698, 3747-3748, 3935-3936, 4822-4823, 5096, 5199, 5202-5203, 5361-5363, 5367, 5614-5615, 6109, 6111, 6181-6182, 7343, 7381, 7403, 7692, 7738, 9805-9806.

**Calvert County:** ANSP 27521; TSU 1248-1249, 10607.

**Caroline County:** CM 139013; TSU 9813.

**Carroll County:** TSU 3645, 4016, 4029-4030, 4042, 4048, 4099, 4193-4194, 4828, 4843, 5306, 5481, 5656, 5674, 6183-6184, 6186, 7357, 7695, 7722, 7930, 8000.

**Cecil County:** NHSM 1552-1554, 1579, 1642, 1874-1875, 1879-1880, 1884-1887, 4066, 4772; TSU 408, 6253, 6276, 6277-6278, 6286-6288, 6294, 7445-7446, 8564, 8571, 8890-8891, 9018-9019, 9058, 10611.

**Charles County:** NHSM 4067, 4771; TSU 526, 917, 919, 8605-8606, 8689, 8725, 10385; UF 8081 (3).

**District of Columbia:** CM 139011.

**Dorchester County:** See text.

**Frederick County:** TSU 5662-5663, 6353-6354, 6432, 6521, 7346-7347, 7712.

**Garrett County:** CM 139015, 139016; NHSM 4677-4678; TSU 364, 7234-7238, 7470, 8088; 1.1 km NW Wilson: Wilson Corona Road (USNM uncatalogued).

**Harford County:** TSU 3455-3456, 3466-3468, 4685-4687, 4861, 4862, 4868, 5364, 5365-5366, 5368, 5384-5385, 5572-5573, 6215-6216, 6217, 6380, 7728, 8010, 8219, 9225, 10555.

**Howard County:** NHSM/HSB 26, 127; TSU 5255, 5258, 5269-5270, 5295, 5304, 5316, 5371-5372, 5386-5387, 5444, 5479, 5509, 5521, 5532-5533, 5652-5653, 6319-6320, 6321-6322, 6325-6326, 7110, 7331, 7342, 7363, 7414, 8210, 8231-8232, 8277, 8283.

**Montgomery County:** TSU 1250, 1251, 5417, 5514, 5546-5547, 6409, 9467-9468, 9512, 9545, 9694, 9923, 10028-10029; USNM 309180.

**Prince George's County:** TSU 8167-8168, 8486, 10102-10103, 10361-10362, 10544; UAZ 23698; USNM 309185, 309186, 309188-309189, 533147.

**St. Mary's County:** LACM 124437; TSU 1526, 8751-8752, 9775 (8), 9776 (12).

**Talbot County:** NHSM 2773-2774.

**Washington County:** CM 139014.

**Wicomico County:** CM 21679, 32817-32818, 37104.

**Worcester County:** CM 143027.

**Specimens unexamined**

**Allegany County:** USNM 141318-141320, 379469, 379546, 511100-511101.

**Anne Arundel County:** USNM 367947, 368133, 368230.

**Calvert County:** FMNH 93281; USNM 202965, 368640-368641, 368656, 368805.

**Cecil County:** MSB 28181-28184.

**District of Columbia:** AMNH 32474.

**Dorchester County:** USNM 365609.

**Garrett County:** USNM 149028, 379824.

**Montgomery County:** AMNH 35837-35838.

**Prince George's County:** USNM 83506, 326464, 371105, 371243-371244.

**Queen Anne's County:** USNM 364345.

**Somerset County:** USNM 565980.

**St. Mary's County:** USNM 369070-36907.

**Talbot County:** MSB 28180.

**Washington County:** USNM 379091.

**Worcester County:** USNM 141322.