

Grass Spiders of the Genus *Agelenopsis* in Virginia (Araneida: Agelenidae)

Richard L. Hoffman

Virginia Museum of Natural History
Martinsville, Virginia 24112

INTRODUCTION

Six species of the Nearctic spider genus *Agelenopsis* occur in eastern North America, five of them native to Virginia. The one nonresident, *A. potteri* (Blackwall), is a transcontinental boreal species ranging from New England to Washington and California, which apparently does not extend southward through the Appalachians. The genus was revised by Chamberlin & Ivie (1941) in an adequate, well-illustrated treatment that left little to be desired except distribution maps.

The members of this genus are not uncommon elements in forest-floor biotopes as well as in open grassy fields and residential-domiciliary situations. Ongoing inventory collecting during the past decade by personnel of the Virginia Museum of Natural History (VMNH) and Virginia Division of Natural Heritage (VDNH), as well as several local naturalists, has yielded sufficient material to define both the instate geographic ranges and periods of adult activity for all five of our resident species. I take this opportunity to summarize such information for the use of anyone wishing to pursue investigations of the biology of these spiders.

MATERIALS AND METHODS

Data on the Virginia distribution of each species have been derived solely from material in VMNH, except for a few collections cited by Chamberlin & Ivie (1941). Undoubtedly, additional records can be obtained from other spider collections, but I doubt that these would significantly alter the findings presented here.

The majority of specimens examined were captured by use of the pitfall-drift fence technique. Most of these installations were serviced at two-week intervals, allowing for a reasonable degree of precision with respect to adult surface activity. Some material, particularly of

A. naevia, was collected by hand, as spiders were found on and around buildings.

Identifications were made with the Chamberlin & Ivie revision (1941) which allows recognition of adults of both sexes. Although reproductive structures provide the most definitive characters, some species can be distinguished by size (*A. naevia*) or color (*A. utahana*), as noted under the individual species accounts that follow. In developing the time intervals on the graph (Fig. 3), account was taken that the label date for pitfall material was that of the pick-up day, and generally covered the two preceding weeks. Thus, samples dated May 1, for instance, were graphed as being from the last two weeks of April. Data from the many sites operated on monthly or longer trapping intervals could not be utilized for the graph.

FAMILY AGELENIDAE

The traditional scope of this family, as expressed in the treatments by Gertsch (1940), Kaston (1948), and Roth & Brame (1972), has been substantially abridged in recent years by the relocation of many genera to other families (e.g., *Wadotes* and *Coras* to the Amaurobiidae, *Cicurina* to the Dictynidae, *Cryphoeca* to the Hahniidae, and *Cybaeus* to its own family). The remaining Nearctic elements of this more exclusive Agelenidae are basically those taxa treated by Chamberlin & Ivie in 1941: *Agelenopsis*, *Barronopsis*, *Calilena*, and *Tortolena* (plus the genera *Hololena*, *Melpomene*, *Novalena*, *Rualena*, added later).

Local species of *Agelenopsis* can be readily distinguished from other ground-dwelling spiders by the elongated posterior spinnerets alone (Fig. 1). Characters requiring use of magnification are the eight eyes in two strongly procurved rows and presence of plumose setae on the body and appendages.

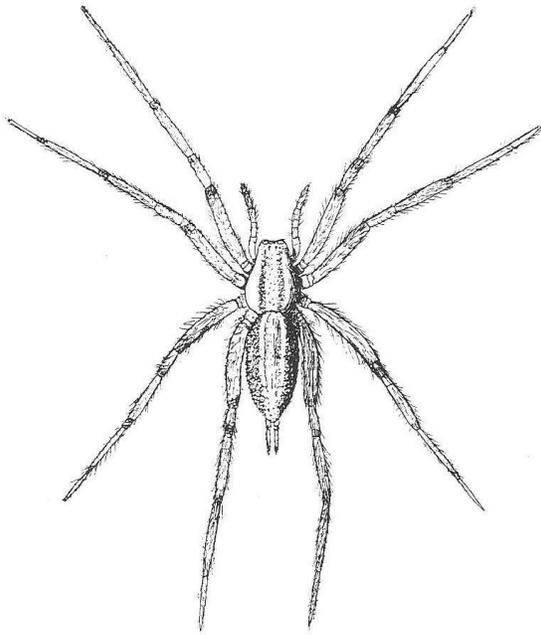


Figure 1. Generalized composite drawing of a species of *Agelenopsis* to show overall appearance and notably long spinnerets.

Females construct sheet webs, often of considerable size, in low grass and other herbage. There is always a retreat tunnel through which the spider escapes from any disturbance (Fig. 2), and attempts to capture such an animal require prior location and closure of the retreat. These webs lack sticky lines, and prey items are captured by rapid response by the spider to movements on the web. The majority of specimens taken in pitfall traps are males, suggesting greater vagility by that sex, and less involvement in web construction, as is usual for many spider taxa. Immature specimens of this genus have only rarely been caught in the Virginia pitfalls.

Agelenopsis emertoni Chamberlin & Ivie (Map 1)

Published records for this species (Chamberlin & Ivie, 1941: 503) implied a basically lowland range extending from New England to Florida, and west to Texas. Without giving specific localities, Seyler (1941) recorded *A. emertoni* also from Ohio. Muma (1945) listed Allegany, Anne Arundel, and Prince Georges counties in Maryland.

Virginia collections suggest that the species is statewide, from sea level to about 3600 ft/1160 m in the Alleghanies, and occurs in all of the five physiographic provinces. Material is at hand from the counties of Accomack, Bath, Cumberland, Dickenson, Franklin,

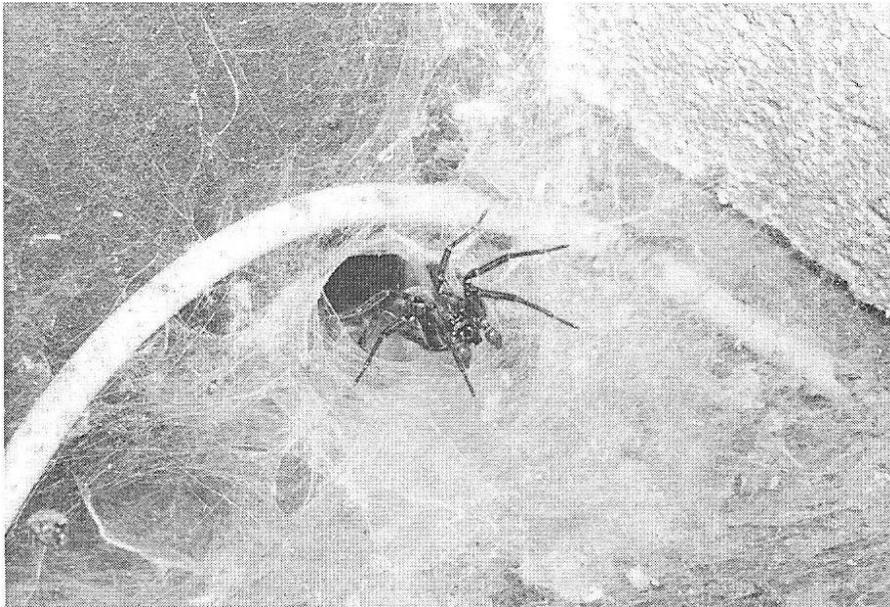


Figure 2. Adult male *Agelenopsis* sp. on web constructed beside a building; the curved white line is an insulated electrical wire. Note retreat tunnel directly behind the spider. Photograph by Steven M. Roble.

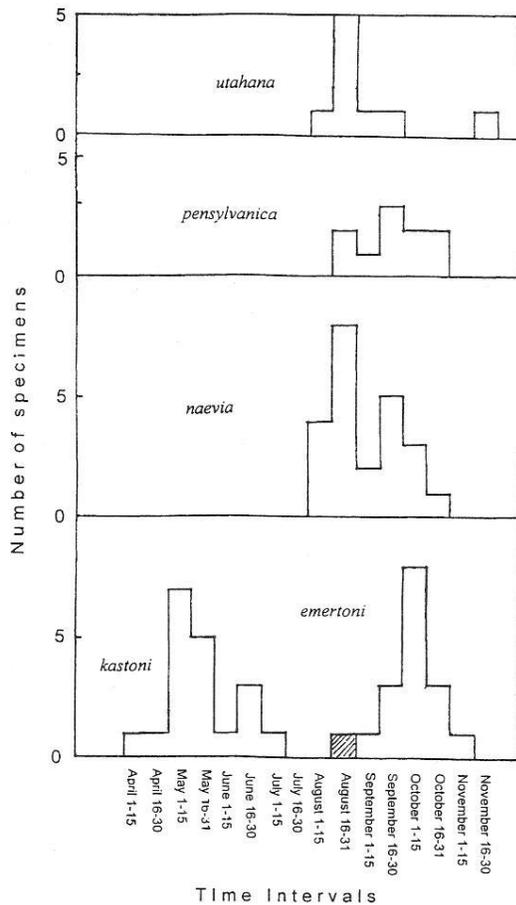


Figure 3. Seasonal surface activity of adults of the five Virginian species of *Agelenopsis*, based on samples (VMNH) taken during the years 1988-1999. The late August record for *A. emertoni* (shaded) is based on an immature male identified as this species with some confidence.

Greensville, Henry, Montgomery, Roanoke, and the City of Virginia Beach (all VMNH). Chamberlin & Ivie (1941) cited specimens from Spotsylvania and Prince George counties. Capture site data indicate that a wide variety of habitats are occupied: dune scrub, interdunal swales, grassy dunes, salt marsh, dry oak woods, pine woods, montane bog. One specimen was taken in a Malaise trap in Greensville County; three males have been found inside the VMNH building in Martinsville. It is therefore the more curious that *A. emertoni* was never taken in many of the pitfall arrays operated on a year-round basis throughout the state. In addition to being sporadically distributed, *A. emertoni* has been

captured in small series (3-5 specimens in a single trap period) only in Virginia Beach City and Cumberland County. Other samples contain typically a single male, implying a low population density. This species has the latest adult activity period of the five Virginia species, extending from early September to early November, with the peak during October 1-15. The single record for late August is of an immature male, almost certainly of this species (shaded on the graph, Fig. 3).

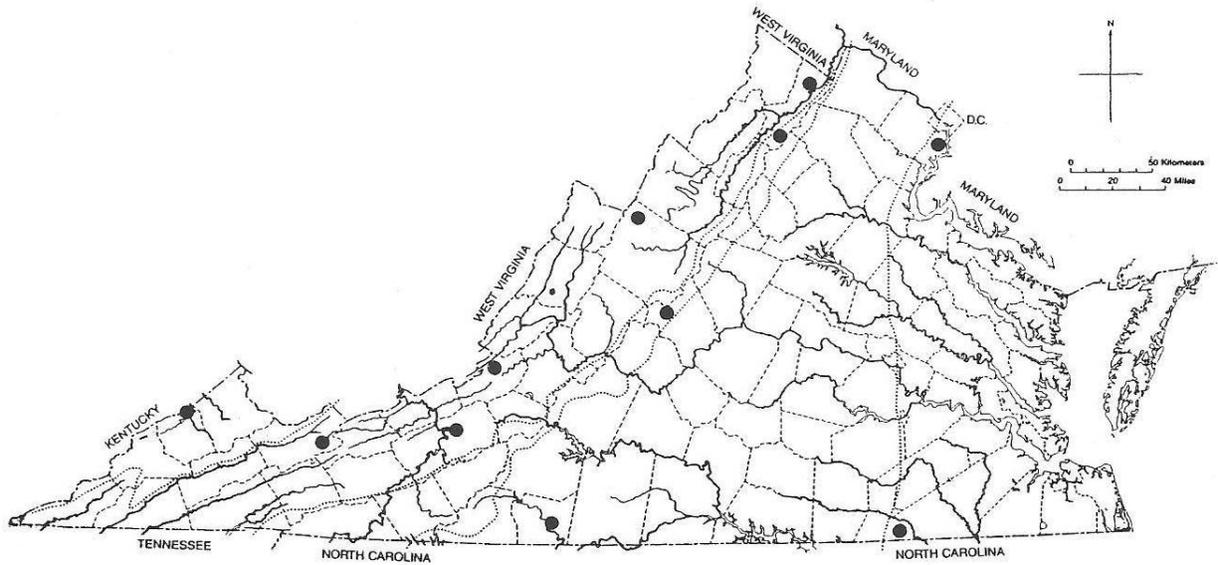
Agelenopsis kastoni Chamberlin & Ivie (Map 2)

Although this species was described sixty years ago, and is certainly abundant in eastern Virginia, remarkably little has been published about it. Kaston (1948: 290) cited three localities in Connecticut, which must be at or near the northernmost limits of the range. Muma (1945) mentioned the occurrence of *A. kastoni* in Maryland, although without having collected it personally there and providing no specific locality. Berry (1970) recorded the capture of a few specimens in the central Piedmont region of North Carolina. VMNH specimens are from Cumberland, Dinwiddie, Henrico, King George, Mecklenburg, Northampton, Prince William, and York counties, and the cities of Chesapeake and Virginia Beach (Map 2). In contrast to the similar-sized *A. emertoni*, *A. kastoni* is taken in pitfalls in far greater numbers: our largest samples contain 16, 15, 15, 14, 13, 13, 11, 9 and 7, all males. Although the impression is gained of a coastal species, three of the largest samples (15, 15, 14 specimens) are from Cumberland County, the inlandmost site for *A. kastoni* in Virginia. Perhaps the species is extending its range westward across the Piedmont?

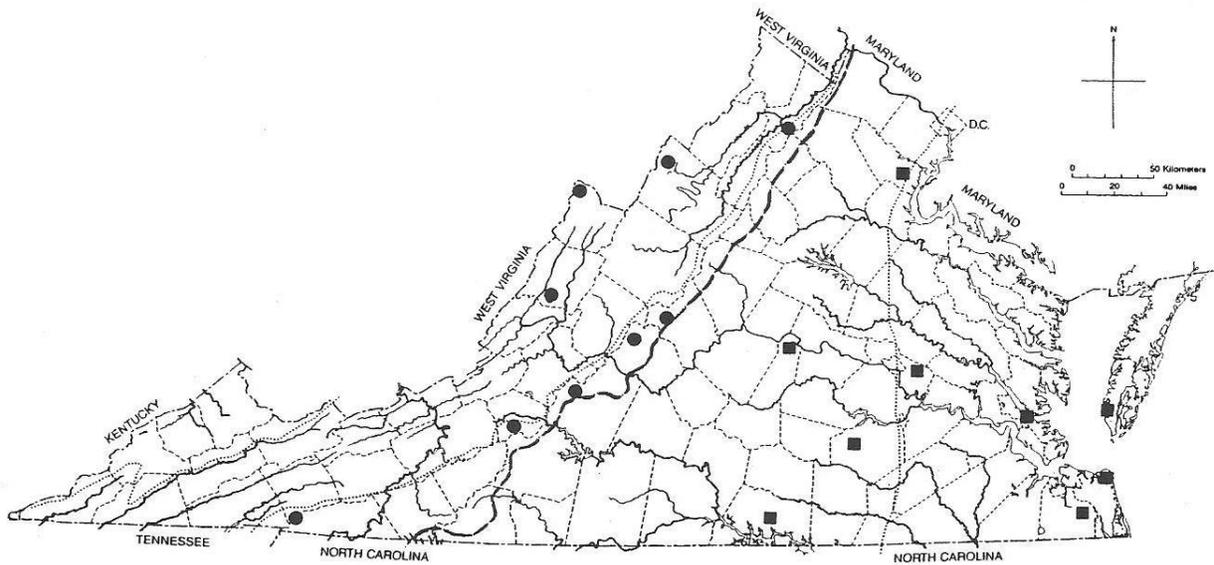
Already in 1948, Kaston observed that "This species matures early; males occurring in May and June." Virginia collections amply confirm that statement, as evident from the graphed data (Fig. 3). Here, males mature even earlier, as we have specimens from pitfalls accumulating during the first two weeks of April. Peak activity occurs in May, with a gradual decline into early July (our single male with that date could have been trapped anytime in the preceding two weeks, thus possibly late June). A gravid female was taken on 22 June 1995.

Some of the samples were taken from pitfalls which also trapped *A. emertoni* a few months later in the year. As these two species are about the same size, perhaps the seasonal displacement is a device to avoid direct resource competition in their shared niche.

The frequency of captures of this species in Virginia,



Map 1. Distributional records for *Agelenopsis emertoni* in Virginia. This species, despite the paucity of localities, is almost certainly statewide except perhaps for higher elevations.



Map 2. Distributional records for *Agelenopsis kastoni* (squares) and *A. utahana* (spots) in Virginia. The range of the latter species is a function of elevation; most localities shown are above 1000 m. The eastern edge of the Blue Ridge physiographic province is indicated by the broken line.

as opposed to the paucity of published records for it, instigated a superficial investigation into the actual range of *A. kastoni*. This, it develops, is far greater than I had imagined likely, and extends as far west as Washington County, Arkansas, and as far north inland as Knoxville, Tennessee, a fairly typical Austral distribution. Almost certainly, greater use of pitfall trapping will show that the species is as abundant throughout this range as it is in Virginia. It is therefore remarkable that *A. kastoni* was not described until 1941, and even then, from a few specimens at the extreme northern extremity of its range.

Agelenopsis naevia (Walckenaer) (Map 3)

This is the largest member of the genus in Virginia, in fact one of our largest spiders, the females attaining nearly 25 mm in length. It is also the one most frequently seen; at least the big webs are conspicuous objects in grass or low shrubs, and in the angles of outbuildings, even if the occupant is not in view. I have sometimes found adult females attracted to lights on the sides of buildings in late Fall, and females of *A. naevia* seem somewhat more liable to capture in pitfalls than their relatives.

Published records for *A. naevia* depict an extensive range in the United States east of the Great Plains. Virginia localities suggest statewide occurrence (Map 3), but none of the sites are above 3000 ft/1000 m, and we have no records for the southwestern third of the state despite pitfall trapping by both VMNH and VDNH. Perhaps this reflects inadequate sampling, as there is no *a priori* reason why *A. naevia* should not occur there. We have specimens at hand from Augusta, Bedford, Cumberland, Henry, Roanoke, and York counties and the cities of Chesapeake and Virginia Beach. Chamberlin & Ivie (1941) cited localities in Brunswick, Fairfax, Prince George, Rappahannock, and Spotsylvania counties. Most samples contained only one individual, whether caught by hand or pitfall. It is noteworthy that only single specimens are available from Seashore/First Landing State Park in Virginia Beach, and from the Fentress Naval Aviation Landing Field in nearby Chesapeake despite the extensive trapping conducted in those and numerous sites elsewhere in the two municipalities throughout 1989 and 1990.

Like most other members of the genus, *A. naevia* is adult-active in late Summer and early Fall. The earliest captures in Virginia are from the first half of August, an obvious peak is reached later that month, and a slow decline takes place until the end of October (Fig. 3).

Agelenopsis pensylvanica (Koch) (Map 4)

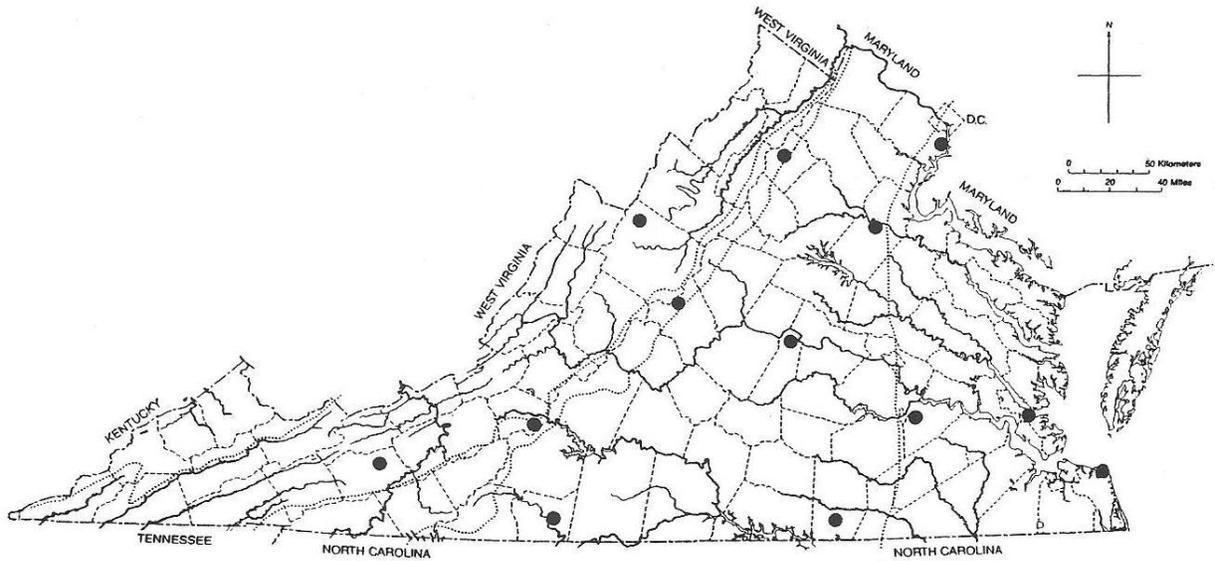
Available published data suggest that this species extends entirely across northern United States, with moderate extension southward to Virginia and Arkansas. There appear to be no records for the Southeast, and even though the Atlantic Coastal Plain has not been thoroughly surveyed for the spider fauna, present indications suggest absence of *A. pensylvanica* from that region. In Virginia, the majority of collections are from the mountains and western Piedmont. Wilton Ivie found a male at Mount Vernon, Fairfax County (on the Fall Line) in 1938, and two males entered a Malaise trap operated by VMNH beside the Meherrin River, southeast of Emporia, Greensville Co., the only actual Coastal Plain locality for the state. Considering the extent and intensity of collecting activity in eastern Virginia during the past decade, the absence of other records must be considered as conclusive. In this respect, it may be noted that Muma (1945) cited no Coastal Plain localities in Maryland.

Virginia specimens of *A. pensylvanica* in VMNH are from Augusta, Bath, Clarke, Craig, Dickenson, Greensville, Henry, Montgomery, Nelson, Tazewell, and Warren counties. About half were collected by hand, as single captures, or in pitfalls, again usually one specimen in year-long sampling intervals. The one sample of any size (10 ♂♂) came from a pitfall five miles west of Stokesville, Augusta County, during the period from mid-August to mid-September 1988. Apparently population densities are always low. In a study of old field spiders in the North Carolina Piedmont, Berry (1970) obtained only one specimen of *A. pensylvanica* in the total of nearly 20,000 spiders of 331 species.

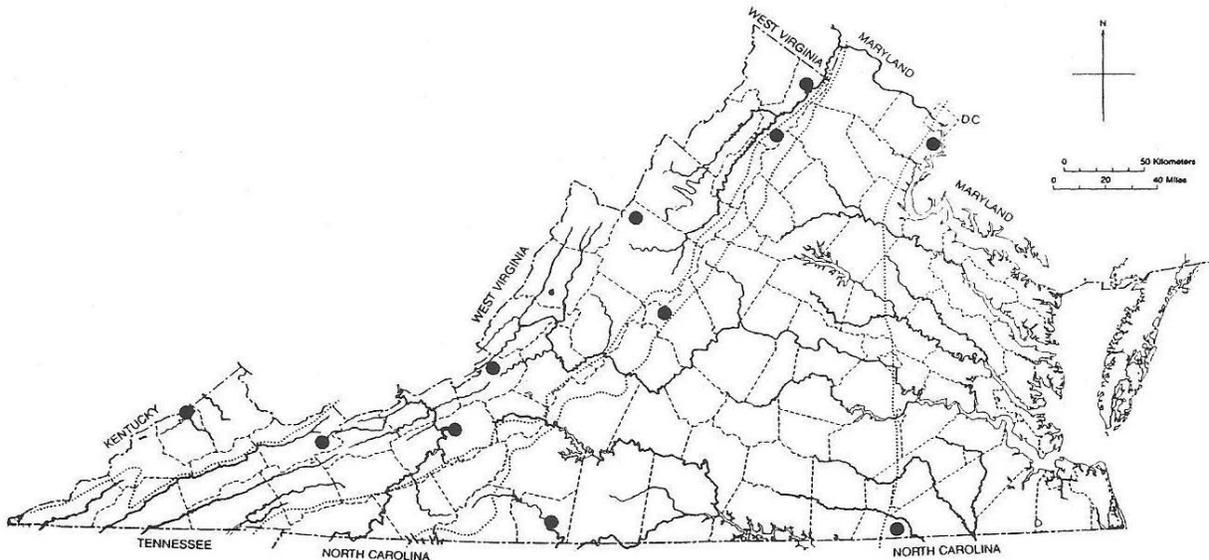
Agelenopsis utahana (Chamberlin & Ivie) (Map 2)

This small agelenid is distinctly lighter in color than its local relatives, generally a light straw yellow with darker paramedian bands on the carapace. Like *A. pensylvanica*, it is a transcontinental, subboreal species, but even more elevationally restricted. Already in 1941 Chamberlin & Ivie reported a female from Spruce Pine, North Carolina, then the only Appalachian locality south of New York.

Virginia records are from Amherst, Augusta, Bath, Bedford, Grayson, Highland, Nelson, Roanoke, Rockingham and Warren counties, all sites but two being well above 3000 ft/1000 m, in broadleaf forest. Pitfalls operated five miles west of Stokesville, Augusta County,



Map 3. Distributional records for *Agelenopsis naevia* in Virginia. Despite the lack of records for some areas, this species is probably statewide, except perhaps for the two Eastern Shore counties.



Map 4. Distributional records for *Agelenopsis pensylvanica* in Virginia. The apparent absence of the species from the Coastal Plain has been documented also for Maryland (Muma, 1945). The lack of Piedmont localities is noteworthy and may imply disjunct status for the population in, for instance, Greensville County.

at an elevation of 2200 ft/700 m, yielded 10 samples between mid-May and mid-October, with the largest number during early September. The Warren County site, four miles southeast of Front Royal, is at 1200 ft/400 m. Data from these two sites, representing monthly or longer intervals, could not be used for the graph.

At the Augusta County site, in the folded Appalachians on Devonian shale substrate, pitfalls were dispersed among three forest stages: recovering from clearcut (two years old), mature red oak forest (around 70 years), and old growth (>138 years). Captures of *A. utahana* sorted out as: two years, 8; mature forest, 9; old growth, 12, reflecting a degree of preference for established forest biotopes, although areas with no canopy were not avoided either.

On 16 August 1999, Robert S. Hogan and Michael W. Donahue found both sexes of *A. utahana* to be abundant in webs constructed in the upper leaves of milkweed (*Asclepias* sp.) plants at the top of Poor Mountain, Roanoke County.

ACKNOWLEDGMENTS

The majority of specimens examined in connection with this survey were taken in trapping programs operated by the Division of Natural Heritage, Virginia Department of Conservation and Recreation, and I am very much indebted to VDNH zoologists Christopher A. Pague, Kurt A. Buhlmann, and Steven M. Roble for depositing this material in the VMNH. Our collections have also been enriched by donations of material from personal field work by Joseph C. Mitchell, Robert S. Hogan, and Michael W. Donahue. VMNH technician Susan C. Kirby tabulated data and prepared the distribution maps. My colleagues Norman I. Platnick

(AMNH), Laura Leibensperger (MCZ), Susan Riechert (University of Tennessee), and Patricia Miller (University of Mississippi) kindly provided records for *Agelenopsis kastoni*.

LITERATURE CITED

- Berry, J. W. 1970. Spiders of the North Carolina Piedmont old-field communities. *Journal of the Elisha Mitchell Scientific Society* 86: 97-105.
- Chamberlin, R. V., & W. Ivie, 1941. North American Agelenidae of the genera *Agelenopsis*, *Calilena*, *Ritalena* and *Tortolena*. *Annals of the Entomological Society of America* 34: 585-623.
- Gertsch, W. J. 1940. Revised edition, "The Spider Book" by J. H. Comstock. Cornell University Press, Ithaca, NY. 729 pp.
- Kaston, B. J. 1948. Spiders of Connecticut. *State Geological and Natural History Survey of Connecticut, Bulletin* 70: 1-874.
- Muma, M. H. 1945. An Annotated List of the Spiders of Maryland. *Bulletin of the University of Maryland Agricultural Experiment Station* A38: 1-65.
- Roth, V. D., & P. L. Brame. 1972. Nearctic genera of the spider family Agelenidae (Arachnida: Araneida). *American Museum Novitates* 2505: 1-52.
- Seyler, P. J. 1941. The generic and specific status of four Ohio spiders of the genus *Agelenopsis*. *Ohio Journal of Science* 41: 51-69.