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ANTHRENUS PIMPINELLAE F., A PALEARCTIC DERMESTID ESTABLISHED IN EASTERN NORTH AMERICA (COLEOPTERA: DERMESTIDAE)

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Abstract.—*Anthrenus pimpinellae* F., a widespread Palearctic dermestid, is reported from Delaware and Pennsylvania, the first confirmed records of this species for the Western Hemisphere. *Anthrenus lepidus* LeConte and *A. occidens* Casey, considered junior synonyms of *A. pimpinellae* since the early 1900's, herein are removed from synonymy with *A. pimpinellae.* A table of external morphological characters separating these 3 species is given. The biology and habits of this introduced dermestid are reviewed and summarized from the European literature. A diagnosis and illustration of the adult are provided, along with a new key to the species of *Anthrenus* occurring in North America east of the Mississippi River.

The genus *Anthrenus* Schaeffer is comprised of 83 species (Mroczkowski, 1968) that occur primarily throughout the Holarctic region, with a number of species also known from the southern hemisphere. In the United States there are at least 13 species placed in 5 subgenera. Seven species are shared with the Palearctic region, presumably accidentally introduced into North America with commerce.

Ever since Arrow (1915) synonymized *Anthrenus lepidus* LeConte and *A. occidens* Casey with the European *A. pimpinellae* F., entomologists have assumed that the latter is indigenous to the United States. Hinton (1945) accepted the synonymy, as did Mroczkowski (1968), a specialist in the genus *Anthrenus.* In our opinion, however, Arrow erred in synonymizing these forms, and the true *A. pimpinellae* has not been recognized previously from the Western Hemisphere.

Anthrenus pimpinellae, a common Palearctic dermestid known from Europe, northern Africa, Asia, and portions of the Oriental region, was recently detected in the New World, based on specimens collected in 1984 by ERH and AGW at Newark, Delaware (New Castle Co.). Three specimens were collected from inflorescences of viburnum (*Viburnum dilatatum* Thunb.) and 1 specimen from inflorescences of *Deutzia lemoinei* Hort. Lemoine ex Bois on the campus of the University of Delaware, on May 28, June 2, and June 6, 1984. In addition, older material of this species was discovered in the collection of the Pennsylvania Department of Agriculture. Two rubbed specimens had the label data: "Jeannette, Pa."/"5300." As the result of a thorough search of an early accession catalog (containing records initiated by H. A. Surface of the PDA in 1904), and examination of an issue of the *Monthly Bulletin* (Surface, 1906), AGW found that these two specimens, with accession number "5300," were among "1600 species and varieties" of Pennsylvania Coleoptera received on

March 22, 1906 from H. G. Klages of the Carnegie Museum (Pittsburgh, Pennsylvania).

In this paper we briefly describe the habits and habitat of *A. pimpinellae* based on the European literature, provide an adult diagnosis and photograph of the dorsal habitus distinguishing this species from *A. lepidus* and *A. occidens,* and present a key to the species of *Anthrenus* occurring in North America east of the Mississippi River.

Anthrenus pimpinellae F.

Within some species of the genus *Anthrenus* there are a remarkable number of variant forms distinguished by arrangements of the colored scales clothing the body, particularly the dorsal surface. *Anthrenus pimpinellae* has been considered such a species; Mroczkowski (1968) lists 2 subspecies and 11 named varieties in addition to the nominate form. The extent to which gene exchange occurs among these various forms has not been demonstrated, however, and whether "*pimpinellae*" consists of one or many species is still a question. Vladimir Kalik of Pardubice, Czechoslovakia, who has been investigating the *A. pimpinellae* complex, believes that there are yet a number of distinct Palearctic species included under the name, some of which are separable by phallic characters only. He considers the nominate form to exist without aberrations, variations or subspecies (*in litt.* to RSB). Should this be true, *A. lepidus* and *A. occidens* would be excluded from *A. pimpinellae.* Most species of *Anthrenus,* as Mroczkowksi recently has shown in his numerous papers, are in fact clearly separable by phallic characters. The male genitalia of *A. lepidus* and *A. occidens,* however, are apparently identical to those of the nominate form of *A. pimpinellae.* Nevertheless, these two western U.S. forms (whether themselves constituting 1 or more species) possess a suite of characters that appear consistently to separate them from *A. pimpinellae.* Consequently, we herewith remove *A. lepidus* LeConte (1854) and *A. occidens* Casey (1900) from synonymy with *A. pimpinellae* Fabricius (1775), and cite in the following table the differences separating these species.

A. pimpinellae	*A. lepidus, A. occidens*
1. Ratio of width of segment 9 of the male antenna to width of segment 11 nearly 1:1.1.	Ratio of width of segment 9 of the male antenna to width of segment 11 nearly 1:1.5.
2. Spiracles of abdominal segments 2–5 not enclosed by darkly pigmented lateral extension of tergum, spiracles outside or (usually) at margin of pigmented area.	Spiracles of abdominal segments 2–4, and usually 5, enclosed by pigmented area extending laterad from tergum.
3. Subbasal band of white scales shorter at suture than at sides of elytron and usually continuous across elytron.	Subbasal band of white scales, if present, appreciably longer at suture than at sides and not continuous across elytron.
4. Subapical reddish or copper-colored band present on elytron behind subapical white band or patch.	No distinct subapical reddish or copper-colored band of scales present on elytron behind subapical white band.

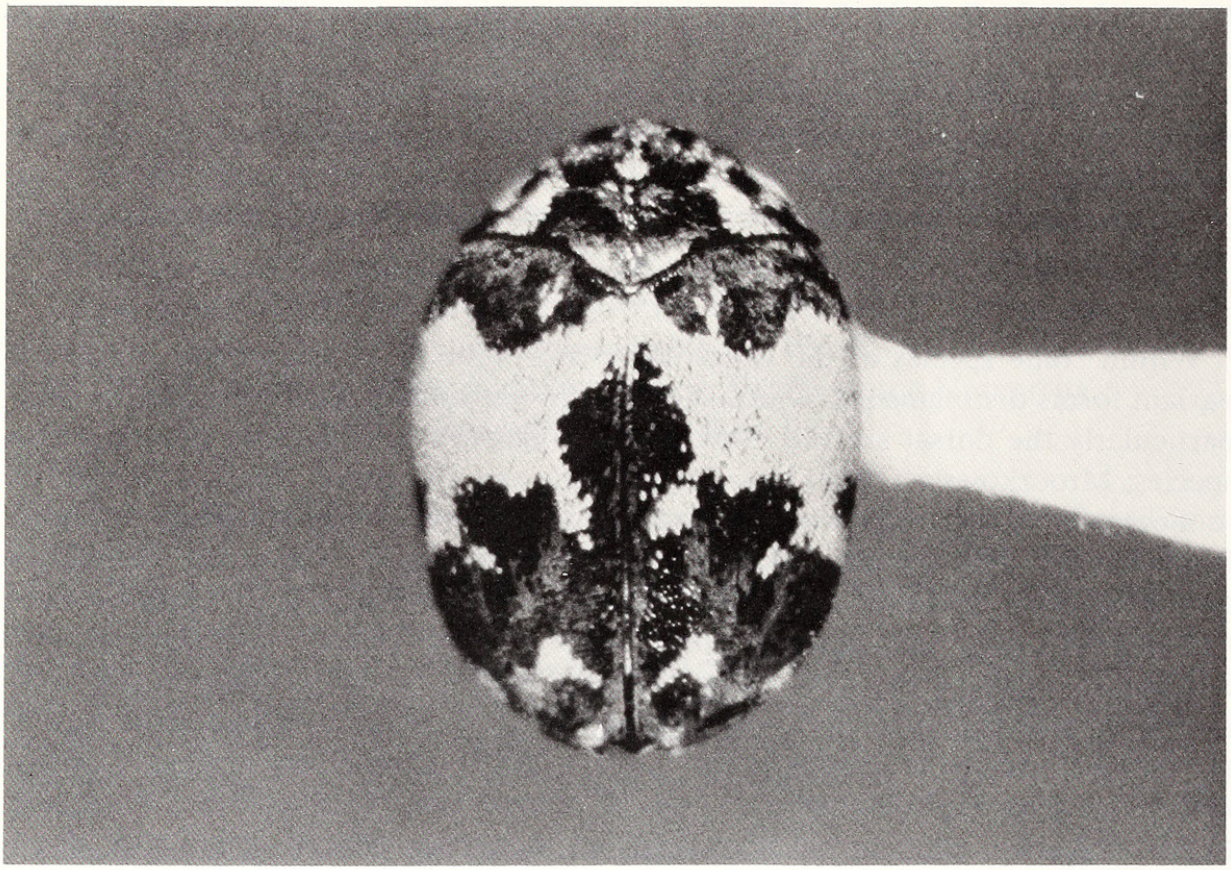
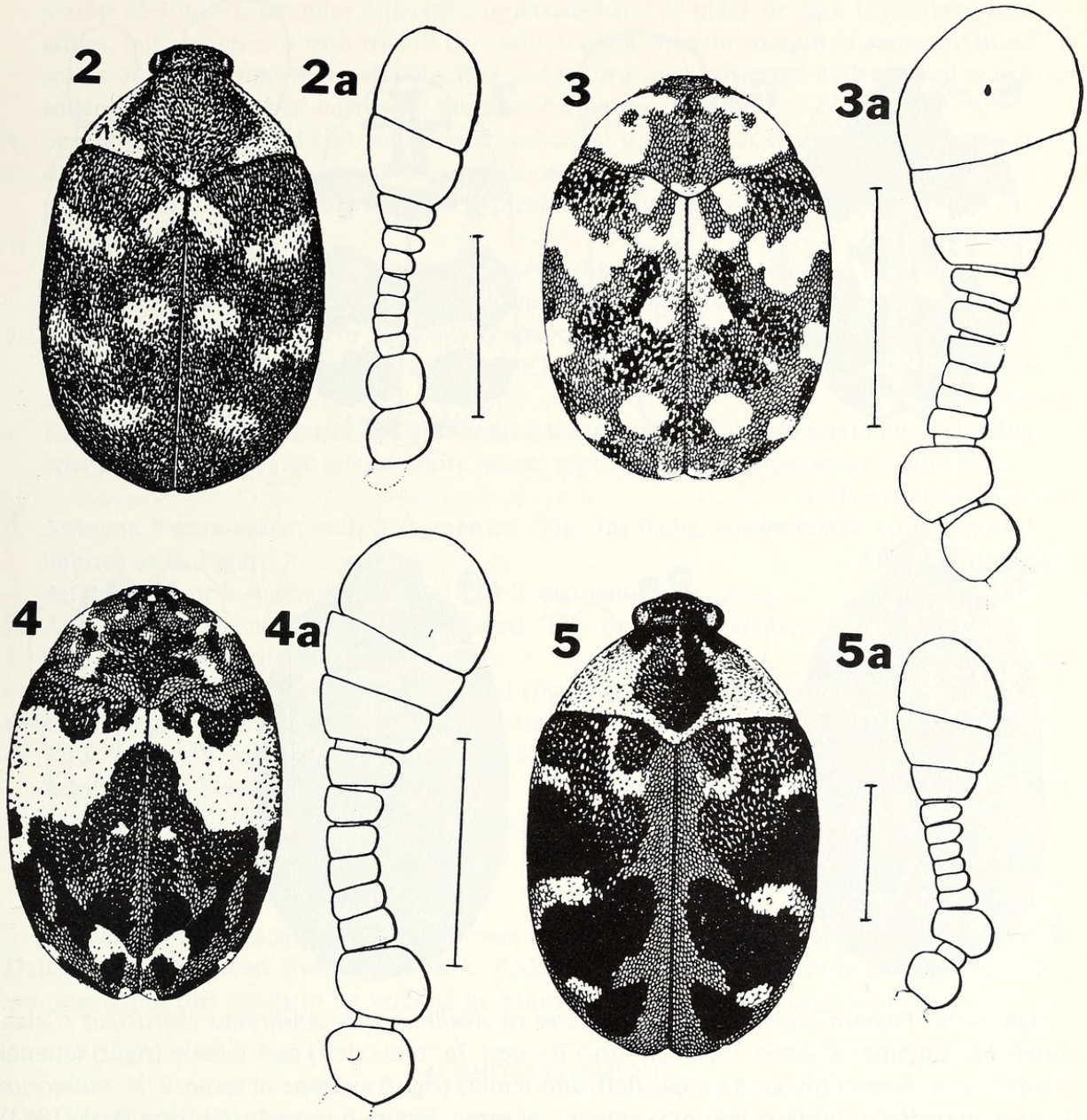


Fig. 1. *Anthrenus pimpinellae* F., typical dorsal habitus.

Habits and habitat. This univoltine species (Yokoyama, 1929, reported an occasional 2-year life cycle in Japan) normally overwinters in the adult stage, although larvae that are slow to develop (about 1%) may hibernate. Adults become active in May and are attracted to flowers of various plants. Females deposit 16–48 eggs in spring or early summer, with hatching occurring in 8 days at 26°C and 15 days at 20–22°C; larval development requires 3–4 months. In one experiment larvae took longer to develop on woollen cloth (140–186 days) than on dead insects (96–144 days) or dry fish (86–104 days) (Özer, 1963). Previously, Kunike (1939) noted that larvae prefer wool to dead insects. The pupal stage lasts 8–10 days with pupation taking place in autumn within the last larval skin. In nature, *A. pimpinellae* develops mainly in bird's nests where larvae feed on feathers, hair, dead nestlings, or insect remains. Occasionally it is encountered indoors feeding on wool, stored products, and dried insect specimens, but it is not considered a major household pest. The foregoing biological sketch is based on Hinton's (1945) review, which should be consulted for additional references to *A. pimpinellae* as a pest.

Recognition. Adults of *A. pimpinellae* (Fig. 1), when fully scaled, are distinctive. The length is 2.0–3.7 mm. The body is moderately strongly convex and broadly oval with the sides of the elytra distinctly rounded. Scales of the dorsal surface are white, golden, and very dark golden-brown to nearly black; the typical scale pattern is shown in Figures 1 and 4. The pronotum on the middle of each side bears an oval or round patch of dark scales enclosed by paler scales. The elytra have a complete (or nearly complete), broad, transverse patch of white scales on the basal third (as in Figs. 1

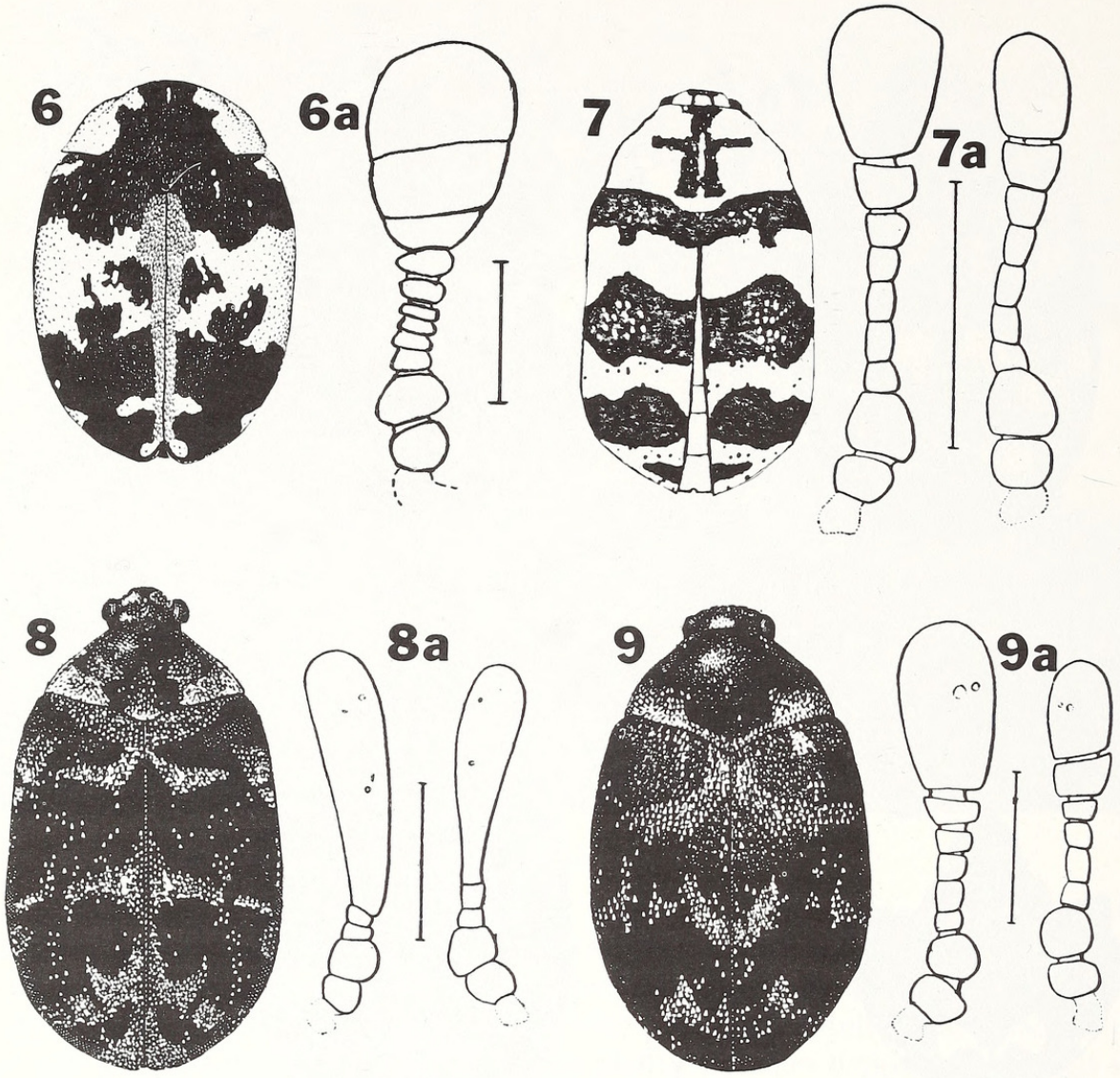


Figs. 2–5. Eastern North American species of *Anthrenus*. 2. *Anthrenus verbasci* (L.); 2a, antenna of same. 3. *A. flavipes* LeConte; 3a, antenna of same. 4. *A. pimpinellae* F.; 4a, antenna of same. 5. *A. scrophulariae* (L.); 5a, antenna of same. All figures reproduced from Hinton (1945). Antennal scale lines = 0.20 mm.

and 4), extending to the suture. Adults of *A. pimpinellae* can be readily separated from other species of *Anthrenus* occurring in eastern North America by the characters given in the following key.

KEY TO NORTH AMERICAN SPECIES OF *Anthrenus* EAST OF THE MISSISSIPPI RIVER

1. Antenna 11-segmented with a 3-segmented club (Figs. 2a–6a). Abdomen with discal striae on first sternum 2
– Antenna with 9 or fewer segments; club 1-, 2-, or 3-segmented. Abdomen without discal striae on first sternum 6



Figs. 6–9. Eastern North American species of *Anthrenus*. 6. *Anthrenus thoracicus* Melsheimer; 6a, antenna of same. 7. *A. coloratus* Reitter; 7a, male (left) and female (right) antenna of same. 8. *A. fuscus* Olivier; 8a, male (left) and female (right) antenna of same. 9. *A. museorum* (L.); 9a, male (left) and female (right) antenna of same. Figure 6 reproduced from Beal (1983); Figure 7 from Kingsolver (1969); and Figures 7a, 8, 8a, 9, and 9a from Hinton (1945). Antennal scale lines = 0.20 mm.

2. Eye with inner margin entire (subg. *Nathrenus*); typical dorsal habitus as in Figure 2 ..... *A. verbasci* (L.)
– Eye with inner margin interrupted in front of middle by a small emargination (subg. *Anthrenus* s. str.) 3
3. Pronotum with dorsal rim of antennal cavity not or only very slightly dilated; visible abdominal sternum 5 not divided by broad band of black or dark brownish black scales, but sometimes with narrow median line or irregular triangular patch of golden or medium golden brown scales at middle; scales of elytra ovate to obovate, more or less evenly rounded posteriad, with ratio of width to length about 3:5; typical dorsal habitus as in Figure 3, but often with mostly white and golden scales and rarely with nearly all white scales ..... *A. flavipes* LeConte
– Pronotum with dorsal rim of antennal cavity moderately strongly to strongly dilated;

visible abdominal sternum 5 divided by broad band of black or dark brownish black scales, but sometimes with row of pale scales along anterior margin of sternum; most scales of elytra somewhat parallel-sided and subtruncate posteriad with ratio of width to length mostly 2:5 or narrower; dorsal color pattern various 4

4. Segment 1 of antennal club with length subequal to or longer than length of segment 2; basal ¾ of each side of pronotum with patch of pale scales enclosing a small, oval patch of dark brown to black scales; typical dorsal habitus as in Figure 4 ..... *A. pimpinellae* F.
- Segment 1 of antennal club distinctly shorter than segment 2; basal ¾ of each side of pronotum with patch of pale scales not enclosing darker patch of scales 5

5. Each elytron with 3 more or less equally spaced, transversely undulate patches of white scales meeting or nearly meeting dilations of reddish sutural stripe; typical dorsal habitus as in Figure 5 ..... *A. scrophulariae* (L.)
- Each elytron with subbasal and submedian transverse bands expanded and coalescing laterally to form a large lateral white patch; typical dorsal habitus as in Figure 6 .... *A. thoracicus* Melsheimer

6. Antenna 9-segmented; club 3-segmented (Fig. 7a) (subg. *Anthrenops*); typical dorsal habitus as in Figure 7 ..... *A. coloratus* Reitter[1]
- Antenna 5-, or 8-segmented; club 1-, or 2-segmented 7

7. Antenna 5-segmented; club 1-segmented (Fig. 8a) (subg. *Helocerus*); typical dorsal habitus as in Figure 8 ..... *A. fuscus* Olivier[1]
- Antenna 8-segmented; club 2-segmented (Fig. 9a) (subg. *Florilinus*) 8

8. Males: Antenna with segment 8 at least 5 times longer than segment 7 (Fig. 9a). Females: Ratio of length of segment 7 to segment 8 from 1:2.8 to 1:2.1 (Fig. 9a); typical dorsal habitus as in Figure 9 ..... *A. museorum* (L.)
- Males: Antenna with segment 8 only 2.8 to 2.1 times longer[2] than segment 7. Females: Ratio of length of segment 7 to segment 8 from 1:2.2 to 1:1.4; typical dorsal habitus similar to *A. museorum* ..... *A. castaneae* Melsheimer

The only remaining species of *Anthrenus* recorded in eastern North America is *A. caseyi* Dalla Torre, described from New York. RSB suspects that *A. caseyi* is conspecific with *A. castaneae,* but this needs to be verified by examination of the type of *A. caseyi.*

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[1] Both *A. coloratus* (Kingsolver, 1969) and *A. fuscus* (Mertins, 1982) have only recently been recognized as occurring in the United States.

[2] The ratios in females of *A. museorum* overlap the ratios in males of *A. castaneae.* There is, however, in *A. museorum* a noticeably longer antennal cavity, so that females of the species are easily separated from males of *A. castaneae.*

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