Israel Journal of Entomology

Vol. XXIX (1995) pp. 109-112

COCCINEA (HOMOPTERA) OF NORTHEASTERN NORTH AMERICA

MICHAEL KOSZTARAB AND MARY RHOADES
Department of Entomology, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061-0319, USA

ABSTRACT

An identification manual for Coccinea of Northeastern North America (NENA) is in preparation. It covers the scale insects from 19 states and Washington, D.C., in the United States of America (USA), and six provinces in Canada, as far north as Ellesmere Island. To date there are about 219 species known from this region, 11 of them pests of indoor plants. They represent 85 genera and 12 families. Only 22 species appear to be endemic to this region. Most species have a wide distribution in North America, including many polyphagous pest species. A comparison between species from this region and other geographic areas showed that the highest number of shared species of Coccidae and Pseudococcidae was with California. The book will provide keys, illustrated morphological descriptions, and information on distribution, hosts, biology/life cycle, natural enemies, other associated organisms and economic importance, as well as an extensive list of references.

KEY WORDS: Homoptera, Coccinea, Coccoidea, scale insects, Northeastern North America, identification manual, survey.

An assessment made in 1990 by homopterists in the USA found that approximately 324 species, or 27% of the total 1200 Coccinea species, have not been described as yet from North America. In addition, for all Coccinea, most of the immature stages and adult males remain undescribed, and updated information on biology and distribution is lacking (Kosztarab et al., 1990). The reason for the dismal current status is that available identification manuals for most of the families are 40 to 65 years old. To improve the situation, we initiated work on a book for identification of Coccinea occurring in Northeastern North America (NENA). The manual will include the scale insects from 19 states and Washington, D.C., in the USA, as well as six provinces in eastern Canada as far north as Ellesmere Island (see Fig. 1). To date we have cataloged about 219 species from this area representing 85 genera and 12 families.

Utilizing the data in our files accumulated over the past 33 years, along with other sources dealing with scale insects in this region, we have compiled and updated information on each species. Included in the book will be keys, illustrated morphological descriptions, an extensive list of references, and information on distribution, hosts, biology/life cycle, natural enemies, other associated organisms, and economic importance.

The manual will be designated as the fourth contribution to a US National Biological Survey, with the hope that it will provide a stimulus for colleagues who work in the southeastern and western US to prepare comprehensive identification manuals for those regions.

Twenty-one species appear to be endemic to NENA, or about 9% of the total species

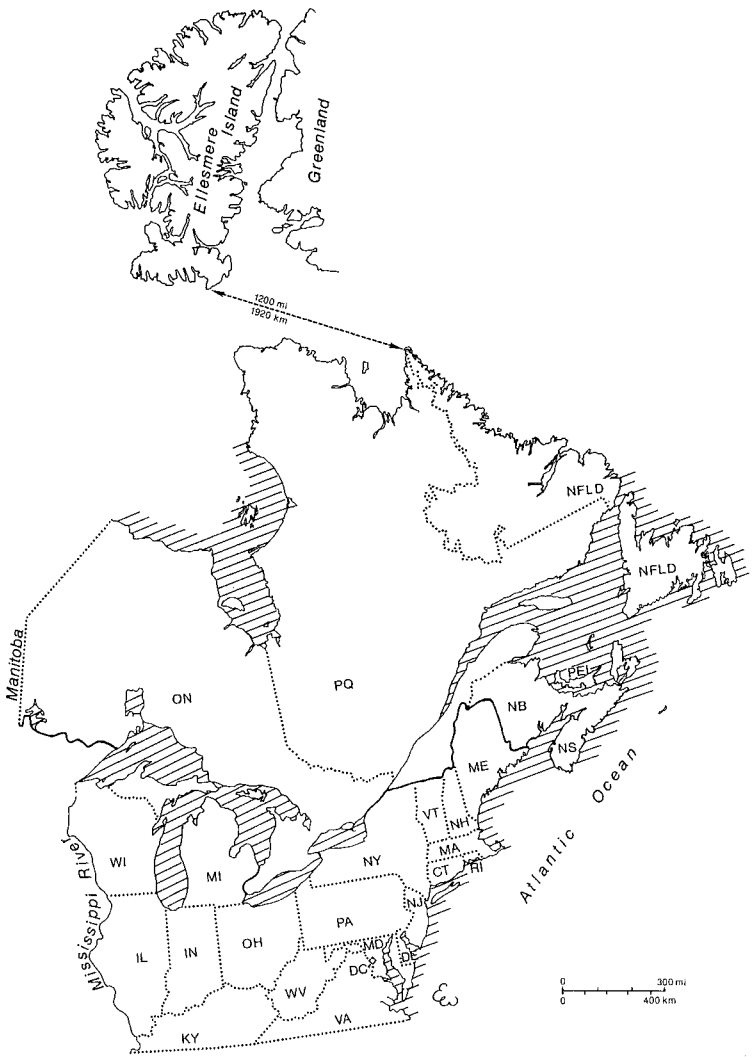

Fig. 1. Northeastern North American Region (NENA) as considered in this article (illustration by Elizabeth Watson).

(Table 1). Four of the endemics are new species of Pseudococcidae that will be described for the first time in the book. Another endemic species, *Puto kosztarabi* Miller and Miller (1993), described from Virginia, is a good example of disjunct distribution; the closest members of the same genus (the giant mealybugs) are known from western Texas. *Puto kosztarabi* occurs on the top of one mountain in southwest Virginia on the grass *Danthonia spicata*. Its extremely limited habitat makes it quite subject to extinction.

Another example of disjunct distribution is provided by *Phenacoccus minimus* Tinsley that is found in the NENA Region only on Mt. Rogers in southwest Virginia. The closest other

TABLE 1
Taxonomic summary for Coccinea in Northeastern North America

Family	Number of			
	Genera	Species	Endemics	New species
Ortheziidae	4	5		
Margarodidae	5	7		
Pseudococcidae	21	53	13	4+
Coccidae	14	30	2	
Aclerdidae	1	4		
Kermesidae	4	8	3	
Cryptococcidae	1	2	1	
Eriococcidae	3	16	2	
Lecanodiaspididae	1	1		
Cerococcidae	1	2		
Asterolecaniidae	1	4		
Diaspididae	29	87		
Total	85	219	21	4+

occurrences of this species are in California, Colorado, and New Mexico (in the USA), and in Alberta, Canada. Two other endemics are *Chorizococcus altoarcticus* (Richards) (Pseudococcidae) and *Pulvinaria ellesmerensis* Richards (Coccidae) described from Ellesmere Island (Richards, 1964). Another two endemic mealybugs are *Dysmicoccus patulae* (Rau) and *Peliococcus saratogensis* (Rau), found in Saratoga Springs, New York. The remaining endemic mealybugs are *Eurycoccus blanchardii* (King and Cockerell), *Phenacoccus flaveolus* (Cockerell), *Rhizoecus bituberculatus* McKenzie, *Trionymus cladestinus* (McConnell) and *Trionymus claviger* (King and Tinsley).

The Eriococcidae contain at least two species of endemics, *Acanthococcus chilos* Miller and Miller, and another one, *Acanthococcus carolinae* Williams. *Cryptococcus williamsi* Kosztarab and Hale is known only from maples from Virginia to Maine. Among the Kermesidae, *Kermes prinus* Baer and Kosztarab, *K. sylvestris* (Cockerell and King), and *Nanokermes folium* Baer and Kosztarab seem to be restricted to the area between Virginia and Massachusetts. The largest family, Diaspididae, is apparently unique in not having any endemic species for the NENA Region.

Faunistic relationships between scale insects in the NENA Region and other areas of the world are illustrated in Tables 2 and 3 using two families which have been studied more

TABLE 2
Faunistic relationships of Coccidae: number of species from each region that are also found in Northeastern North America (Coccidae species in NENA = 30)

Geographical Area	Number of species shared with NENA
California (Gill, 1988)	18
Japan (Kawaii, 1980)	10
Central Europe (Kosztarab and Kozár, 1988)	9
Oriental Region (Varshney, 1985)	5

TABLE 3
Faunistic relationships of Pseudococcidae: number of species from each region that are also found in Northeastern North America (Pseudococcidae species in NENA = 53)

Geographic Area	Number of species shared with NENA
California (McKenzie, 1967)	20
Neotropics (Williams and Granara de Willink, 1992)	11
China (Tang, 1992)	10
Oriental Region (Varshney, 1985)	6
Central Europe (Kosztarab and Kozár, 1988)	5
Australia (Williams, 1985)	5

intensively than the others. For the Coccidae (Table 2), we found the closest association with the fauna of California, 60% shared species. The Pseudococcidae species were also most similar to those of California, with 38% shared species (Table 3).

ADDENDUM. By the time this manuscript was printed, the final tally of the taxa included in the book (NENA Region Scales) comprised 12 families, 93 genera (1 new) and 254 species (11 new). Out of these, 14 species overwinter only indoors.

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