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A REVIEW OF THE LITERATURE ON CULICIDAE IN POLAND AND THE  
REGISTRATION AND REGIONALIZATION OF THE INSECTS  
IN OUR COUNTRY

[Following is a translation of an article by Barbara Skierska of the Laboratory of Medical Entomology, Institute of Maritime Medicine (Pracownia Entomologii Lekarskiej Instytutu Medycyny Morskiej), Gdansk (Danzig), in the Polish-language periodical Wiadomosci Parazytologiczne (Parasitology News), Vol IX, No 6, Warsaw, 1963, pp 579-97.]

Up to the present time, there have been published in Poland four major works which have discussed the occurrence of species of stinging mosquitos in our area. They are the following:

1. K. Tarwid, "Results of Dr. H. Raab's inquiry on the question of the occurrence of domestic mosquitos in Poland in 1924 and 1925" [87],
2. K. Tarwid, "Faunal notes on mosquito-type insects (muchowki) of Poland" [89],
3. K. Tarwid, "Fauna -- mosquitos of Poland" (Diptera, Culicidae) [91],
4. J. Lukasiak, "Occurrence of strains of Anopheles Meig. species, 1818, in Poland, with particular consideration given to Warsaw and environs" [43].

Tarwid's work concerns areas of Poland from before 1939, while Lukasiak's paper discusses the occurrence of the An. maculipennis complex species alone.

It has been 16 years since Tarwid's last presentation (1947). Since then several score papers have appeared in our country, and the occurrence of many species new to Poland has been confirmed. As the result of this, a list of writings and regionalization of all the stinging species of Culicidae found to date are necessary both for specialists engaged in studies on this group of insects and for those persons interested in the state of research on mosquitos in Poland.

It is very surprising that among foreign specialists so little is known about the state of culicidae research in our country. One proof of this is the fact that in monographs treating of European species only one, Natvig's, gives the location of 27 species in Poland, while other researchers mention but a few of their several species as occurring in our territory.

Passing on to a review of the works pertaining to species in Poland, I should like to mention that this review cannot be complete. As the result of the First and Second World Wars, many papers were destroyed or became unavailable within the country. In addition, in spite of the desire to mention in this review all of the papers available, a certain number of them might be unconsciously neglected. On the other hand, in some cases certain items were purposely omitted, such as articles on mosquito control in Wroclaw and in the wojewodstwo of Wroclaw, given in Bibliographie der Schlesiischen Zoologie, F. Pax (1960), since these are popular articles published in the daily press and do not contribute anything new to knowledge of mosquitos.

In this paper, the currently used names of the species are given, while later in the work in the section devoted to regionalization of the individual species, the more frequently used synonyms are given.

Up until 1905, it was possible to find only infrequent mention of the incidence of stinging mosquitos in our country. This mention was made in faunal works dedicated to Dipter, such as papers by Bobek (1897), Nowicki (1864, 1873), Czwaliny (1893), Rübssaamen (1901), Enderlein (1906, 1908), and Albień (1905).

On the basis of the above works in Poland before 1905, 9 species of stinging mosquitos were found. They are as follows: Anopheles maculipennis, Culex pipiens, Theobaldia annulata, Aedes vexans, Ae. cinereus, Ae. cantans, Ae. annulipes, Ae. dorsalis, and Ae. communis. But these designations

should be accepted with a certain degree of reserve, since in many cases, they are probably not very exact, as the result of the fact that the taxonomic characteristics of Culicidae in this area are not very well known.

In the first few years of the Twentieth century, the sudden development of research on mosquitos began in Europe after the role which these insects play in epidemiology of malaria in human beings and birds was discovered. In 1905, Speiser in his article "Diseases carried by insects" instigated research on disease-carrying insects in this number and on stinging mosquitos, at the same time stating that almost nothing was known in Pomorze and what was at that time Eastern Prussia. Schroeder (1909) in his "Contribution on Pomeranian Diptera" gave a short history of dipterous research in Pomorze and stated that Diptera had been omitted in previous faunal studies of that region.

In 1908 appeared Speiser's paper discussing the occurrence of stinging mosquitos in the area which was formerly Western Prussia. This is the first work to discuss Culicidae alone. Next four papers appeared discussing the incidence of An. maculipennis in our area. They were Czaya (1914, 1915) on the incidence of An. maculipennis in the Wroclaw area and in Kamionka (Steinkumzendorf) near Bielawa in the Sowe Mountains, Duda (1911) on the incidence of An. maculipennis in Niemcza (Nimptch) and Storch (1914) on the incidence of An. maculipennis in Upper Silesia. The interest in mosquitos from the point of view of the transmission of malaria by them had in a sense a bad effect on the faunal studies concerning this group of insects. In many cases, only the An. maculipennis species was worked on, while all other species of stinging mosquitos were neglected. The best example of this is perhaps the Wroclaw center, where in spite of the studies on anopheles and the many drives to control domestic mosquitos in the Wroclaw area, the level of knowledge about stinging Culicidae in 1927 must have still been very meager, since it was in this year that Professor Wilhelmi, director of the Preus. Landesanstalt f. Wasser-, Boden-, u. Lufthygiene was invited from Berlin. He investigated those factors of various species of mosquitos which were of biological interest and showed their typical hatching places. Mosquitos collected in the following years in Wroclaw were sent to Berlin, where F. Reus identified them. In the 1920's two further papers were published on the incidence of stinging mosquitos in Poland. The first of these was E. Martini's work (1920) noting the species of Culicidae from Gdansk, the Gdansk powiat, Hel, and other places. The second work was Sack's paper, published almost in 1925, but

discussing Diptera collected during the First World War in Bialowieza, among which were 10 species of mosquito. As the result of the above research, the list of stinging mosquitos then found in Poland was increased by 9 more species, i.e., An. claviger, An. punctor, An. leucomolas, An. flavescens, An. excrucians, An. geniculatus, An. sticticus, An. rusticus, and Taeniorrhynchus richiardii.

After the First World War the studies in Poland were done mainly from the epidemiological point of view, and therefore mainly concerned the species An. maculipennis. The first post-war papers were publications by Anigstein (1925) and Wasilewski (1923), discussing the incidence of anopheles and other domestic mosquitos.

In the years 1929-1935 the German authors Peus (1929 a, b, 1930, 1933, 1934, 1935) and Martini (1931) listed from Upper Slask, Pomerania (Pomorze), and what was formerly Eastern Prussia the following species first noted in Polish territory: Theobaldia alaskaensis, Th. ochroptera, An. riparius, An. intrudens, An. diantaeus, and An. caspius. Then Tarwid (1934, 1935, 1938 a, b, 1947 b) mentioned stinging mosquitos of the following further species occurring in our territory: An. cataphylla, An. nigrinus, Culex territans and Th. morsitans (the species An. plumbeus and An. cypricus found by this author in Polesie and Th. fumipennis and C. torrentium found in Smorgonie were not recognized). In 1938 Carl did a faunal work on Culicidae of the Slupsk region, and Weyer (1938) found An. atroparvus in Gryfina and in Rokitnica near Bytom. Hence, by 1939, 29 species of stinging mosquito were found in our country. The Second World War did not entirely stop Polish research. During the occupation 5 papers were prepared which were published after the war (Tarwid 1947 a, Knopacka 1947, and Dymowska 1950). In 1943 a work by Olzach also came out. It discussed the incidence of strains of the An. maculipennis in the region from Wejherow and Slupsk to Katowice.

After the Second World war, as after the First, the initial interest was again confined to the An. maculipennis species, in connection with the incidence of malaria in some of our areas. In this period detailed biological studies were also made of An. atroparvus occurring in coastal areas (Lachmajer 1948, 1949 a, b, c, 1950 a, b, c, 1951). It was only after 1952 that works concerning all species of stinging mosquitos appeared by Tarwid (1952) and Lachmajer (1954). In the years 1954-1962, in addition to the numerous faunalecological papers (Chodorowski (1958 a, b, c), Dabrowska-Tarwid (1954), Dabrowska (1959 a, b), Dabrowska-Prot

(1960 a, b, 1961), Lukasiak (1955, 1956 a, b, 1957 a, b, 1958 a, b, 1959 a, b, 1960 a, b), Lukasiak-Zawislak (1958), Skierska (1955, 1956, 1958, 1959, 1960, 1961, 1962, 1963 (in print)), Skierska-Lachmajer (1960), Wojnarowicz (1960, 1961), Zwolski (1949)), several works appeared in Poland discussing stinging mosquitos from the epidemiologic point of view (Lachmajer-Skierska-Wegner (1958), Sachmajer-Wegner (1958), Zoltowski-Rogozinski (1960), Zoltowski and Wroblewska-Maularczykowa (1961 a, b), Zoltowski (1961)) and in connection with mosquito control and mosquito resistance to insecticides (Bojanowska (1960), Bosak-Dworak-Golba-Ogonska (1961, 1962), Zych (1959, 1962), Zoltowski (1958)).

In spite of these vigorously developing studies in our country on stinging mosquitos, the incidence of Culicidae has still not been checked in many wojewodztwos, except for An. maculipennis. Previous studies, except for nineteenth century publications and a few German papers which discussed in general the occurrence of a few species in, for example, Eastern Prussia, without giving exact location, is concentrated principally in a few regions, as is clearly visible on the map presented below. It would seem that a study of areas previously neglected might produce much valuable information on stinging mosquitos occurring in Poland.

Up to the present time, in addition to the species previously mentioned, the following also appear in Poland: An. plumbeus, Th. suborchea, Th. fumipennis, Ae. cyprius, Ae. detritus, Ae. nigripes, Ae. pullatus, C. molestus, C. torrentium, so that the list of mosquitos appearing in our country includes 39 species (Table I). This list may still be expanded to include Taeniorhynchus buxtoni, which was recently found by Gucwicz (1962) in the USSR near the southeastern border of Poland; Ae. behningi, given by Rybinsky (1933) from Polesie; Ae. beklemishevi, commonly found in western areas of the USSR; and perhaps Ae. refiki, noted in Niemcze (partly in Lübeck) and in Czechoslovakia; and An. algeriensis, noted in Northern Germany and in Estonia (Remm, 1957).

It is also probable that Th. glaphyroptera, found on the Czech side of the Karkonosz Mountains, will also be found in Poland. This species was actually given by Czwalin [12] from Gdansk, but Speiser [89] strongly refuted this, so that the statement of the incidence of this species in our territory needs confirmation.

There should also be a taxonomic check made on the species Ae. punctor commonly occurring in some of our areas.



This work would make it possible to list the species Ae. hexodontus and Ae. pionips, which up until recently were not differentiated from Ae. punctor in Palearktyka.

#### Regionalization of Stinging Mosquito Species Found in Poland

From among the 39 stinging mosquito species registered in our country, 10 are noted by almost all authors, so that we should suspect that they commonly occur all over Poland. They are the following species: An. maculipennis, An. claviger, Th. annulata, C. pipiens, Ae. cinereus, Ae. vexans, Ae. communis, Ae. cantans, Ae. excrucians, and Ae. annulipes. In their description we will not mention the items in which their occurrence is mentioned.

1. Anopheles (Anopheles) maculipennis Meigen, 1818 -- An. mac. typicus Hackett et Missiroli 1935 and An. mac. mes-sae Falleroni 1926.

The occurrence and biology of this species in Poland was discussed in Lukasiak's paper [13]. This is a holarctic species, commonly found all over the country. It was first noted by Nowicki (1873) in Galicia.

2. Anopheles (Anopheles) atroparvus Van Thiel, 1927 (an. maculipennis, atroparvus Van Thiel strain, An. labranchiae, strain -- atroparvus Buonomini et Mariani (1946), An. labranchiae s. sp. atroparvus Frizzi (1954), An. atroparvus s. sp. atroparvus Rioux (1958)).

Palearctic species. Larvae develop in salt water, but they may also occur in fresh water. Noted for the first time in our area by Weyer (1938) from Gryfin and Rokitnica near Bytom. It was next noted by Lachjaerowa (1948, 1949, 1950 a, b, 1958 a, b, 1961) on the Baltic coast and in Inowraclaw.

3. Anopheles (Anopheles) claviger Meigen, 1804 (An. bifurcatus Meigen, 1818).

Palearctic, silvan species, often found in animal shelters in communities located near forests. Larva develop in containers with cool very clean water. This species commonly occurs throughout the country. It was first noted by Speiser (1908) in the Sierakowice region.

4. Anopheles (Anopheles) plumbeus Stephens, 1928 (An. nigripes Staeger, An. intermedius Schingarew).

Palaearctic species, typically silvan. Larvae develop in leafy-tree hollows filled with rainwater. It was first noted in the area presently Poland by Lukasiak (1955, 1956) in Kudowa, later by Skierska (1960) in Bialowieza.

5. Theobaldia (Theobaldia) annulata Schrank, 1776.

Palaearctic species, frequently in places where animals or human beings live. Larvae develop mainly in containers of impure water containing large amounts of decaying organic particles. A common species throughout the country, it was first listed by Nowicki (1864) in the Crakow region.

6. Theobaldia (Theobaldia) subochrea Edwards, 1921  
(Th. (Th) annulata subochrea Edwards).

Palaearctic species with lesser known biology. Larvae develop mainly in salt water. Noted for the first time in Poland by Skierska (1955) in the Szczecin wojewodztwo, then by Lukasiak in Miedzydroje (1960) and in Warsaw (1961 b).

7. Theobaldia (Theobaldia) alaskaensis Lundlow, 1906.

Holarctic species, northern, very numerous in tundra. In moderate climates found both in forests and in transition areas from forest to meadow. Aggressive towards people. Listed by Martini (1931) near Szczecin, by Peus (1929) in Swinoujscie and Upper Silesia, then by Karl (1933) found near Slupsk. Tarwid (1938) listed it from Kampinos, Skierska (1955) in the Szczecin wojewodztwo, near Kartuzy (1958) and from Bialowieza (1960), Lukasia (1959 a) in Krynica Morska, and Wojnarowicz (1960) in Mikolajki.

8. Theobaldia (Culicella) fumipennis Stephens, 1825.

Palaearctic species, both silvan and meadow. Unaggressive to people, as is the entire Culicella subgenus. Noted in Poland by Dabroska and Tarwid (1954) in Kampinos.

9. Theobaldia (Culicella) morsitans Theobald, 1901.

Holarctic species, silvan and meadow. Larvae hibernate in deep water containers which do not freeze to the bottom. Females are not aggressive towards people. In our land, it was first registered by Karl (1938) in the Slupsk region and by Tarwid (1938) from Kampinos, then by Skierska (1961) from Sztutow and by Lukasiak (1961 a) from Warsaw.

10. Theobaldia(Culicella) ochroptera Peus, 1935.

Palaearctic species, biology similar to Th. morsitans. In 1935 Peus lists the occurrence of this species in Niemczy in Upper Silesia. Then Lukasiak notes it in Krynica Morska (1959 a) and in Warsaw (1961 a), Wojnarowicz (1960) in Mikolajki, and Skierska (1961) in Sztutow.

11. Taeniorhynchus (Coquillettidia) richiardii Ficalbi, 1889. (Mansonia (Coq.) richiardii Ficalbi).

Palaearctic species. Larva hibernate in large permanent water containers. This species in Poland was first listed by Martini (1920) in Gdansk, then Peus (1929) mentions its occurrence in Swinoujscie and in the entire Odra Valley near Wroclaw. In 1938 it was noted by Tarwid in Kampinos, and by Karl near Slupsk. Then it was given by Dabrowska and Tarwid (1954, 1959) in Campinos, by Lukasiak in Krynica Morska (1959 a) and in Kampinos (1959 b) and Warsaw (1961 a), by Skerska in Bialowieza (1960) and Sztutow (1961) and by Bosak et al (1961) in Karsibroze.

12. Aedes (Ochlerotatus) dorsalis Meigen before separation of Aedes (O) dorsalis from Ae. (O) caspius.

First noted in 1873 by Nowicki in the Galicia area, then by Bobek (1883, 1884) in the Crakow and Przemysl area, by Czwalina (1893) in Eastern Prussia, by Speiser (1905) in the Sierakowice region, by Martini (1920) in the Gdansk region, and by Sack (1925) in Bialowieza.

Holarctic species, meadow, rarely found in forests. Very frequent in coastal areas, readily migrating substantial distances. Larvae develop in fresh and salt water. In Poland Lachmajer (1954) gives the species in Szczecin, Skierska (1955) in the Szczecin wojewodztwo, in Bialowieza (1960), in Gdansk (1960) and in Sztutow (1961), Lukasiak in Kampinos (1959 b) and in Warsaw (1961 a, b), and Wojnarowicz in Mikolajki (1960).

13. Aedes (Ochlerotatus) caspius Palla, 1771 (Ae. (O) punctatus Meigen).

Palaearctic meadow species, with biology similar to Aedes dorsalis. Peus (1930) states that this species occurs in the Odra Valley in Vilesia, Lachmajer notes it in Szczecin (1954), Skierska in the Szczecin Wojewodztwo (1955), in Gdansk (1960), and in Sztutow (1961), and Bosak et al (1961) in Karsiborze.

14. Aedes (Ochlerotatus) cantans Meigen, 1818 (Ae.

(O) maculatus Meigen).

Palaearctic species, typically silvan, also found in broad-leaf, mixed, and coniferous forests. Given by some authors as typical also for transitional areas from forest to meadow. Larvae develop only in shaded containers. Commonly occurs throughout the country. First noted by Czwalińska (1893) in Eastern Prussia.

15. Aedes (Ochlerotatus) riparius Dyar et Knab, 1907 (Ae. (O) semicantans Martini).

Holarctic species, typical of meadows, marshes, and peat bogs. Grouped in the United States with subarctic species. Larvae are found most often in containers with stagnated bottoms. Registered for the first time in Poland by Edwards (1921) in the Poznań collections of Loew, then by Tarwid (1935) in Bielany outside Warsaw and in Puszcza Kampinoska (1938, 1952), by Dąbrowska and Tarwid (1954) in Kampinos, by Łukasiak (1959 b) in Kampinos and in Warsaw (1961 a), by Skierska in Białowieża (1960), in Gdansk (1960) and in Sztutowo (1961), and by Bosak et al. (1961) in Karłowice.

16. Aedes (Ochlerotatus) annulipes Meigen, 1930 (Ae. (O) quartus Martini).

Palaearctic species, typical for transition areas of forest to meadow and for sparse forests. Noted throughout the country, for the first time by Nowicki (1873) in Galicia.

17. Aedes (Ochlerotatus) excrucians Walkeri, 1856.

Holarctic species, usually grouped with meadow species but often found on the edge of forests. Noted throughout the country, for the first time listed by Martini (1920) in Gdansk.

18. Aedes (Ochlerotatus) flavescens Müller, 1764 (Ae. (O) lutescens Fabricius, Ae. (O) variegatus Schrank).

Holarctic meadow species, frequent in meadows stretching out along the Baltic. First noted by Martini (1920) in Gdansk. Then given by Peus (1934) in Cedynia-on-the-Odra, by Lachmajer (1954) in Szczecin, by Skierska in the Szczecin województwo (1955), in Białowieża (1960), in Gdansk (1960) and in Sztutowo (1961), by Łukasiak in Kampinos (1959 b), in Krynica Morska (1959 a), Miedzyzdrój (1960) and Warsaw (1961 a, b), by Wojnarowicz in Miłolańki (1960), and by

Bosak et al (1961) in Karsiborze.

19. Aedes (Ochlerotatus) cyprius Ludlow, 1920 (Ae.  
(0) frey Edwards Ae. (0) lutescens Fabricius, Ae. (0) vari-  
egatus Schrank).

Palaearctic Eastern European species found in meadows and on the edge of forests. Larvae occur in relatively deep containers with cool water. First found in Poland in 1954 in Szczecin by Lachmajerowa, then listed by Skierska in the Szczecin wojewodztwo (1955), in Bialowieza (1960), and in Sztutow (1961), by Lukasiak in Krynica Morska (1959 a) and Kampinos (1959 b), and by Zwolski (1959) in Lubartow. According to Peus (1951) this species was very frequent in 1941 on the shores of Lake Mamra.

20. Aedes (Ochlerotatus) leucomelas Meigen, 1804 (Ae.  
(0) salinellus Edwards).

Palaearctic meadow species, frequent in river valleys. First registered in our areas by Martini (1920) in Gdansk and environs. Then Tarwid listed it (1935, 1938) in Bielany outside Warsaw, Lukasiak (1959 b) in Kampinos and Warsaw (1961 b), and Skierska in Bialowieza (1960) and Gdansk (1960).

21. Aedes (Ochlerotatus) detritus Halliday, 1833 (Ae.  
(0) salinus Ficalbi).

Palaearctic meadow species. Larvae develop in salt water, as the result of which they occur most frequently near sea shores. In Poland this species has been noted but once by Lachmajerowa (1954) in Szczecin, in a water container on the ruins of salt deposits.

22. Aedes (Ochlerotatus) cataphylla Dyar, 1916 (Ae.  
(0) cataphylla var. rostochiensis Martini).

Holarctic species found both in forests and in meadows. In Poland it was listed for the first time by Tarwid (1935, 1938), in Bielany outside Warsaw, then by Karl in the Slupsk region, by Lukasiak in Kampinos (1959 b) and in Warsaw (1961 b), by Skierska in Bialowieza (1960), by Wojnarowicza (1960) in Mikolajki, and by Bosak et al (1961) in Karsiborze.

23. Aedes (Ochlerotatus) communis De Geer, 1776 (Ae.  
(0) nemorosus Meigen).

Common in northern parts of Holarctica. Occurs mainly in forests and mountains. Larvae develop in containers

with relatively cool water. Occur commonly throughout the country. First noted in Poland by Nowicki (1864) in the Crakow area.

24. Aedes (Ochlerotatus) punctor Kriby, 1837 (Ae. (0) var. meigenanus Dyar).

Common in the northern parts of Holarctica. Silvan and peat bog species, gladly migratory. In Poland it was registered for the first time by Martini (1920) in Gdansk, then by Peus (1929) in Swinojskie. Tarwid (1938, 1952) found it in Kampinos, Karl (1938) in the Slupsk region, Dabrowsk (1954, 1959) in Kampinos, Skierska in the Szczecin wojewodztwo (1955), in the Kartusk powiat (1958), in Bialowieza (1960 a), in Gdansk (1960 b) and in Sztutow (1961). Lukasiak found it in Krynica Morska (1959 a) and in Kampinos (1959 b), Wojnarowicz (1960) in Mikolajki, and Bosak et al in Karsiborze (1961).

25. Aedes (Ochlerotatus) sticticus Meigen, 1838 (Ae. (0) lateralis Meigen).

Holarctic species of the lowlands, frequent in flood regions of larger rivers, found on the edge of forests and in sparse forests. First given by Sack (1925) in Bialowieza, then by Peus (1933) in the flood areas of the Odra. Tarwid (1938, 1952) listed this species in Kampinow, as did Lukasiak (1959 b). Skierska found it in the Kartus region (1958), in Bialowieza (1960), in Gdansk (1960), and in Sztutow (1961).

26. Aedes (Ochlerotatus) nigrinus Eckstein, 1918 (Ae. (0) sticticus Martini).

Palaearctic meadow species. First noted in Poland by Tarwid (1934, 1938) in Bielany outside Warsaw, then by Lukasiak in Krynica Morska (1959 a), Kampinos (1959 b) and Warsaw (1961 a) and by Wojnarowicz (1960) in Mikolajki.

27. Aedes (Ochlerotatus) nigripes Zetterstaedt, 1838.

Holarctic, subarctic species. Common and often even extremely annoying in the far North. Easily migrates long distances. Larvae develop in water mixed with melting snow. Found once in Poland by Skierska in Sztutow (1962).

28. Aedes (Ochlerotatus) pullatus Coquillet, 1904.

Holarctic species, noted in Europe solely in mountains. Found for the first time in Poland by Lukasiak (1955) in

Kudow, then by Wojnarowicz (1962) in the Tatra Mountains.

29. Aedes (Ochlerotatus) intrudens Dyar, 1919.

Holarctic species, found in forests and in forest-meadow transition areas. First found in Poland by Edwards (1921) in Poznan collection of Loew. Then Tarwid came across this species in Bielany outside Warsaw, Karl (1938) near Slupsk, Lachmajer (1954) in Szczecin, Skierska in the Szczecin wojewodztwo (1955) and in Bialowieza (1960), and Wojnarowicz (1960) in Mikolajki.

30. Aedes (Ochlerotatus) diantaesus H.D.K., 1917.

Holarctic, silvan species. Martini (1931) gives it as a species frequent in Eastern Prussia and in Northern Germany east of Hamburg. In 1938 Karl found it near Slupsk, then Lachmajer (1954) in Szczecin, Skierska in the Szczecin wojewodztwo (1955), in the Kartuzy area (1938), in Bialowieza (1960) and in Gdansk (1960), and Lukasiak in Kampinos (1959 b) and in Warsaw (1961 a).

31. Aedes (Ochlerotatus) rusticus Rossi, 1790 (Ae. (O) diversus Theob.).

Palaearctic species, frequent in Western Europe. The eastern limit of its occurrence (according to Kirschberg and Petri, 1955) is consistent with the isotherm  $-1^{\circ}\text{C}$  for January, with a tendency to a further shift to the East. In our country it was first found by Martini (1920) in Hel, then by Skierska (1955) in Szczecin wojewodztwo, and by Lukasiak in Kampinos (1959 b) and in Warsaw (1961 b).

32. Aedes (Finlaya) geniculatus Olivier, 1791 (Ae. (F) ornatus Meigen).

Palaearctic silvan species. Larvae develop in broadleaf tree hollows, often together with the An. plumbeus larvae. In our country, listed by Martini (1920) in Gdansk, by Sack (1925) in Bialowieza, by Lachmajer (1954) in Szczecin, by Lukasiak in Kudowa (1955), in Szczawno Zdroju and Szklarska Porega (1958 b), in Kampinos (1959 b) and in Warsaw (1961 a), by Skierska in the Kartuzy area (1958) and in Bialowieza (1960).

33. Aedes (Aedimorphnus) vexans Meigen, 1830.

Holarctic meadow species, but also found in administered forests. Frequent in flood areas of larger rivers,

easily migrating long distances. Larvae develop in fresh water, but they can also be found in salt water. Commonly occur throughout the country, first being found by Nowicki (1873) in Galicia.

34. Aedes (Aedes) cinereus Meigen, 1818.

Holarctic species, typical for meadows and sparse forests. Larvae hatch in large numbers in meadow basins. Commonly occur throughout the country. First found by Nowicki (1873) in Galicia.

35. Culex (Barraudius) modestus Ficaibi, 1890.

Palaearctic species, widely spread over warm countries of Europe, but also found in Southern Siberia. Larvae occur in well-lit containers, often together with the larvae of An. maculipennis, C. pipiens, and C. torrentium. Aggressive to people. In Poland they have been found to date but once by Lukasiak (1959 b) in Kampinos.

36. Culex (Neoculex) territans H.D.K., 1917 (C. (N) apicalis Adams).

Holarctic species, common in Western Europe, does not attack people. In Poland they were first noted by Tarwid (1938, 1952) in Kampinos, then by Lachmajerowa (1954) in Szczecin, by Lukasiak in Kudow (1955), Kampinos (1959 b), and Warsaw (1961 a, b), and by Wojnarowicz (1960) in Mikolajki.

37. Culex (Culex) pipiens Linne, 1758 (C. bicolor. C. ciliaris L.).

Cosmopolitan species, usually unaggressive to people. Larvae occur most frequently in containers near homes, such as fire barrels, rain barrels, etc., but they may also be found in natural silvan and meadow receptacles. They commonly occur throughout Poland, first being found by Nowicki (1864) near Crakow.

38. Culex (Culex) molestus Forskal, 1775 (Culex pipiens Forskal).

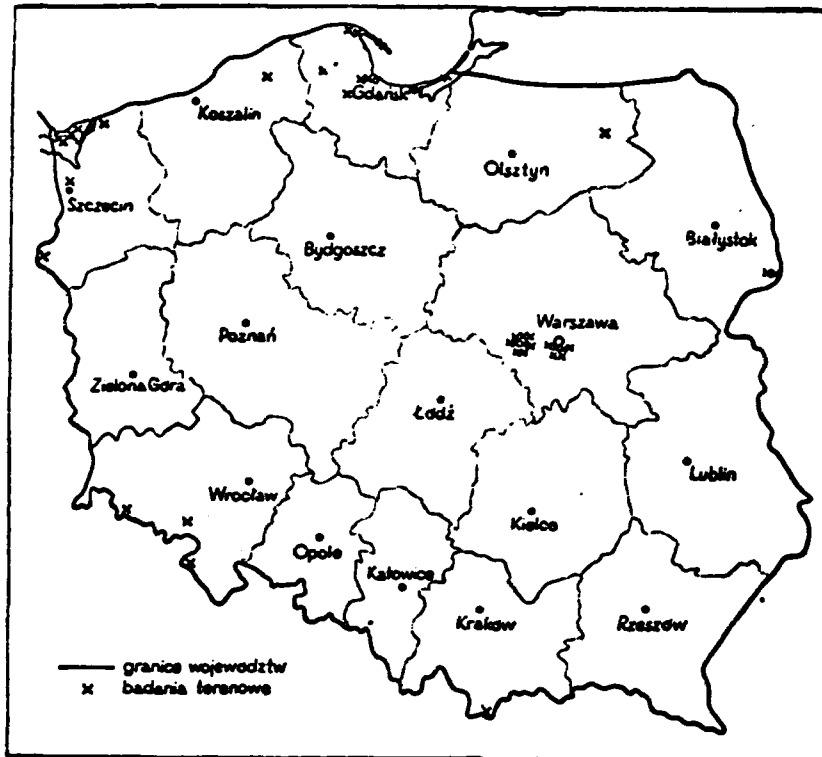
Synanthropic species, hatches mainly in covered artificial water containers, often in complete dark (vats filled with water standing in basements, etc.). In summer and fall the larvae are found in fire barrels and other containers of this type near the house. This type is often noted as at-



tacking people in hospitals, subways, etc. First noted by Skierska (1960) in Kamien Pomorski, then in Bialowieza (1960) and Sztutow (1961). It was found by Lukasiak (1959 a) in Krynica Morska, in Miedzyzdroje (1960), and in Warsaw (1961 a, b).

39. Culex (Culex) torrentium Martini, 1924 (C. (C) exilis Dyar).

Palearctic species, often not distinguished from Culex pipiens, as the result of which its biology is rather little known. Larvae can develop in very impure containers (together with Erythraea sp. larvae), but they also develop in rather clean water. They usually do not attack people. The species was first found on territory presently Poland by Lukasiak (1955) in Kudow, then in Miedzyzdroje (1960) and in Warsaw (1961 a). It was found by Skierska in Sztutow (1961).



Localization by regional research on Culicidae conducted after 1900 (not including research on *An. maculipennis* and *An. atroparvus* nor research describing mosquitos where exact localization is not established).

[Legend:] ..... województwo boundaries  
 x local research

TABLE I.

Species	Species of stinging mosquitos in:			
	Germany Poland	European parts of USSR (except Caucassus, Crim- ea, southern parts of Ukraine)	Czecho- slovakia	
1. Anopheles (A) maculipennis = A. typicus M. et H., A messiae Faller.,	+	+	+	+
2. Anopheles (A) atroparvus V. Thiel	+	+	+	+
3. Anopheles (A) claviger Meigen	+	+	+	+
4. Anopheles (A) plumbeus Stephens	+	+	+	+
5. Anopheles (A) labranchiae Falleroni	-	-	-	-
6. Anopheles (A) algeriensis Theobald	+	+	+	+
7. Theobaldia (T) annulata Schrank	+	+	+	+
8. Theobaldia (T) subochrea Edwards	+	+	+	+
9. Theobaldia (T) alaskaensis Ludlow	+	+	+	+
10. Theobaldia (T) glaphyoptera Schiner (T. bergrothi Edwards)	+	+	+	+
11. Theobaldia (C) fumipennis Stephens	+	+	+	+
12. Theobaldia (C) morisitans Theobald	+	+	+	+
13. Theobaldia (C) ochroptera Peus	+	+	+	+
14. Taeniorhynchus (Coq) richiardii Fic.,	+	+	+	+
15. Taeniorhynchus (Coq) buktoni Edwards	-	-	-	-
16. Aedes (O) dorsalis Meigen	+	+	+	+
17. Aedes (O) caspius Pallas	+	+	+	+
18. Aedes (O) cantans Meigen	+	+	+	+
19. Aedes (O) riparius D. et Knab	+	+	+	+
20. Aedes (O) annulipes Meigen	+	+	+	+
21. Aedes (O) excrucians Walker	+	+	+	+
22. Aedes (O) flavescens Müller	+	+	+	+
23. Aedes (O) cyprius Ludlow	+	+	+	+
24. Aedes (O) behningi Martini	-	-	-	-
25. Aedes (O) beklemishevi Devisova	-	-	-	-
26. Aedes (O) leucomelas Meigen	+	+	+	+

Table I. (continued)

27.	Aedes	(O)	detritus	Halliday	+					+					
28.	Aedes	(O)	cataphylla	Dyar	+					+					
29.	Aedes	(O)	communis	De Geer	+					+					
30.	Aedes	(O)	punctator	Kirby	+					+					
31.	Aedes	(O)	sticticus	Meigen	+					+					
32.	Aedes	(O)	nigrinus	Eckstein	+					+					
33.	Aedes	(O)	nigripes	Zetterstaedt	+					+					
34.	Aedes	(O)	nearcticus	Dyar	-					-					
35.	Aedes	(O)	pullatus	Coguillet	+					+					
36.	Aedes	(O)	diantæus	H.D.K.,	+					+					
37.	Aedes	(O)	intrudens	Dyar	+					+					
38.	Aedes	(O)	rusticus	Rossi	+					+					
39.	Aedes	(O)	refiki	Medshid	+					+					
40.	Aedes	(O)	pulchritersis	Rondani	-					-					
41.	Aedes	(F)	geniculatus	Olivier	+					+					
42.	Aedes	(Aedmph.)	vexans	Meigen	+					+					
43.	Aedes	(A)	cinereus	Meigen	+					+					
44.	Aedes	(A)	rossicus	D.G.M.,	-					-					
45.	Culex	(B)	modestus	Ficalbi	+					+					
46.	Culex	(N)	terrītans	H.D.K.,	+					+					
47.	Culex	(N)	hortensis	Ficalbi	+					+					
48.	Culex	(C)	martini	Medschid	+					+					
49.	Culex	(C)	pipiens	Linne	+					+					
50.	Culex	(C)	molestus	Forskål	+					+					
51.	Culex	(C)	torrentium	Martini	+					+					
Total											42	39	46	40	

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