

Distribution chart for European mosquitoes

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The early work on the unravelling of the *Anopheles maculipennis* complex in Europe during the 1920s and 1930s, as described by Bates (1949), was an object lesson on what could be achieved with the equipment and techniques available at that time. With the development of increasingly sophisticated equipment and methods, our knowledge of the European mosquitoes continues to expand. The earliest known European mosquito, *Culex erikae* was discovered in Baltic amber from the Neocene (Szadziewski & Szadziewski, 1985). Although this species is extinct, and some taxonomic problems await resolution, nearly one hundred species, belonging to seven genera, are recognised in the present day European fauna.

A number of problems of identification and taxonomy still exist (e.g. possible confusion between *Culex univittatus* and *perexiguus*) and new species will be named as a result of the newer taxonomic techniques being applied to the European fauna (e.g. *Aedes detritus* and *Aedes caspius* complexes) (Pasteur *et al.*, 1977; Cianchi *et al.*, 1980). It is the prime aim of this article to stimulate further interest in producing detailed country distribution maps, using a grid system similar to those published for Britain (Snow *et al.*, 1997) and to compile these for the whole of Europe. At present the available information is very variable with detailed information for only a few countries. The authors would be grateful to have errors, omissions and alternative views communicated to them either personally or through the pages of the *Bulletin*.

Increasing knowledge of the mosquito fauna reveals a growing list of mosquito-borne diseases afflicting a variety of European vertebrates, some of a zoonotic character. This makes a detailed knowledge of the distribution of each species essential. An epidemic of West Nile Fever in Romania, probably transmitted principally by *Culex pipiens*, occurred as recently as the summer and autumn of 1996. An estimated 90,000 to 100,000 people in Bucharest and an extensive area of southern and eastern Romania became infected, with about 40 deaths attributable to the virus (WHO Regional Office for Europe, 1996; Nicolescu, 1998). The recent addition of *Aedes albopictus* to the European fauna has increased the risk of outbreaks of the dengue group of viruses (Romi, 1995; Dalla Pozza & Majore, 1992).

Mosquito distribution has been dealt with in many excellent treatises on a country or regional basis (e.g. Braga, 1931; Briegel, 1973; Encinas Grandes, 1982; Gutsevich *et al.*, 1971; Marshall, 1938; Mihalyi & Sztankay-Gulyas, 1963; Mohrig, 1969; Moog, 1995; Moussiegt, 1986; Natvig, 1948; Nicolescu, 1995; Peus, 1951; Romi *et al.*, 1997; Samanidou-Voyadjoglou & Darsie, 1993; Skierska, 1977; Snow *et al.*, 1997; Wesenburg-Lund, 1921) and others are in preparation. However, an overview of European mosquito distribution on a country basis has not previously been attempted, although Dahl & White (1978) listed species on a regional basis.

The chart gives a list of the species of mosquitoes currently recognized in Europe together with their known distribution, as determined from information provided by personal communications and from published literature, which appears as an annexe to this article.

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Explanation of distribution chart

The individual countries/ areas are given at the top of the chart in an abbreviated form. They are, from left to right: Britain (BRIT), Ireland (IRE), Channel Islands (CHIS), Norway (NOR), Sweden (SWE), Finland (FIN), Denmark (DEN), France (FRA), Corsica (CORS), Spain (SPAIN), Balearics Islands (BALA), Portugal (PORT), Belgium (BELG), Netherlands (NETH), Luxembourg (LUX), Germany (GER), Austria (AUST), Czechoslovakia (CZECH), Slovakia (SLOVK), Poland (POL), Switzerland (SWITZ), Italy (ITAL), Sardinia (SARD), Sicily (SIC), Maltese Islands (MALT), Yugoslavia (YUGO), Croatia (CROA), Bosnia-Herzegovina (BOSN), Slovenia (SLOVN), Macedonia (MACE), Albania (ALB), Greece (GREE), Turkey (European region) (TURK), Hungary (HUNG), Romania (ROM), Bulgaria (BULG), Moldova (MOLD), Ukraine (UKR), Belarus (BELA), Russia (European region) (EuRUS), Lithuania (LITH), Latvia (LATV) and Estonia (EST).

Use of the chart

It is suggested that the four pages of the chart are photocopied, trimmed and arranged to form a single sheet.

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SARD	SIC	MAL	YUGO	CROA	BOSN	SLOVN	MACE	ALB	GREE	TURK	HUNG	ROM	BULG	MOLD	UKR	BELA	ETRUS	LITH	LATV	EST		
																					<i>Anopheles algeriensis</i>	
																						<i>Anopheles atroparvus</i>
																						<i>Anopheles beklemishevii</i>
																						<i>Anopheles clariger</i>
																						<i>Anopheles hyrcanus</i>
																						<i>Anopheles labranchiae</i>
																						<i>Anopheles maculipennis</i>
																						<i>Anopheles marleri</i>
																						<i>Anopheles melanoon</i>
																						<i>Anopheles messeae</i>
																						<i>Anopheles petraguani</i>
																						<i>Anopheles plumbeus</i>
																						<i>Anopheles sacharovi</i>
																						<i>Anopheles subalpinus</i>
																						<i>Anopheles cinereus</i>
																						<i>Anopheles multicolor</i>
																						<i>Anopheles sergentii</i>
																						<i>Anopheles superpictus</i>

																						<i>Aedes cinereus</i>
																						<i>Aedes geminus</i>
																						<i>Aedes taeniorhynchus</i>
																						<i>Aedes vexans</i>
																						<i>Aedes vittatus</i>
																						<i>Aedes echinus</i>
																						<i>Aedes geniculatus</i>
																						<i>Aedes gicolladoi</i>
																						<i>Aedes annulipes</i>
																						<i>Aedes atropalpus</i>
																						<i>Aedes behningi</i>
																						<i>Aedes berlandi</i>
																						<i>Aedes cantans</i>
																						<i>Aedes caspius</i>
																						<i>Aedes cataphylla</i>
																						<i>Aedes commutatus</i>
																						<i>Aedes cypricus</i>
																						<i>Aedes darwini</i>
																						<i>Aedes dorsalis</i>
																						<i>Aedes duplex</i>
																						<i>Aedes excrucians</i>
																						<i>Aedes flavescens</i>
																						<i>Aedes hexodontus</i>
																						<i>Aedes hungaricus</i>
																						<i>Aedes impiger</i>
																						<i>Aedes instrudens</i>
																						<i>Aedes leucomelas</i>
																						<i>Aedes mariae</i>
																						<i>Aedes nigritus</i>
																						<i>Aedes nigripes</i>
																						<i>Aedes pionipes</i>
																						<i>Aedes pulcritarsis</i>

Appendix

Some major references to the distribution of mosquitoes in Europe

In compiling the distribution chart, and maps of European mosquitoes that will appear in future issues, numerous personal communications were made which have been acknowledged. In addition to these, the following references were used. Clearly this listing is incomplete and the editors are inviting researchers throughout Europe to contribute individual articles on the key publications relating to the distribution of mosquitoes in their countries. The following list of key works is arranged alphabetically by country.

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