

Ambrosia: A New Impending Disaster for the Israeli Allergic Population

Yoav Waisel PhD, Amram Eshel PhD, Nurit Keynan PhD and Dafna Langgut PhD

Department of Plant Sciences, Tel Aviv University, Ramat Aviv, Israel

ABSTRACT: The pollen of Ambrosia (ragweed) is one of the major causes of pollen-induced allergy worldwide. This genus of plants has apparently evolved in North America but later spread into Europe and Asia. Flowering of the Ambrosias starts in mid-July and continues throughout the autumn and is a cause of major morbidity to allergic sensitized patients. The invasion of new species of Ambrosia into Israel is still in progress. Plants of *Ambrosia artemisiifolia* (American short ragweed), *Ambrosia trifida* (American giant ragweed), *Ambrosia confertifolia*, *Ambrosia grayi* and *Ambrosia tenuifolia* are increasingly found in Israel, mainly in the Hula valley in the eastern Galilee and near the Alexander River in the Sharon plain. From experience it is known that the time it takes to eradicate a new invasive species is limited. Action should be taken immediately or this new invasion will spread and cause a significantly increased burden of morbidity and increased health costs in Israel.

KEY WORDS: Ambrosia, pollen, allergens, invading plants

Pollen-induced allergy is a well-known source of suffering for millions of people around the world, and several plant species are responsible. One of the major causes of pollen-induced allergy is the pollen of Ambrosia (ragweed).

The genus Ambrosia (Asteraceae) comprises 42 species that are distributed over North America and Europe. The plants are robust, having lobed or divided leaves with a characteristic scent. The plants flower in the late summer and autumn. The flowers of Ambrosia are inconspicuous and are organized in small greenish flower heads. Male and female flowers develop in separate heads on the same plant, where the male heads are at the top of the branches and the female ones are lower down. The male flowers produce a large number of pollen grains that are spread by the wind over large distances.

The genus apparently evolved in North America but was later spread into Europe and Asia. One species, *Ambrosia maritima* L., is native to southern Europe as well as to the Israeli coastal plain. It was first reported from the coasts of the Adriatic Sea some 150 years ago [1]. One cannot rule out the possibility that the clones of *Ambrosia maritima* in Israel also came from Europe and were

introduced by humans in historic times. By the end of the 19th century three American species of Ambrosia were observed in Western Europe: *Ambrosia artemisiifolia* (short ragweed), which is the most common, *Ambrosia trifida* (giant ragweed) and *Ambrosia psilostachya* (perennial ragweed).

The main invasion of Ambrosia into Europe started after the Second World War, when seeds of Ambrosia contaminated shipments of grains and clover seeds that were sent from the United States. The spread into Italy was mainly from Genoa to northern Italy and in France the plants spread from Marseille into the Rhone valley. From there the plants spread eastwards into Austria, Switzerland, Germany and Hungary [2]. The spread of Ambrosia plants in Germany occurred later but was extremely fast; the area infested by Ambrosia in 2007 in Germany was 10 times larger than what it was in 2000 [3]. In 2007 Ambrosia pollen was monitored also in northern Greece. Because of its severe health effects, strict regulations demanding the eradication of Ambrosia stands were implemented in France and in Hungary. Ambrosia airborne pollen grains have been monitored in the Rhone valley since 1992 [4,5] as well as in several cities across Italy [6].

The pollination season in Europe begins in July and ends in October. In Israel the pollination season of *Ambrosia maritima* extends from July to September whereas that of *Ambrosia confertifolia* starts in late August and continues until November. Pollen clouds of Ambrosia pollen traverse large distances. For example, pollen clouds of Ambrosia reached Vienna from eastern Slovakia [7], and they even reached Denmark from Hungary [8].

The incidence of Ambrosia allergy is high. Some 15% of the Hungarian population were sensitized to Ambrosia pollen and since 1990 the number has increased dramatically [7].

THE SITUATION IN ISRAEL

Flowering of the Ambrosias starts in mid-July and continues throughout the autumn. Airborne pollen grains of Ambrosia have been monitored sporadically in Jerusalem. However, because of their scarcity such information was regarded by allergologists as irrelevant. Moreover, in the flora of Israel one can find the following statement: "The pollen of *Ambrosia maritima* is not allergenic" [9]. This statement was challenged in a later study [10]. Assuming that at least cross-allergenicity should exist between the allergens of all species of Ambrosia that are present in Israel, we skin-prick tested 100 atopic