



# Ragweed story: from the plant to the patient

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This paper is a synthesis dedicated to the “ragweed story,” starting from the plant to the patient’s health, with a focus on the particular situation determined by the *Ophraella communis* LeSage (*O. communis*) spreading.

*Ambrosia artemisiifolia* (common ragweed) is a worldwide wind-pollinated annual weed, native to North America. In Europe, it was accidentally introduced as a seed contaminant in the nineteenth century, and it is a highly invasive species (Montagnani et al. 2017 and references therein).

Ragweed spends the winter season in the form of seed, and it starts to vegetate only in late spring. The flowering lasts from the summer to autumn, starting from around the end of the month of July to beginning of August. The highest concentrations of pollen are recorded from mid-August to mid-September. After pollination and fertilization, the plant relies mainly on passive and accidental dissemination by animals and humans. Then it dries and dies. The seeds spend the winter mixed with the soil, and then, in spring, they

start a new life (Déchamp and Méon 2002 and references therein).

Ragweed is producing large amounts of allergenic pollen that we can collect with our volumetric Hirst trap and observe by our light microscope and count (CEN/TS16868:2015).

It causes severe allergic rhinitis, conjunctivitis and asthma due to its high allergenic pollen, generating significant medical costs and reduced quality of life among the allergic population (Mouttet et al. 2017).

For example, in the northwest of Milan area, we had an evident increase in the prevalence of the ragweed allergic patients, starting from 1996 to 2012 (Bonini et al. 2014).

Ragweed is a relevant allergen factor in many countries and places around the world (i.e., France, Northern Italy especially the Po Plain, North America, Canada, Austria, Hungary and Pannonian Plain, etc.). For this reason, various actions to limit its effects have been already taken in the past.

For example, in Canada, eradication campaigns were organized since 1937 involving children and organizing contests (Déchamp 1995).

In the USA, health problems related to ragweed are well known as documented by some historical pictures published by Wisconsin Historical Society ([www.wisconsinhistory.org](http://www.wisconsinhistory.org)), dated August 1949, showing that ragweed already was a problem in that period.

Subsequently, in the 1970s, the boy scouts organized “Ragweed Operation” ([www.boyslife.org](http://www.boyslife.org))

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wayback), in order to inform the young generations and push them to act spreading knowledge on the characteristics of the plant and the health problems it causes.

In the recent past, in some countries, ragweed became a serious public health problem, so primary prevention measures were needed, in order to protect the health of the citizens (Bonini et al. 2012).

For example, in Italy, where the most infested zone is the northwest of Milan area, preventive measures were taken since 1999 (Bonini et al. 2012).

Indeed, in that year, the first regulation was promulgated by Lombardy Region in order to protect the citizens' health. In particular, since the most effective method to contain the ragweed pollen production and diffusion was considered to be mowing, it was recommended to carry out three consecutive mowings prior to blossom: (1) last 10 days of June; (2) last 10 days of July; (3) second 10 days of August.

Subsequently, as Local Health Authority, we developed and improved our management strategy including primary prevention actions.

These measures were: control of the territory, also by the aerobiological monitoring, surveillance and monitoring of the infested area, town planning; epidemiological studies (in collaboration with the allergological services of the hospitals); studies on the effectiveness of different methods to limit the ragweed spreading, first in collaboration with the Province of Milan and the Lombardy Region and, subsequently, in the context of the COST Action SMARTER (Sustainable Management of *Ambrosia artemisiifolia* in Europe). These studies were at the root for the promulgation of the current regional and local regulations, indicating the interventions to be adopted to limit the ragweed development and the production and diffusion of its pollen. Again, assessment of drug consumption and the direct health costs due to ragweed; information and education campaigns to the population; control of the implementation of the measures used to warn or eliminate ragweed; trainings for ragweed recognition and/or plant control.

Subsequently, due to the spreading of *O. communis* in this area, reduction in both the number of infested areas and levels of ragweed airborne pollen was reached in 2013 and maintained until now (Bonini et al. 2015, 2016, 2017).

Indeed, *O. communis* is a beetle which preferably feeds on ragweed plants causing their drying up and death and contributes to the decrease in the levels of airborne allergenic pollen.

Thus, information campaigns were needed to be renewed introducing information on this beetle.

Furthermore, many initiatives have been promoted, for example in the occasion of the International Ragweed Day, an event organized by IRS (International Ragweed Society; [www.internationalragweedsociety.org](http://www.internationalragweedsociety.org)).

The idea of creating an international association for ragweed was discussed in 2008 by the founders after the "First International Ragweed Conference" in Budapest and after the Colloque européen "Ambrosie: de la connaissance à l'action" in Aix-les-Bains.

IRS was founded in Nyon (Switzerland), on October 2, 2009, by Christian Bohren, Bernard Clot, Levente Kiss, Tamas Komives and Michel Thibaudon.

The first President of IRS was Tamas Komives (Hungary; 2009–2014), followed by Maira Bonini (Italy; 2014–2018) and Michel Thibaudon (France; 2018–2022).

This scientific society is aimed to promote the knowledge concerning ragweed (*Ambrosia L.*); to facilitate collaboration, research, education, information, technical development, practical applications and laws concerning ragweed and its direct and indirect impacts, as well as the fight against the plant; to create a platform for the people, associations, societies and institutions with an interest in ragweed; to elect the bodies responsible for organizing the International Ragweed Conferences; and to encourage collaboration with other areas related to environmental and health issues.

The annual International Ragweed Day and the scientific events organized by the IRS could be occasions to keep the scientific community informed, as well as the citizens and the politicians on findings and progress on this topic.

For example, in 2017, in France, on the occasion of the International Ragweed Day, a drone expert, a farm owner, an agricultural engineer, AFEDA (Association Française d'Etudes des Ambrosies; [www.ambrosie-afeda.org](http://www.ambrosie-afeda.org)) members went in corn fields and took photographs with a camera and with a drone.

Always in France in 2018, a Facebook page *Ambrosia Observatories* was created ([www.facebook.com/AmbroisieOBS](http://www.facebook.com/AmbroisieOBS)).

Canada renews eradication campaigns with boy scouts. Indeed, in 2015, the Montreal suburb, across the river from Oka, launched the contest in late August and offered the prize in both units: five cents for a pound of ragweed and 10 cents for a kilogram. A 7-year-old boy scout won Hudson's contest for eradicating ragweed from the territory.

He took the top prize by hauling in 306 lb (about 140 kg) of ragweed, with a little help from his friends ([www.cbc.ca/news/canada/montreal/kyle-secours-hudson-ragweed-wins-1.3227968](http://www.cbc.ca/news/canada/montreal/kyle-secours-hudson-ragweed-wins-1.3227968)).

The contest was the town's innovative way to reduce the presence of the allergy-causing weed.

At present, different organizations continue their information campaigns on ragweed and on *Ophraella communa*. Others organize education and hands-on campaigns, and several institutions and scientific organizations promote awareness using different methods and technologies (i.e., RNSA, AFEDA, ANSES, ANS, IRS, Local Health Authority of Milano Città Metropolitana, COST EU SMARTER).

Overall, the scientific community carries on researches on this invasive alien species dangerous for the health (i.e., the COST Action SMARTER has started several ragweed experimental fields in collaboration with the Local Health Authority of Milano Città Metropolitana).

In the future, we should not forget that information and education campaigns need to be renewed introducing news on *Ophraella communa* or other control methods.

As well as the implementation of the limiting interventions, the mapping of the territory, the pollen monitoring, need to continue in order not to lose the obtained results. Particularly, the aerobiological monitoring is essential to be alert in case of a revival of the infestation.

Finally, this story is an example on how different professionals can work on the same issue starting from different points of view: ecology, aerobiology, health, management, agriculture, pharmacy, economy and many others (Gladieux et al. 2011; Grewling et al. 2018; Basky et al. 2017; Šikoparija et al. 2016; Müller-Schärer et al. 2014; Cardarelli et al. 2018; Makra et al. 2016; Mouttet et al. 2017; Auvigne et al. 2016).

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