

Science for Environment Policy

Herbicide levels in coastal waters drop after EU ban

The European ban on atrazine has effectively reduced concentrations of the herbicide in coastal waters, a new study has found. However, the researchers also warn that, in some areas, atrazine levels remain relatively high as some countries have not yet restricted use of the chemical.

Atrazine is one of a group of [herbicides](#) used to control broad-leaved weeds and grasses. Although once widely used across Europe, its long-term persistence in the environment, together with toxicity for wildlife and possible link to effects on human [health](#), led to an EU-wide ban in 2004. Atrazine is listed as a priority pollutant in the Water Framework Directive¹, and in many European countries, such as Germany and Italy, it was banned as early as 1991.

In this study, part-funded by EU GABARDINE project², researchers measured concentrations of atrazine in European [coastal waters](#). A total of 132 water samples were taken from areas off the coast of Greece (from the Northern Aegean Sea), Turkey (from the Dardanelles, a narrow channel leading to the Aegean Sea), Germany (from the Baltic Sea), Italy (from the Northern Adriatic Sea) and the Mediterranean coastline close to Barcelona, Spain. For comparison with a currently used herbicide of the same type, researchers also measured levels of terbuthylazine.

The results showed that atrazine concentrations have dropped substantially in the Thermaikos Gulf (Northern Aegean Sea) to less than 7.2 nanograms per litre (ng/L), from 150 ng/L in 1991, reflecting the beneficial effects of the ban. However, despite the lower levels, the herbicide was detected in all samples in the Northern Aegean Sea, highlighting the long-term persistence of this chemical in the environment. In the Aegean Sea, concentrations of atrazine were higher in the east than the west.

Atrazine is not restricted in some countries bordering the Black Sea and the highest levels (31 to 41 ng/L) were found in the Dardanelles and near Istanbul. This explains the declining concentrations from east to west across the Aegean Sea, suggest the researchers.

Atrazine was detected only once in the Northern Adriatic Sea, and this was at low concentrations. A similar situation was found in the Baltic Sea, where it was not detected at all. These results probably reflect the early ban of this chemical in the 1990s by both Italy and Germany. In fact, the only potential evidence of the herbicide in the Baltic Sea was low levels of desethylatrazine, a chemical formed from reactions with atrazine, which occurred near the German-Polish border and was probably the result of the later implementation of the ban in Poland, the researchers propose.

Although levels of terbuthylazine were low in the Northern Aegean Sea, it was detected in all samples in the Northern Adriatic Sea and reached levels of 52-76 ng/L in Venice. This should serve as a warning signal, say the study's authors, that careful monitoring of terbuthylazine is needed to check that levels do not increase sharply in the coming years.



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1. <http://ec.europa.eu/environment/water/water-framework/>

2. The GABARDINE (Groundwater Artificial Recharge Based on Alternative Sources of Water: Advanced Integrated Technologies and Management) project was supported by the European Union under the Sixth Framework Programme. See: http://cordis.europa.eu/search/index.cfm?fuseaction=lib.document&DOC_LANG_ID=EN&DOC_ID=129721171&q=