

## **Bark biomonitoring of airborne pesticides between 2014 - 2018; multi analytic of over 500 pesticides including Glyphosate**

TIEM Integrierte Umweltüberwachung GbR

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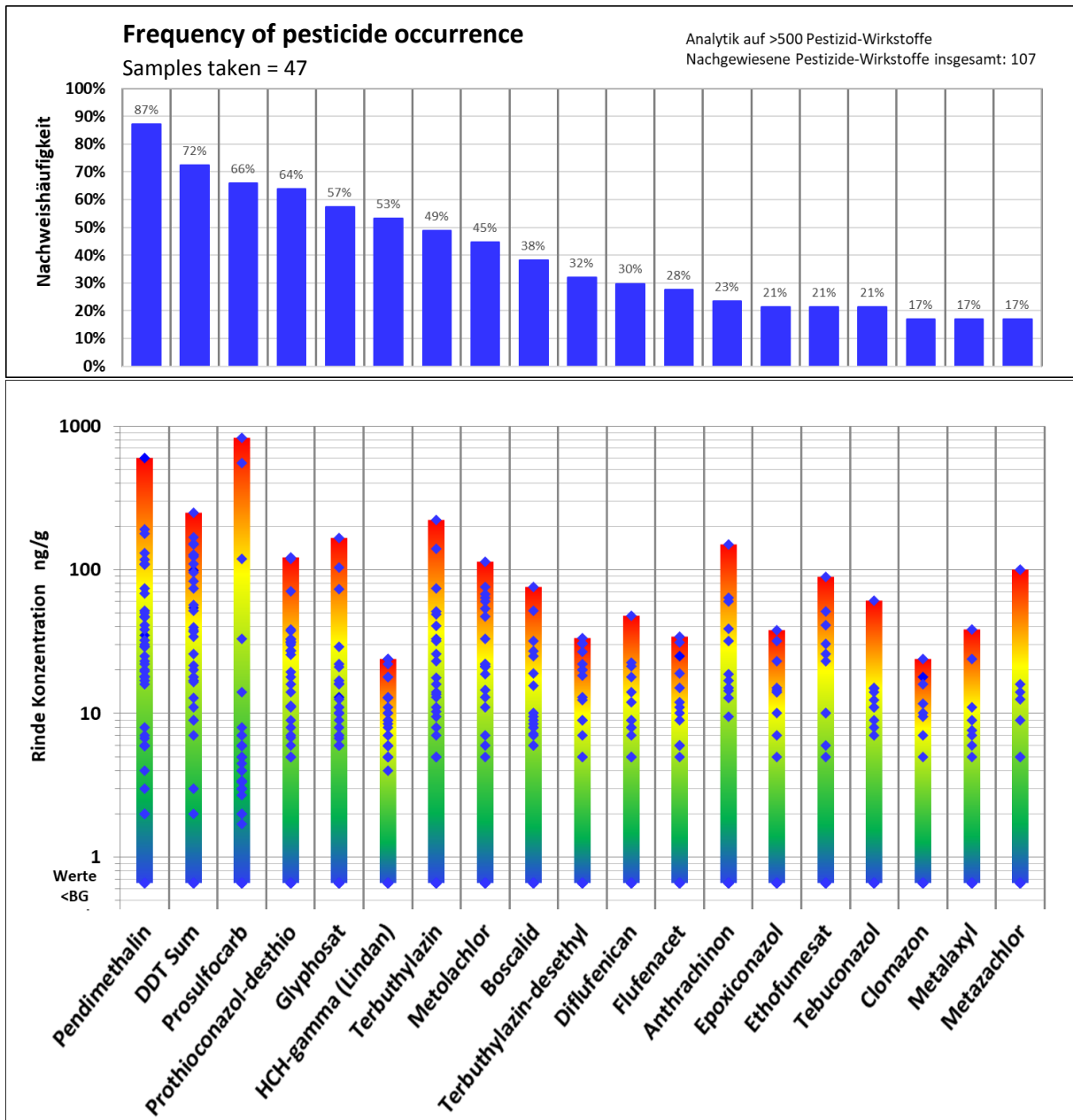
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Organic farmers in the area of the Schorfheide-Chorin Biosphere Reserve were unable to market organically grown Fennel seed over several years because their content of the pesticides Pendimethalin and Prosulfocarb was too high. The Schorfheide-Chorin area is one of the largest areas of organic farming in Germany, therefore no pesticides are applied in the region. Other crops such as parsley or kale were also affected.

A first study using bark biomonitoring funded by the State of Brandenburg aimed to identify airborne pesticides and their distribution in the area. It showed that the pesticides Pendimethalin and Prosulfocarb were found abundantly in most sampled locations. In the following years the study was extended to include 47 sites all over Germany. In 2018, all samples were analysed for 500 pesticides and Glyphosate. This is the largest study trying to identify airborne pesticide transport in Germany. It covered a wide range of sites, many in protected areas of all specifications as well as agricultural sites with varying grades of intensification and 4 inner cities. Altogether 107 pesticide parameters were detected. Pendimethalin and Prosulfocarb were again the most widespread pesticides and were found on 87% and 66% of the sampled sites. Both are volatile and will continue to emit the air over several month after application if the prevailing conditions are favourable. Current measures to curb this emission are clearly not sufficiently effective. The various forms of DDT and HCH gamma (Lindan) could still be found to a high extend in the environment.

Our study could present clear evidence of airborne glyphosate in Europe. Even though Glyphosate is not volatile, it ranked on 5<sup>th</sup> place and was found on more than half of the sampled sites (57%). Further study clearly linked observed glyphosate concentrations to the soil classification for wind erosion, indicating glyphosate can travel considerable distances on airborne soil particles. Furthermore, data showed that protected habitats are not sheltered from high glyphosate concentration, in all probability due to the abundant use of the pesticide.



**Fig: 1** Frequency distribution of pesticides found in tree bark during monitoring between 2014 – 2018

47 Samples

Blue dots: single measurements (data given in the appendix)

Coloured bar: range of measurements

Werte <BG: Values under the detection limit

Total number of pesticides found: 107 parameters

Number of pesticides occurring >15 %: 19, including

H=Herbicides (10); F=Fungicides (5); I=Insecticides (2); R=Repellent (1); M=Metabolites (1)

## References

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