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Transport losses of pesticides to surface waters

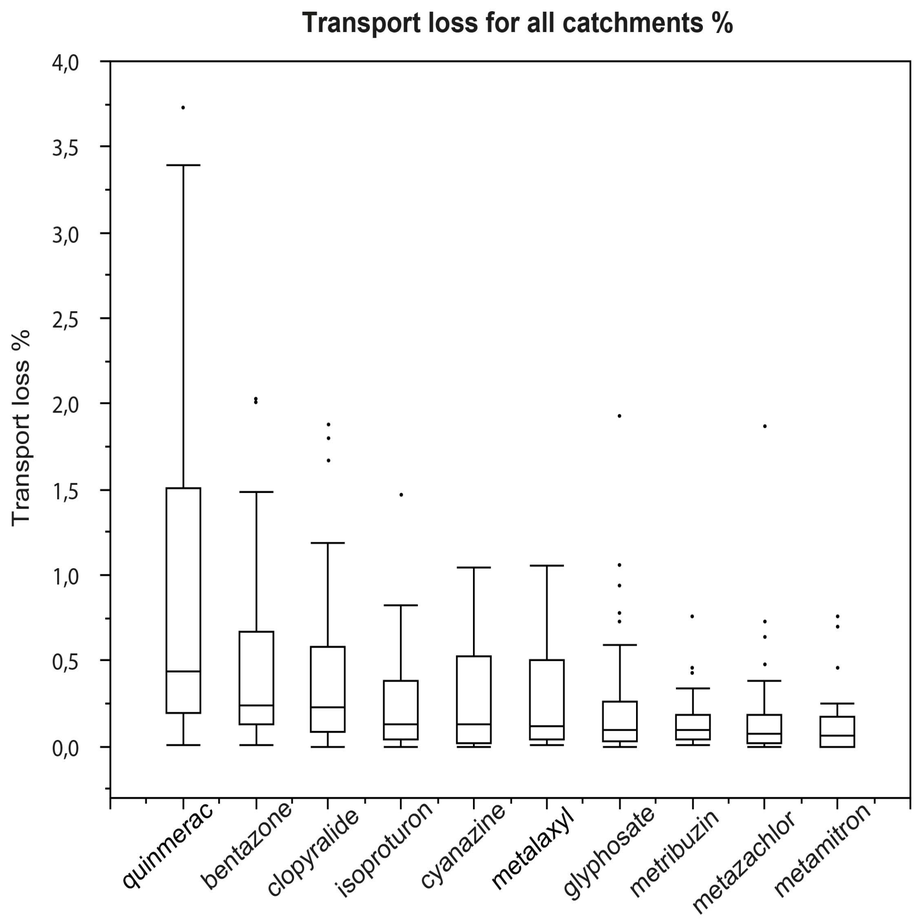


FIGURE 1.THE TEN PESTICIDES WITH THE LARGEST ABSOLUTE TRANSPORT LOSSES (%) FROM ALL CATCHMENTS, 2002-2013.

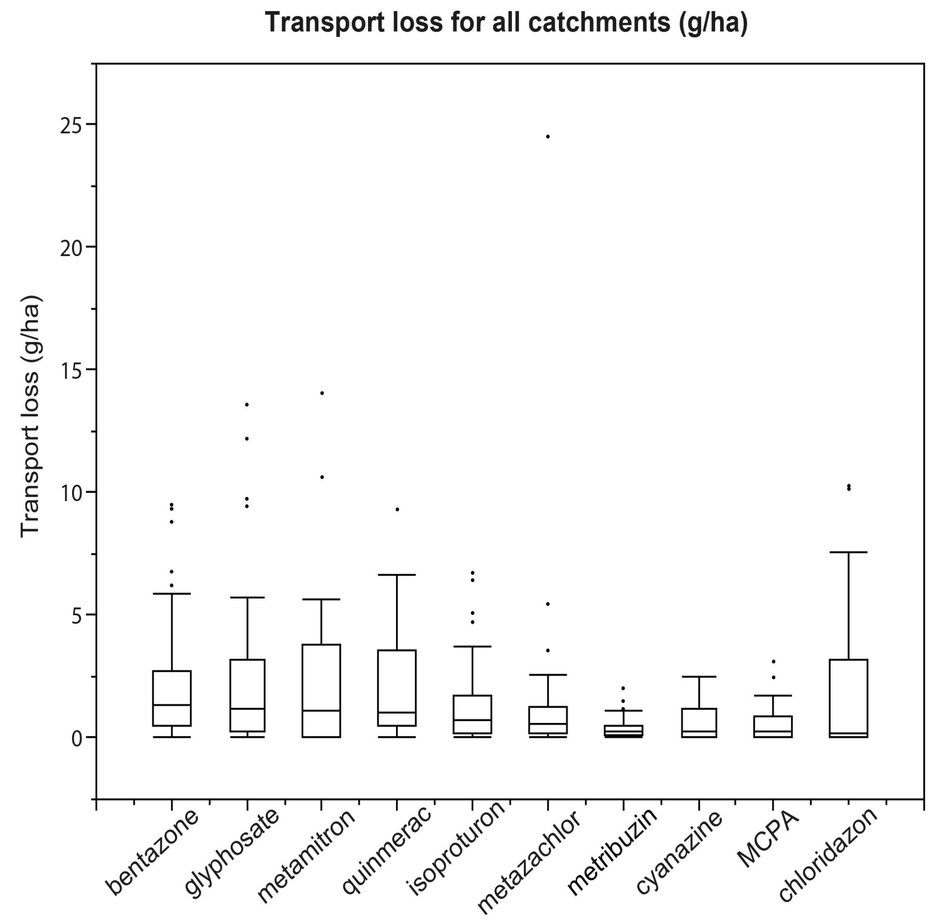
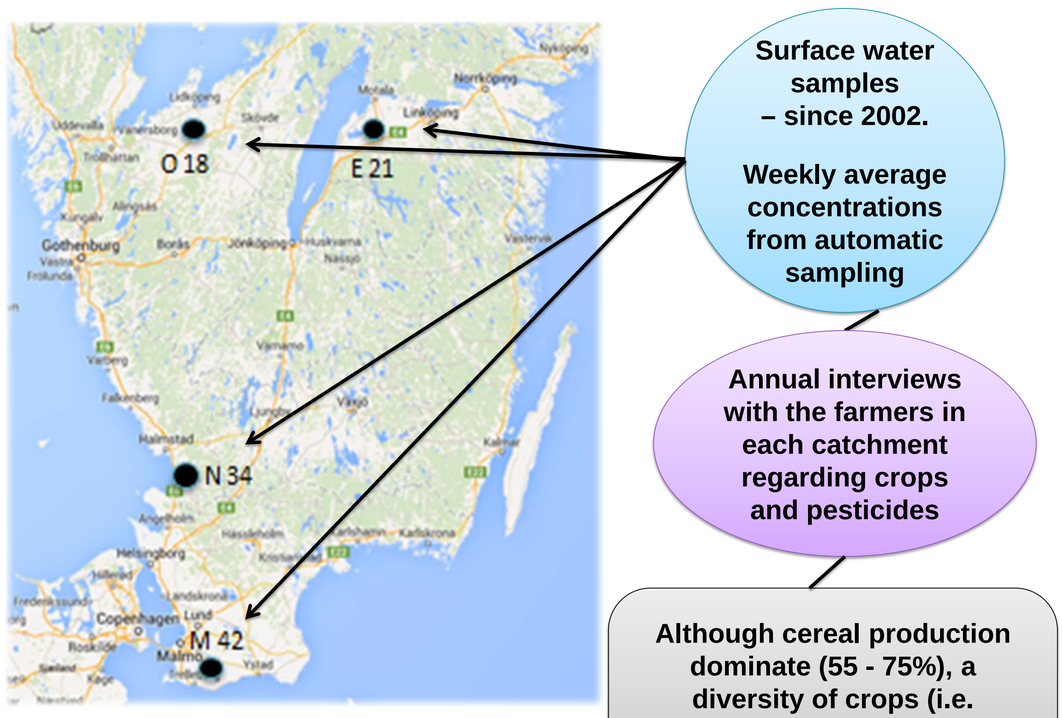


FIGURE 2. THE TEN PESTICIDES WITH THE LARGEST RELATIVE TRANSPORT LOSSES (G/HA) FROM ALL CATCHMENTS, 2002-2013.

CONCLUSIONS

- **Transport losses were commonly less than 1 % of the applied amount of individual pesticides, with most values < 0.1 %**
- **Substances with the highest transport losses were used in larger quantities by the farmers and/or found frequently in surface water samples**
- **Top ten pesticides with the highest relative transport losses (%) were all but one herbicides**
- **Transport losses in absolute numbers (g/ha) shows a somewhat different picture, i.e. pesticides applied in higher doses, resulting in higher concentrations in the streams, dominates**

INTRODUCTION AND OBJECTIVES



- Investigate the links between applied amounts of pesticides and stream water concentrations.
- Calculate transport losses in % and g/ha between 2002-2013 for all catchments.
- To highlight differences in leaching losses.

RESULTS AND DISCUSSION

- Relative transport losses (Figure 1) were generally less than 1 % of the applied amounts of pesticides, with most values < 0.1 %. Median values of transport losses of the top ten substances ranged from 0.44 % (quinmerac) to 0.06 % (metamitron)
- Top ten substances with the largest absolute transport losses (Figure 2) had a median value from 1.3 g/ha (bentazone) to 0.2 g/ha (chloridazon). These substances have generally been applied in relatively larger quantities in the catchments.
- Substances included in Figure 1 & 2 are all herbicides, except for the fungicide metalaxyl (in Figure 1).
- Relative losses demonstrates the leaching potential of individual pesticides. However, absolute losses better reveal the actual concentrations commonly detected in stream water.

MATERIALS AND METHODS

Some general catchment characteristics of the four catchments are presented in Table 1.
Transport calculations were restricted to pesticides analysed during all years (2002-2013), although not always applied each year, resulting in a total of ca 40 substances included.
Transport losses in relative terms (%) were calculated by dividing transported amounts (weekly average x water flow) with applied amounts for each substance.
Transport losses in absolute terms (g/ha) were calculated by dividing transported amounts (weekly average concentration x water flow) with the total area of use for each substance.

TABLE 1. OVERVIEW OF MONITORING CATCHMENTS: AREA (KM^2), ARABLE LAND (%), DOMINANT SOIL TYPE, ANNUAL AVERAGE PRECIPITATION AND TEMPERATURE 2002-2012.

Site	Area (km^2)	Arable (%)	Soil type	Prec. (mm)	Temp. (° C)
O 18	0.8	92 %	Silty clay	650	7.0
E 21	1.6	89 %	Loam	584	6.9
N 34	1.4	85 %	Sandy loam	775	8.2
M 42	0.8	92 %	Sandy loam	731	8.5