ssdtools: An R package to fit Species Sensitivity Distributions (SSDs)

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Summary

Species sensitivity distributions (SSDs) are cumulative probability distributions which are fitted to toxicity concentrations for multiple species (Figure 1). They are used for the derivation of environmental quality criteria and ecological risk assessment for contaminated ecosystems (Posthuma, Suter II, and Traas 2001).

`ssdtools` is an R package (R Core Team 2018) to fit log-normal (lnorm), log-logistic (llog), gompertz, log-gumbel (lgumbel), gamma or weibull distributions to species concentration data.

The user can also define their own distributions. Multiple distributions can be averaged using Information Criteria (Burnham and Anderson 2002). The available Information Criteria are the Akaike Information Criterion (AIC), the Akaike Information Criterion corrected for small sample size (AICc) and Bayesian Information Criterion (BIC). Confidence intervals can be calculated for fits or specific hazard concentrations (HCs). The confidence intervals are currently produced by parametric bootstrap resampling.

`ssdtools` loads the `fitdistrplus` R package (Delignette-Muller and Dutang 2015) upon which it depends for model fitting, calculation of AIC and bootstrapping. `ssdtools` also loads the `ggplot2` R package (Wickham 2016) which it extends by defining `ssdfit`, `xribbon` and `hcintersect` geoms to allow the user to produce custom SSD plots.

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The software archive is at https://github.com/bcgov/ssdtools.

References

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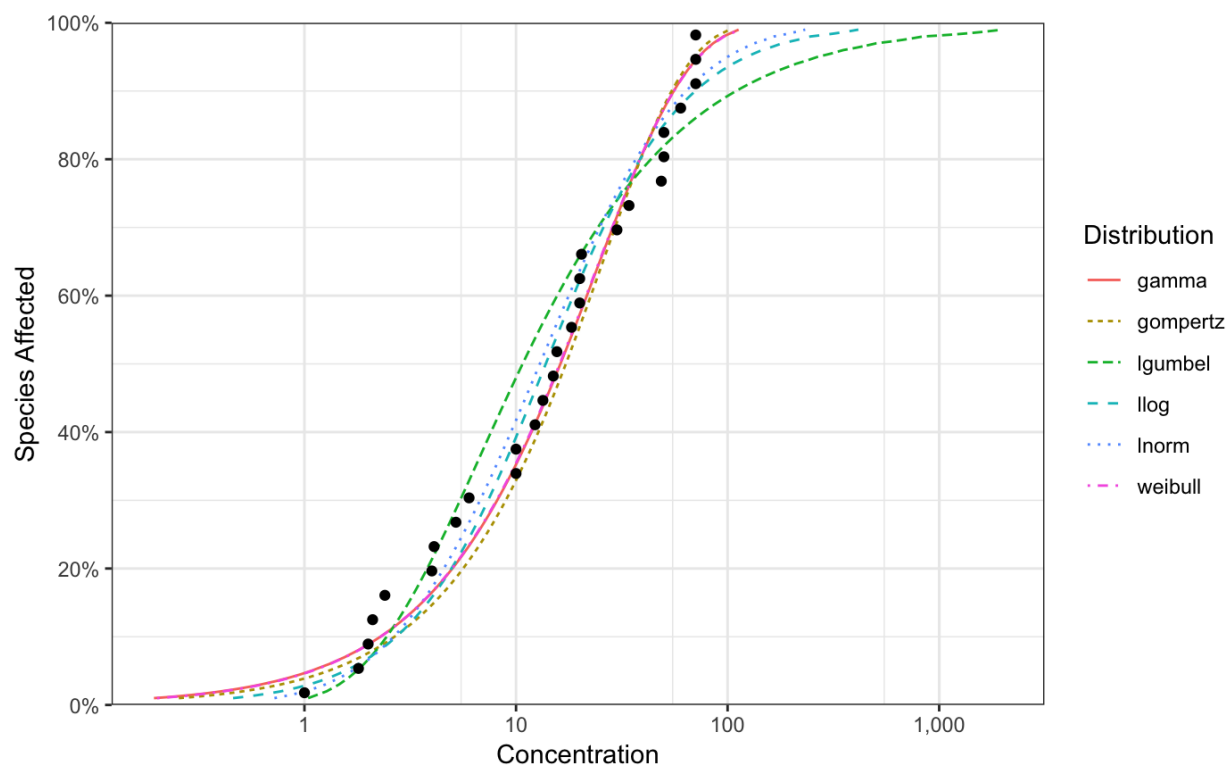
Figure 1: Species sensitivity distributions for example species concentration values