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Nota di contenuto	Cover -- Half Title -- Series Page -- Title Page -- Copyright Page -- Contents -- Preface -- 1. Continuous data -- 1.1 Analysis of single dose-response curves -- 1.1.1 Inhibitory effect of secalonic acid -- 1.1.1.1 Fitting the model -- 1.1.1.2 Estimation of arbitrary ED values -- 1.1.2 Data from a fish test in ecotoxicology -- 1.1.3 Ferulic acid as an herbicide -- 1.1.4 Glyphosate in barley -- 1.1.5 Lower limits for dose-response data -- 1.1.6 A hormesis effect on lettuce growth -- 1.1.7 Nonlinear calibration -- 1.2 Analysis of multiple dose-response curves -- 1.2.1 Effect of an herbicide mixture on Galium aparine -- 1.2.2 Glyphosate and bentazone treatment of Sinapis alba -- 1.2.2.1 A joint dose-response model -- 1.2.2.2 Fitting separate dose-response models -- 2. Binary and binomial dose-response data -- 2.1 Analysis of single dose-response curves -- 2.1.1 Acute inhalation toxicity test -- 2.1.1.1 Link to ordinary logistic regression -- 2.1.2 Tumor incidence -- 2.1.3 Earthworm toxicity test: Abbott's formula -- 2.1.4 Another earthworms toxicity test: Estimating the upper limit -- 2.2 Analysis of multiple dose-response curves -- 2.2.1 Toxicity of fluoranthene under different ultraviolet radiation -- 2.2.2 Toxicity of different types of

selenium -- 3. Count dose-response data -- 3.1 Analysis of single dose-response curves -- 3.1.1 Counting number of fronds -- 3.1.2 Counting offspring: Modeling hormesis -- 3.1.3 More counting offspring: Varying observation periods -- 3.2 Analysis of multiple dose-response curves -- 3.2.1 Counting bacteria colonies: Wadley's problem -- 4. Multinomial dose-response data -- 4.1 Trichotomous data -- 4.1.1 Insecticide residues -- 4.1.2 Effect of two arboviruses on chicken embryos -- 5. Time-to-event-response data -- 5.1 Analysis of a single germination curve -- 5.1.1 Germination of Stellaria media seeds.
5.2 Analysis of data from multiple germination curves -- 5.2.1 Time to death of daphnias -- 5.2.1.1 Step 1 -- 5.2.1.2 Step 2 -- 5.2.2 A hierarchical three-way factorial design -- 5.2.2.1 Step 1 -- 5.2.2.2 Step 2 -- 6. Benchmark dose estimation -- 6.1 Binomial dose-response data -- 6.1.1 Pathogens in food -- 6.1.2 Chromosomal damage -- 6.1.3 Tumor incidence continued: Integration of historical data -- 6.2 Continuous dose-response data -- 6.2.1 Toxicity of copper in an ecosystem with giant kelp -- 6.2.2 Toxicity of an antituberculosis drug -- 6.3 Model averaging -- 6.3.1 Pathogens in food revisited -- 6.3.2 Toxicity of an antituberculosis drug revisited -- 7. Hierarchical nonlinear models -- 7.1 Normally distributed dose-response data -- 7.2 The R package medrc -- 7.2.1 In vitro effects of the fungicide vinclozolin -- 7.2.2 Inhibition of photosynthesis in spinach -- 7.2.3 Herbicides with auxin effects -- 7.2.4 Drought stress resistance in Brassica oleracea -- Appendix A: Estimation -- A.1 Nonlinear least squares -- A.2 Maximum likelihood estimation -- A.2.1 Binomial dose-response data -- A.2.2 Count dose-response data -- A.2.2.1 The Poisson distribution -- A.2.2.2 The negative-binomial distribution -- A.2.3 Time-to-event-response data -- A.3 The transform-both-sides approach -- A.4 Robust estimation -- A.5 Sandwich variance estimators -- A.6 Constrained estimation -- A.7 Two-stage estimation for hierarchical models -- A.7.1 Technical replicates -- A.7.2 Two-stage approaches -- A.7.3 Lindstrom-Bates algorithm -- A.8 Starting values and self-starter functions -- A.9 Confidence intervals -- A.10 Prediction and inverse regression -- A.10.1 Effective dose -- A.10.2 Relative potency -- Appendix B: Dose-response model functions -- B.1 Log-logistic models -- B.1.1 Four-parameter log-logistic models -- B.1.1.1 Three-parameter version.
B.1.1.2 Two-parameter version -- B.1.1.3 E-max and Michaelis-Menten models -- B.1.2 Extensions -- B.1.2.1 Generalized log-logistic models -- B.1.2.2 A model with two slope parameters -- B.1.2.3 Hormesis models -- B.1.2.4 Two- and three-phase models -- B.1.2.5 Fractional polynomial models -- B.2 Log-normal models -- B.3 Weibull models -- B.3.1 Weibull type 1 models -- B.3.1.1 Exponential decay model -- B.3.1.2 Other special cases -- B.3.2 Weibull type 2 models -- B.3.2.1 Asymptotic regression -- B.3.2.2 Other special cases -- B.3.2.3 Generalized Weibull-2 model -- B.4 Other types of models -- B.4.1 Gamma models -- B.4.2 Multistage models -- B.4.3 NEC -- B.4.4 Biphasic models with a peak -- B.5 Fixing parameters -- Appendix C: R code for plots -- C.1 Continuous dose-response data -- C.1.1 Ferulic acid as an herbicide -- C.2 Estimation of BMD -- C.2.1 Pathogens in food -- C.2.2 Toxicity of an antituberculosis drug -- C.3 Hierarchical nonlinear models -- C.3.1 Inhibition of photosynthesis in spinach -- C.3.2 Herbicides with auxin effects -- C.3.3 Drought stress resistance in Brassica oleracea -- Bibliography -- Index.

Sommario/riassunto

Nowadays the term dose-response is used in many different contexts and many different scientific disciplines including agriculture, biochemistry, chemistry, environmental sciences, genetics,

pharmacology, plant sciences, toxicology, and zoology. In the 1940 and 1950s, dose-response analysis was intimately linked to evaluation of toxicity in terms of binary responses, such as immobility and mortality, with a limited number of doses of a toxic compound being compared to a control group (dose 0). Later, dose-response analysis has been extended to other types of data and to more complex experimental designs. Moreover, estimation of model parameters has undergone a dramatic change, from struggling with cumbersome manual operations and transformations with pen and paper to rapid calculations on any laptop. Advances in statistical software have fueled this development. Key Features: Provides a practical and comprehensive overview of dose-response analysis. Includes numerous real data examples to illustrate the methodology. R code is integrated into the text to give guidance on applying the methods. Written with minimal mathematics to be suitable for practitioners. Includes code and datasets on the book's GitHub: https://github.com/DoseResponse. This book focuses on estimation and interpretation of entirely parametric nonlinear dose-response models using the powerful statistical environment R. Specifically, this book introduces dose-response analysis of continuous, binomial, count, multinomial, and event-time dose-response data. The statistical models used are partly special cases, partly extensions of nonlinear regression models, generalized linear and nonlinear regression models, and nonlinear mixed-effects models (for hierarchical dose-response data). Both simple and complex dose-response experiments will be analyzed.