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12. The bioassay according to claim 1, wherein the chemical substance is an herbicide, insecticide, fungicide, xenobiotic, plasticizer, phytohormone, phytoestrogen, organic solvent, or a combination thereof.

13. The bioassay according to claim 12, wherein the chemical substance is selected from the group consisting of estradiol, diethylstilbestrol, kepone, dichlorodiphenyltrichloroethane, dichlorodiphenyldichloroethane, 1-hydroxychlorodane, chlordane, zearalenone, coumestrol, nonylphenol, butylphenol, pentylphenol, isopentylphenol, polychlorinated biphenyl, chlorpyrifols, pentachlorophenol, atrazine, carbaryl, endosulfan, ethanol, and derivatives thereof.

14. The bioassay according to claim 1, wherein the substance is atrazine.

15. A bioassay for determining the sublethal level of toxicity of a substance, comprising:

maintaining a control medium and a series of dilutions of the substance in an aqueous medium under growth conditions to induce sexual reproduction in Daphnia, each of the dilutions and the control containing an effective number of adult, oviparous Daphnia of a single clone for crowding;

determining the sublethal level of toxicity of the substance by comparing fecundity and survivorship of Daphnia in the dilutions and the control to identify the dilution having the highest concentration of the substance at which survivorship and fecundity are at about the same level as the control.

16. The bioassay according to claim 15, further comprising:

comparing one or more endpoints that indicate a deviation from normal Daphnia sexual reproduction in the test sample dilution having the highest sublethal concentration of the substance.

30

17. The bioassay according to claim 15, wherein the endpoints include the number of male offspring, number of female offspring, sex ratio of males: total offspring, number of resting eggs, and number of offspring displaying a morphological abnormality, number of offspring displaying a behavioral abnormality, and nutritional status of offspring.

18. A bioassay for determining the presence of a toxic chemical substance in a sample, comprising:

maintaining a control medium and the sample in an aqueous medium under growth conditions to induce sexual reproduction in Daphnia, each of the control and the sample containing an effective number of adult, oviparous Daphnia of a single clone for crowding; and comparing fecundity and survivorship of the Daphnia in the sample and the control;

wherein the presence of a toxic substance in the sample is determined by a lower level of fecundity, and survivorship of the Daphnia in the sample compared to the control.

19. A kit for use in conducting a Daphnia reproductive bioassay on an aqueous sample to detect a substance that interferes with endocrine function in an animal, comprising, in association and separately packaged:

a culture of a clone of Daphnia capable of producing at least about 5–70% males of the total offspring under control conditions; instructions for conducting the Daphnia bioassay according to claim 1; a data scoring sheet; and an algal food source for the Daphnia.

20. The kit according to claim 19, further comprising:

a container for the sample; a container for the control; a container for observing the Daphnia; a device for manipulating the Daphnia; a growth medium for culturing the Daphnia and the algae; or any combination thereof.

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