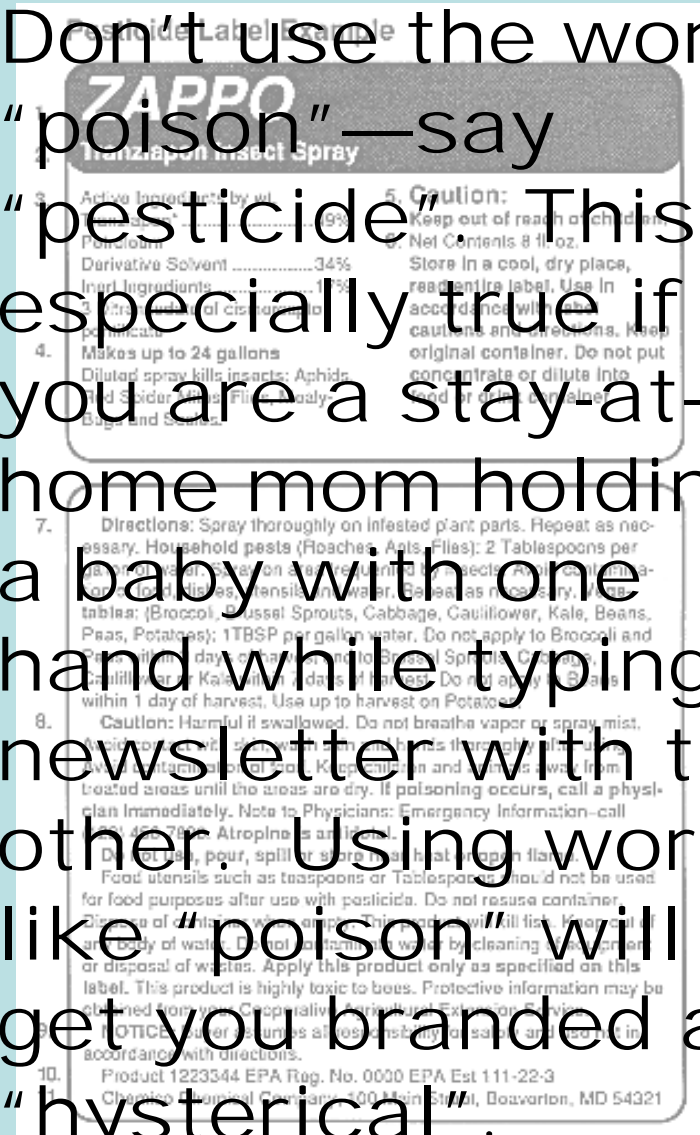
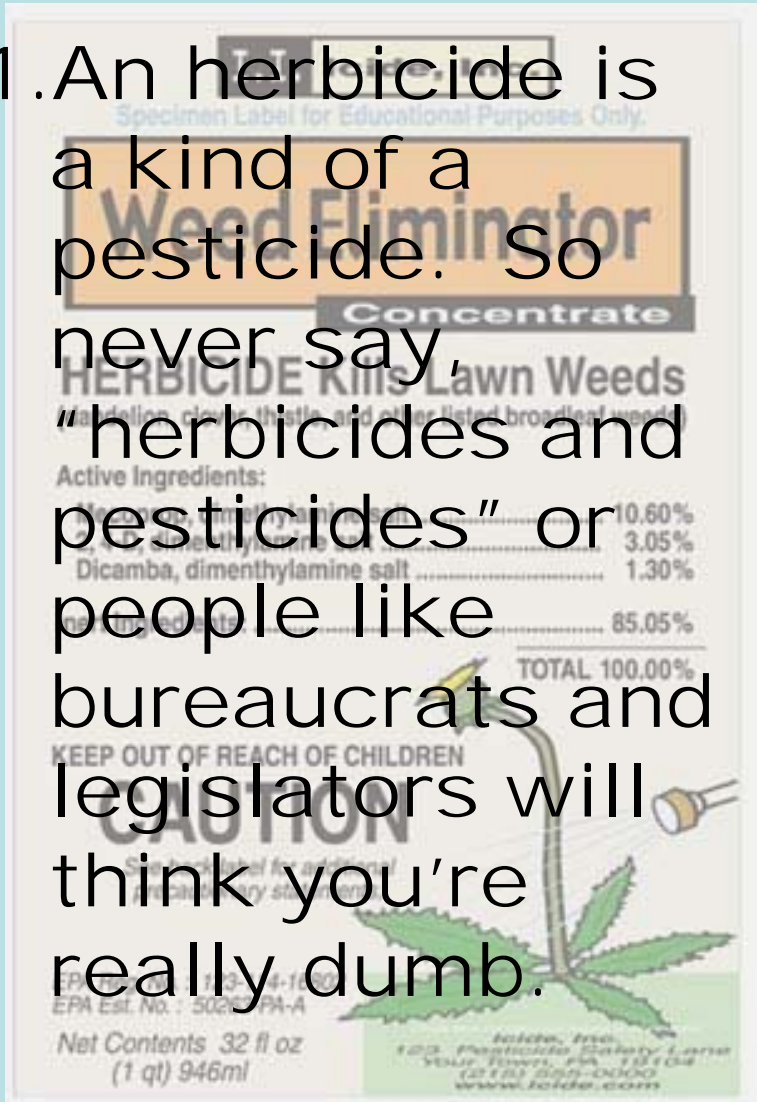


First Lessons

1. An herbicide is a kind of a pesticide. So never say, “herbicides and pesticides” or people like bureaucrats and legislators will think you’re really dumb.

2. Don’t use the word “poison”—say “pesticide”. This is especially true if you are a stay-at-home mom holding a baby with one hand while typing a newsletter with the other. Using words like “poison” will get you branded as “hysterical”.



First Lessons

What's In a Number?

5. Risk values are often stated, in shorthand-fashion, as a number. When the risk concern is cancer, the risk number represents a probability of occurrence of a certain number of cancer cases. For example, such an estimate for Pollutant X might be expressed as 1×10^{-6} , or simply 10^{-6} . This number can be interpreted as 0.000001, or one in a million—meaning one additional case of cancer projected in a population of one million people exposed to a certain level of Pollutant X over their lifetimes. Similarly, 5×10^{-5} , or 0.0000005, or five in 1,000,000, might indicate a potential risk of five additional cancer cases in a population of 100 million people exposed to a certain level of the pollutant. These numbers signify incremental cases above the background cancer incidence in the general population. American Cancer Society statistics indicate that the background cancer incidence in the general population is one in three over a lifetime.

If the effect associated with Pollutant X is not cancer but another health effect, perhaps neurotoxicity (nerve damage) or birth defects, then numbers are not typically

given as probability of occurrence, but rather as levels of exposure estimated to be without harm. This often takes the form of a reference dose (RfD). RfD is typically expressed in terms of milligrams (of pollutant) per kilogram (of body weight) per day, e.g., 0.004 mg/kg-day. Simply described, a RfD is a rough estimate of daily exposure to the human population (including sensitive subgroups) that is likely to be without appreciable risk of deleterious effects during a lifetime. The uncertainty in a RfD may be one or several orders of magnitude (i.e., multiples of 10).

What's in a number? The important point to remember is that the numbers by themselves do not tell the whole story. For instance, even though the numbers are identical, a cancer risk value of 10^{-6} for the "average exposed person" (perhaps someone exposed through the food supply) is not the same thing as a cancer risk of 10^{-6} for a "most exposed individual" (perhaps someone exposed from living or

working in a highly contaminated area). It's important to know the difference. Omitting the qualifier "average" or "most exposed" does not completely describe the risk and would mean a failure in risk communication. The number estimate is only as good as the data it is based on. Just as important as the quantitative aspect of the data (i.e., the risk numbers), then, are the qualitative aspects. How sensitive is the data base supporting the assessment? What are the questions? Does it include human epidemiological data as well as laboratory data? Does the laboratory data base include test data on multiple species were tested, did they all respond similarly to the test substance? What are the "data gaps" in this piece of the puzzle? What are the scientific uncertainties? What is the policy decision where made to address these uncertainties? What working assumptions underlie the risk assessment? What is the overall confidence level in the risk assessment? All of these qualitative considerations are essential to deciding what reliance to place on a number and to characterizing a potential risk.

—Eds.

1×10^{-6}

10^{-6}

0.0000001

First Lessons

7. *Never* talk about ecological balance. You'll sound like some kind of tree-hugging hippie. Talk about alternatives to pesticides and IPM.

8. *Never* talk about humus. Unless it's with pita, in which case, say hummus. Talk about the health of the soil is unscientific.



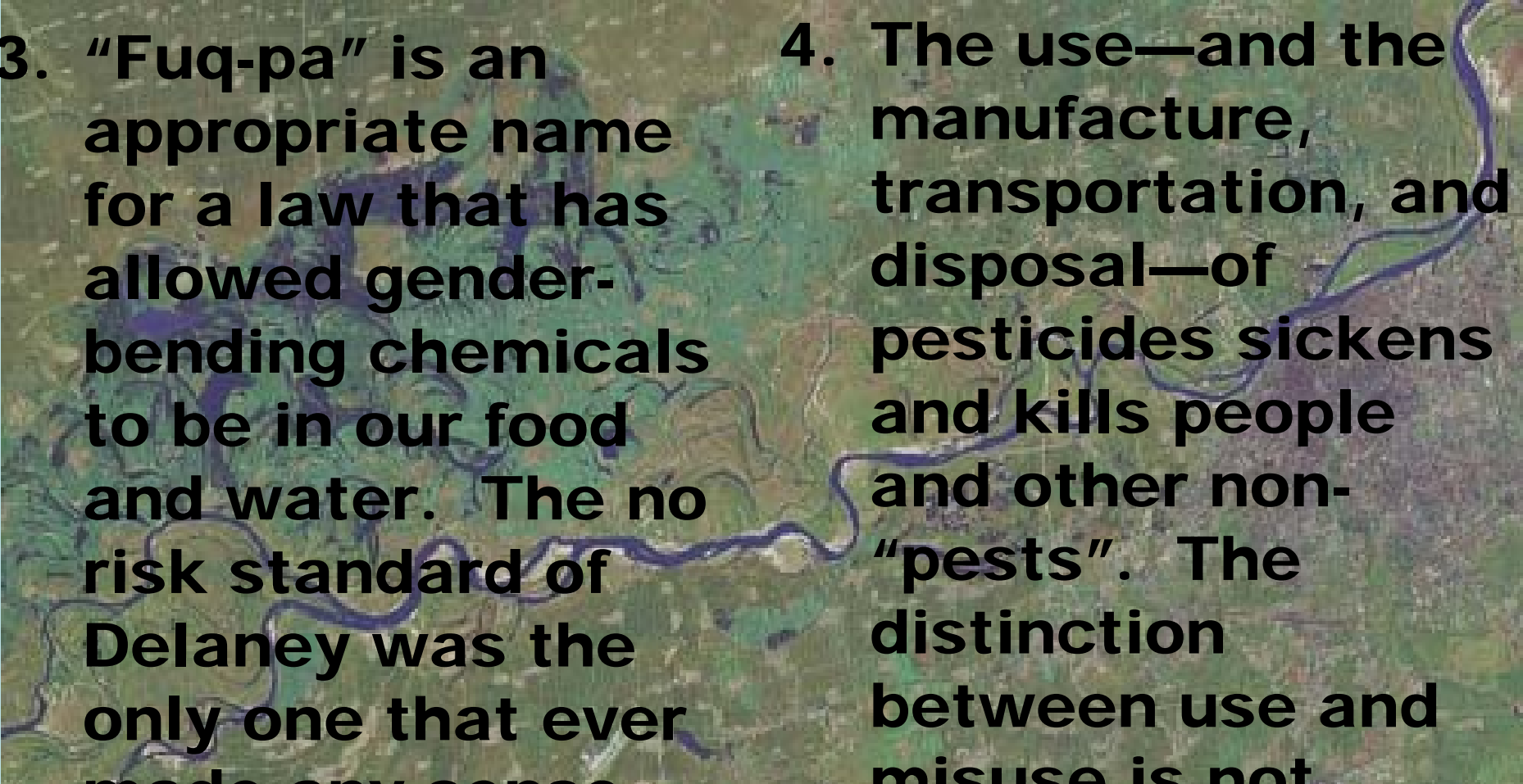
Later Lessons

1. An herbicide is a poison designed to kill plants. Plants are at the base of ecological food chains. You can say "biocide" or "ecocide".



2. Say "poison" when you mean poison. These chemicals kill, and they do not know the difference between "pests" and "not pests". And it's ok to be emotional when you're protecting the life of your baby.

Later Lessons



3. “Fuq-pa” is an appropriate name for a law that has allowed gender-bending chemicals to be in our food and water. The no risk standard of Delaney was the only one that ever made any sense.

4. The use—and the manufacture, transportation, and disposal—of pesticides sickens and kills people and other non-“pests”. The distinction between use and misuse is not useful.

Later Lessons

5. People who compartmentalize their lives, making decisions in one part that are acceptable because different rules apply there, are avoiding making hard ethical decisions by creating fictional worlds.
6. Real people are getting real cancers and are really dying. Bureaucrats who make decisions concerning "acceptable risks" are deciding how many people die.

Later Lessons



7. Learn about ecological balance by visiting old-fashioned organic farms with lots of diversity-- appreciate how that balance works.

8. Humus feeds the soil that feeds the plants. The soil is alive—or it should be.