

Pesticides...

Perception vs. Reality

J.M. Vargas, Jr.

Anti-Pesticide

- 8,000,000 Anti-pesticide websites on the Internet
- It is time we become proactive before it is too late

IPM

- Can we maintain healthy turf without pesticides?
- When does IPM work the best?

The beginning -

“Silent Spring”

Pesticides

... two billion more song birds than there were in the late 16th century.

U.S. Fish and Wildlife Service

Turfgrass Industry - Proactive

- GCSAA cooperation with EPA

Turfgrass Industry - Proactive

- USGA - NY Audubon Society Sanctuary Program

Politics and Finances

- 1) NYAS vs. National Audubon Society
- 2) Financial support
- 3) Difficult to fight Mainstream Media

A View from the Rough

Being an ardent environmentalist, I had always perceived golf courses as “green scars” on the landscape. My mind-set began to change as I recognized that excellent birding can be done on well-managed golf courses. Intrigued, I began to research the issues surrounding the public’s negative perception of golf courses. The research led me to the undeniable conclusion that golf courses and the environment CAN coexist.

Catherine B. Waterhouse

Audubon Cooperative Sanctuary Coordinator

General Conclusions - USGA

- 1) Fertilizer and pesticides applied to mature turf present little danger to ground water.
- 2) Thatch is important in holding nutrients and pesticides.
- 3) Sand soil is more susceptible to leaching.
- 4) 2,4D, MCPP, and Dicamba are most susceptible to leaching.
- 5) Light irrigation following applications helps prevent leaching.

How are most
human pathogens
controlled?

Chemically

- Medicine (pesticides)

Pesticides Used in Human Medicine

- 1) Antibiotics
 - a) streptomycin
 - b) oxytetracycline
- 2) Athlete's foot - fungicides
- 3) Head and body lice - miticides

Plant and Human Health Products

- Turf and Ornamental Pests
- Agricultural Crop Pests
 - Pesticides
- Human Pests
 - Medicine

Perception vs. Reality

Triazole fungicides - medicines

- Triadimefon - Bayleton (turf)
- Propiconazole - Banner (turf)
- Cyproconazole - Sentinel (turf)
- Miconazole
 - Micatine - Athlete's foot, jock itch
 - Miconazole - vaginal yeast infections
- Ketoconazole
 - Ketoconazole – Athlete's foot, jock itch, yeast infections
- Itraconazole
 - Sporanox - nail fungus

Triazole Chemistry

- Turf diseases
 - dollar spot, summer patch
 - controlled by triazole fungicides (Bayleton, Banner)

Triazole Chemistry

- Human diseases
 - Athlete's foot, yeast infections
 - controlled by triazole **medicine**
(Micatin, Miconazole)

Antibiotics

- Human bacterial diseases
 - pneumonia, strep throat, tuberculosis
 - controlled by **antibiotics**
(streptomycin, oxytetracycline)

Antibiotics

- Plant bacterial diseases
 - fire blight, bacterial wilt
 - controlled by **bacteriocides**
(streptomycin, oxytetracycline)

Insecticide - carbaryl

- Plant insects
 - cutworms, grubs, ants
 - controlled by insecticide (Sevin, Sevimol)

Insecticide - carbaryl

- Dog and cat flea and tick spray
 - fleas and ticks
 - controlled by **doggie spray**
(Sergeant's Flea and Tick Spray)

Miticide - Lindane

- Plant mites
 - spider mites
 - controlled by miticide (Lindane)

Miticide - Lindane

- Head and body lice
 - controlled by **medicine - Quell** (Lindane)

Pesticides in the Home

“Disinfectants”

Pesticides in the Home

“Carpet Cleaner”

Pesticides

People who are worried about pesticides fail to realize that cancer rates have dropped over the last 40 years.

C. Everett Koop

Former Surgeon General

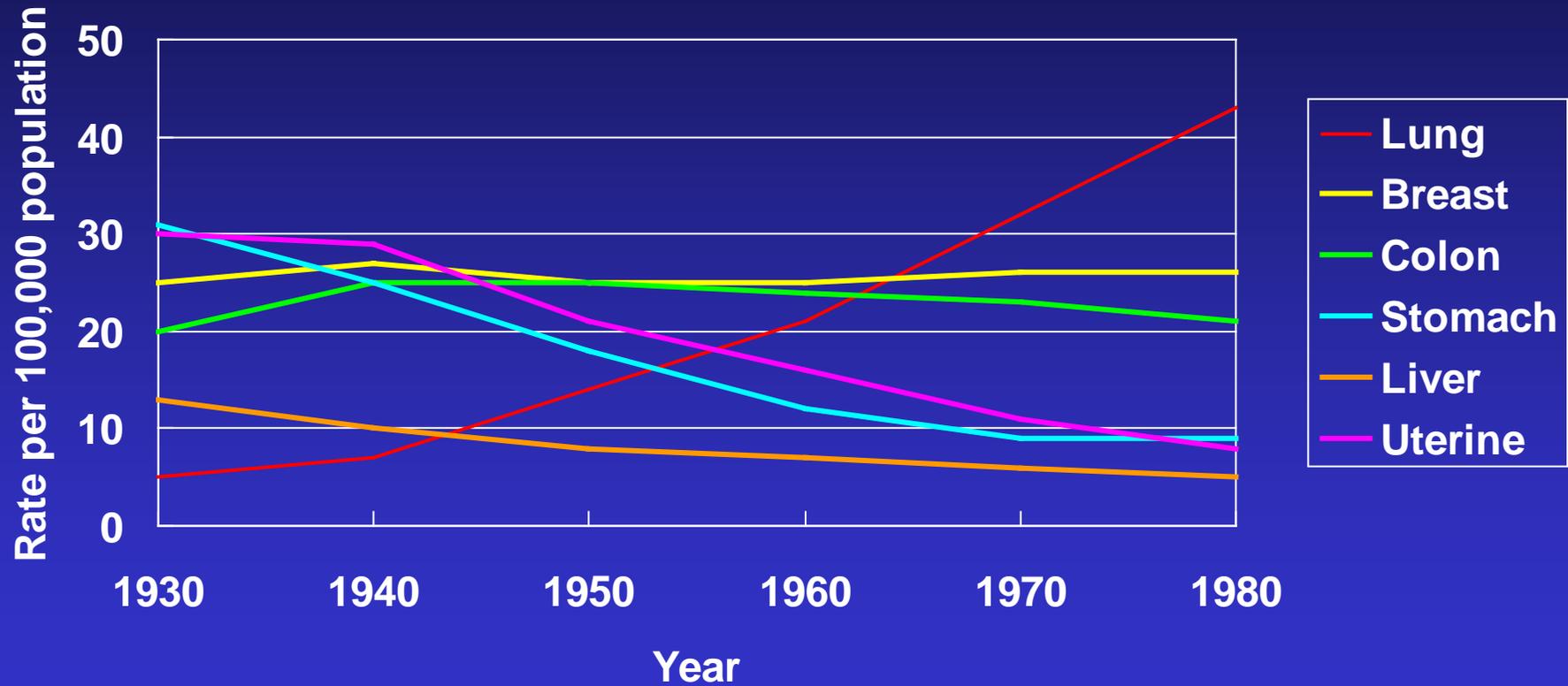
Pesticides

Stomach cancer has dropped more than 75% while rectal cancer has dropped by more than 65%.

C. Everett Koop

Former Surgeon General

Cancer Death Rates in the U.S.



No Cancer Risk From Pesticides In Foods

An advisory panel of the National Cancer Institute of Canada concludes no definitive evidence exists to link exposure to pesticides to the overall number of cancer deaths in the general population. The panel report also notes that a higher consumption of fruits and vegetables does not increase the risk of cancer despite the increased intake of agricultural pesticide residues that can result from eating more produce.

November 15, 1997 issue of the journal, *Cancer*, a publication of the American Cancer Society.

No Cancer Risk From Pesticides In Foods

Ritter and the panel emphasize that any slight increases in risk from exposure to pesticide residues that may result from an increased intake of fruits and vegetables “were far outweighed by the benefits associated with shifting diets away from fat and toward the kind of fiber that’s provided by fruits and vegetables.”

November 15, 1997 issue of the journal, *Cancer*, a publication of the American Cancer Society.

No Cancer Risk From Pesticides In Foods

The toxicologist also notes that “the panel concluded, based on the totality of evidence that it saw, that where pesticide exposure to the general public is taking place at all, it takes place mainly through the food supply, and that the exposure is very, very small.”

November 15, 1997 issue of the journal, Cancer, a publication of the American Cancer Society.

No Cancer Risk From Pesticides In Foods

Ritter and the panel concluded that the number one cause of preventable cancer in Canada was cigarettes.

November 15, 1997 issue of the journal, Cancer, a publication of the American Cancer Society.

Plants defend themselves from
pests by producing
Natural Pesticides or Toxins

Endophytes

- Mutualistic Symbiotic Relationship
- Plant - Fungus

Endophytes

- Cattle and horses that feed on endophytic grasses become ill and may even die.

Organically Grown Food

- Plants which can be grown without **Plant Health Products** are usually resistant to diseases and insects.
- This means they probably contain **natural pesticides**.

Pesticides on the Inside

- Plants resistant to insects and diseases contain natural pesticides

Insect Resistant Potatoes

- Withdrawn from market
- Acute toxicity to humans
- Higher levels of solanine and chaconine

Dr. Bruce Ames, 1989
University of California – Berkley

Where would you like your pesticides on the food you eat?

- On the inside?
- On the outside?

Pesticides

- 1) 99.9% of **ALL PESTICIDES** consumed are naturally occurring
- 2) We ingest 10,000 times more natural pesticides than synthetic

Dr. Bruce Ames, 1989

Plant Toxins

- 1) Very few have been tested for carcinogenicity
- 2) Of 42 plant toxins tested, 20 were carcinogens

Dr. Bruce Ames, 1989

Foods that contain natural pesticides:

- apples
- bananas
- basil
- broccoli
- brussel sprouts
- cabbage
- cantalope
- carrots
- cauliflower
- celery
- cinnamon
- cloves
- cocoa
- grapefruit juice
- horseradish
- mushrooms
- mustard
- nutmeg
- orange juice
- black pepper
- radishes

Naturally Occurring Toxicants

- Carcinogens
 - Mushrooms - hydrazine
 - Celery - furocoumarin
 - Black pepper, nutmeg, cinnamon - safrole
 - Chocolate - theobromine

Estimated Daily Intake Carcinogens

Cola (formaldehyde)	2000µg
Basil leaf (estragole)	760µg
Coffee – 1 cup (hydrogen peroxide – methylglyoxal)	500µg
Bread – 1 slice (formaldehyde)	185µg
Pesticide residues	45µg

Dr. Bruce Ames, 1989
University of California – Berkley

Suspected Carcinogens in Daily Diet

- 1) cigarettes
- 2) ethyl alcohol
- 3) fatty foods

Black Pepper

- A) Safrole, Piperidine and alpha-Methylpyrrolidine
 - 1) 4 mg of dried pepper/day
 - 2) 3 months
 - 3) tumors in rats
- B) Humans average 140 mg/day

Coffee

- 1) Contains mutagens - chlorogenic acid
- methylglyoxal
- 2) Caffeine - inhibits DNA repair

Coffee

- 3) Inconclusive epidemiological evidence about heavy coffee drinkers suggest association with the following forms of cancer:
 - ovary
 - bladder
 - pancreas
 - colon

Dose makes the poison

Lethal Doses

- Caffeine - 100 cups coffee
- Solanine - 100-400 lbs. potatoes
- Oxalic acid - 10-12 lbs. spinach or rhubarb
- Aspirin - 100 tablets
- Hydrogen cyanide - 4 lbs. lima beans

Bacterium *Clostridium botulin*

- Toxin botulinum - botulism
- 1 mg pure toxin - kill 500 adults

Botulinum

- Approved by FDA for medical usage
- Treatment of muscle spasms

Wrinkle Remover

- Botox

Botox



Although it is a toxin, Botox has been used safely by ophthalmologists for over 10 years. It has been used for wrinkle therapy since the early 1990's with no serious side effects documented.

Botox injections relax the muscles that create wrinkles thereby lessening the appearance of frown lines, laugh lines and crow's feet. After a Botox injection, for example, you are no longer able to frown so the lines created by frowning are eliminated.

Older Pesticides

- Sevin
- Dursban
- Balan
- Daconil Ultrex
- Chipco 26GT
- Vorlan
- Clearys 3336
- 2,4-D
- MCPP
- Banner
- Bayleton

A pesticide applied at 1 lb ai/A

Equivalent to

1 tsp. sugar spread over 5000 (5 inch)
cereal bowls

Pesticides applied at 1 lb/acre

- 1) 1 lb ai/acre
- 2) 16 oz ai/acre
- 3) 1 oz ai/2,500 sq ft
- 4) 0.4 oz ai/1000 sq ft

Reduced Risk Pesticides

- Barricade
- Merit
- Heritage
- Compass
- Mach II

A pesticide applied at $1/8$ lb ai/A

Equivalent to

1 tsp. sugar spread over 40,000 (5 inch)
cereal bowls

Pesticides applied at 1/8 lb/acre

- 1) 1/8 lb ai/acre
- 2) 2 oz ai/acre
- 3) 1 oz ai/21,500 sq ft
- 4) 0.05 oz ai/1000 sq ft

1 part per million (ppm)

- 1 oz. salt in 62,500 lbs. sugar
- 1 inch in 16 miles
- 1 second in 11 days

1 part per billion (ppb)

- 1 inch in 16,000 miles
- 1 second in 32 years

1 part per trillion (ppt)

- 1 pinch of salt in 10,000 tons of potato chips
- 1 inch in 16,000,000 miles
- 1 second in 320 centuries

Alar...

The Rest of the Story

Alar

- Third world countries petition WHO
- Re-approved for use by WHO in 1999

Alar

- 1% of diet (MXTD)
- 28,000 lbs of apples
 - per day
 - 10 years

Apple Juice

- 1) 137 natural volatile chemicals
- 2) Only five have been tested for carcinogenicity
- 3) Three have been found to be carcinogenic
 - a) acetate
 - b) alcohol
 - c) acetaldehyde

Actuarial estimates compiled by Decision Research in 1982.

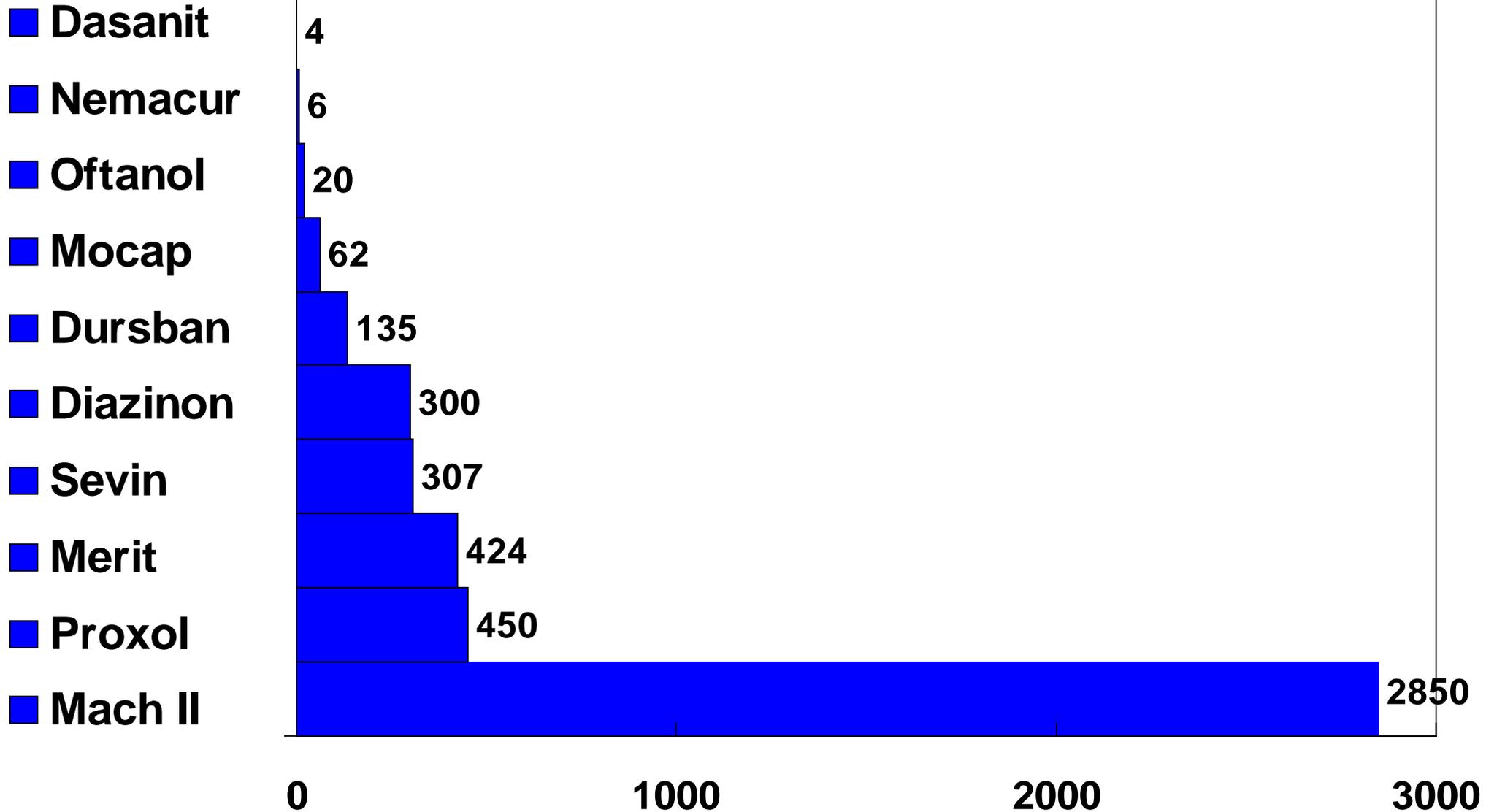
Causes of Death	Deaths/Year
Smoking	400,000
Alcoholic beverages	100,000
Motor vehicles	50,000
Handguns	17,000
Swimming	3,000
Bicycles	1,000
Hunting	800
Commercial aviation	130
Skiing	18
Pesticides	0

Pesticides vs. cigarettes - Effect on life expectancy

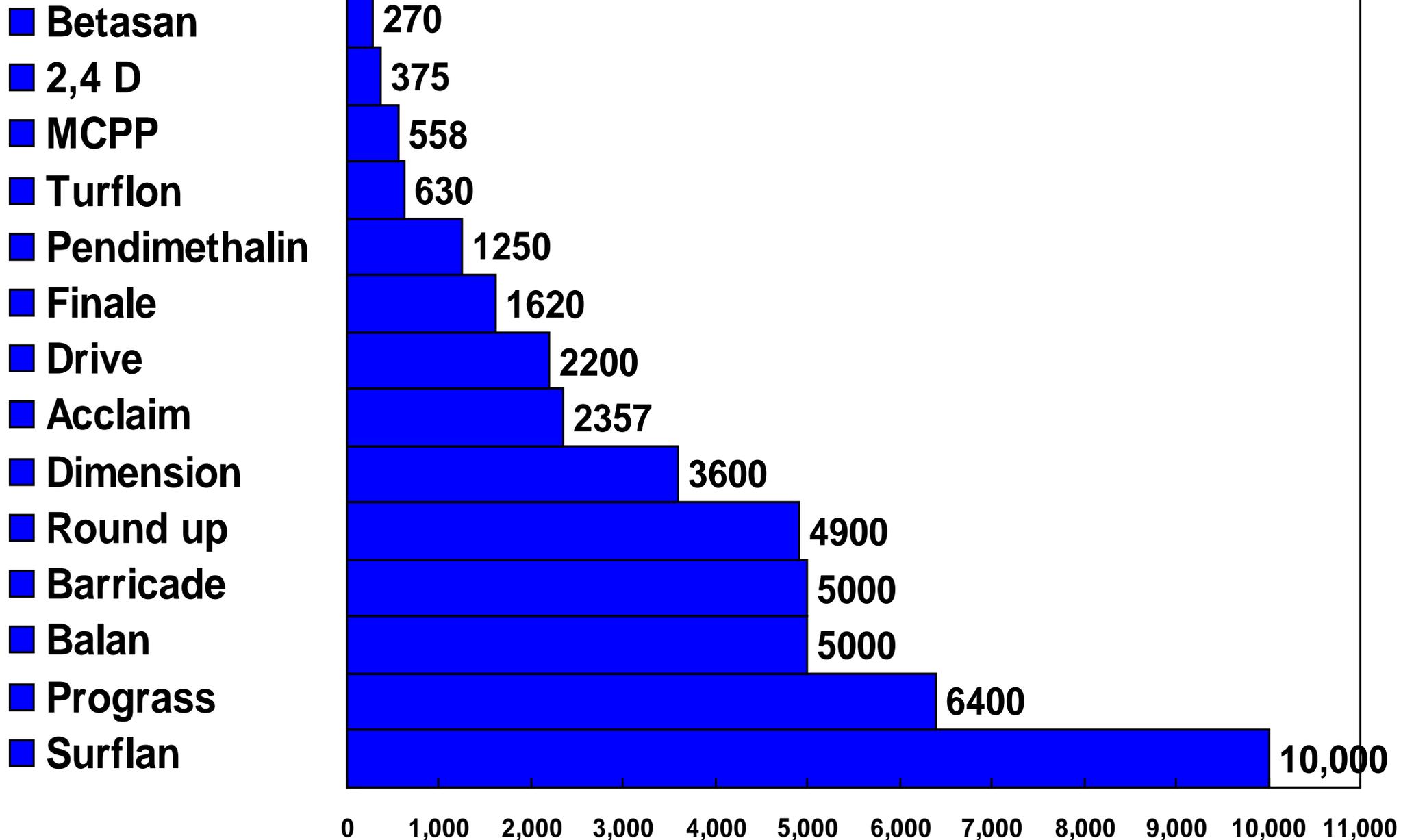
- Estimated reduction
 - Synthetic Pesticides: 2-7 days
 - Cigarettes: 8 years

Insecticides - Nematicides

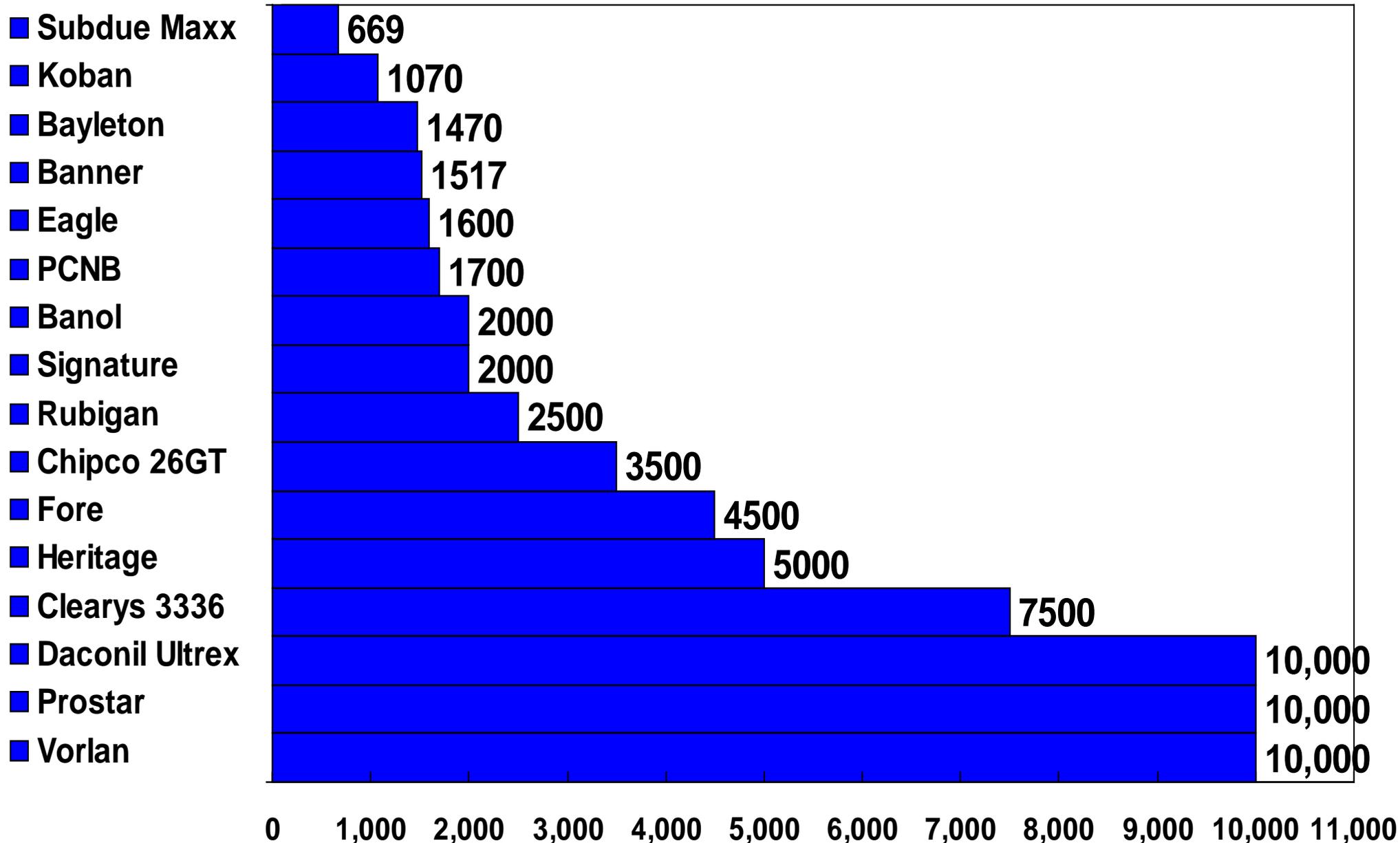
Oral LD₅₀



Herbicides Oral LD₅₀



Fungicides Oral LD₅₀



Fungicides Oral LD₅₀

- Caffeine
- Subdue Maxx
- Aspirin
- Koban
- Bayleton
- Banner
- Eagle
- PCNB
- Banol
- Signature
- Rubigan
- Salt
- Chipco 26GT
- Ethyl Alcohol
- Fore
- Heritage
- Clearys 3336
- Daconil Ultrex
- Prostar
- Vorlan

