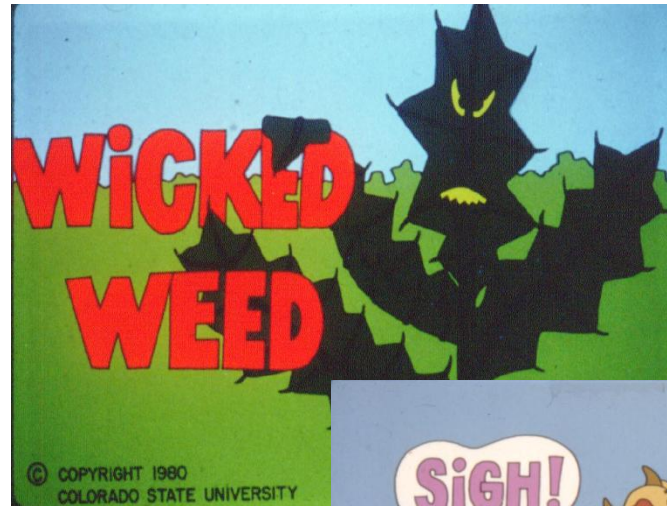


Introduction to Weed Science



M. Haidar

Professor of Weed Eco-physiology



Food Security

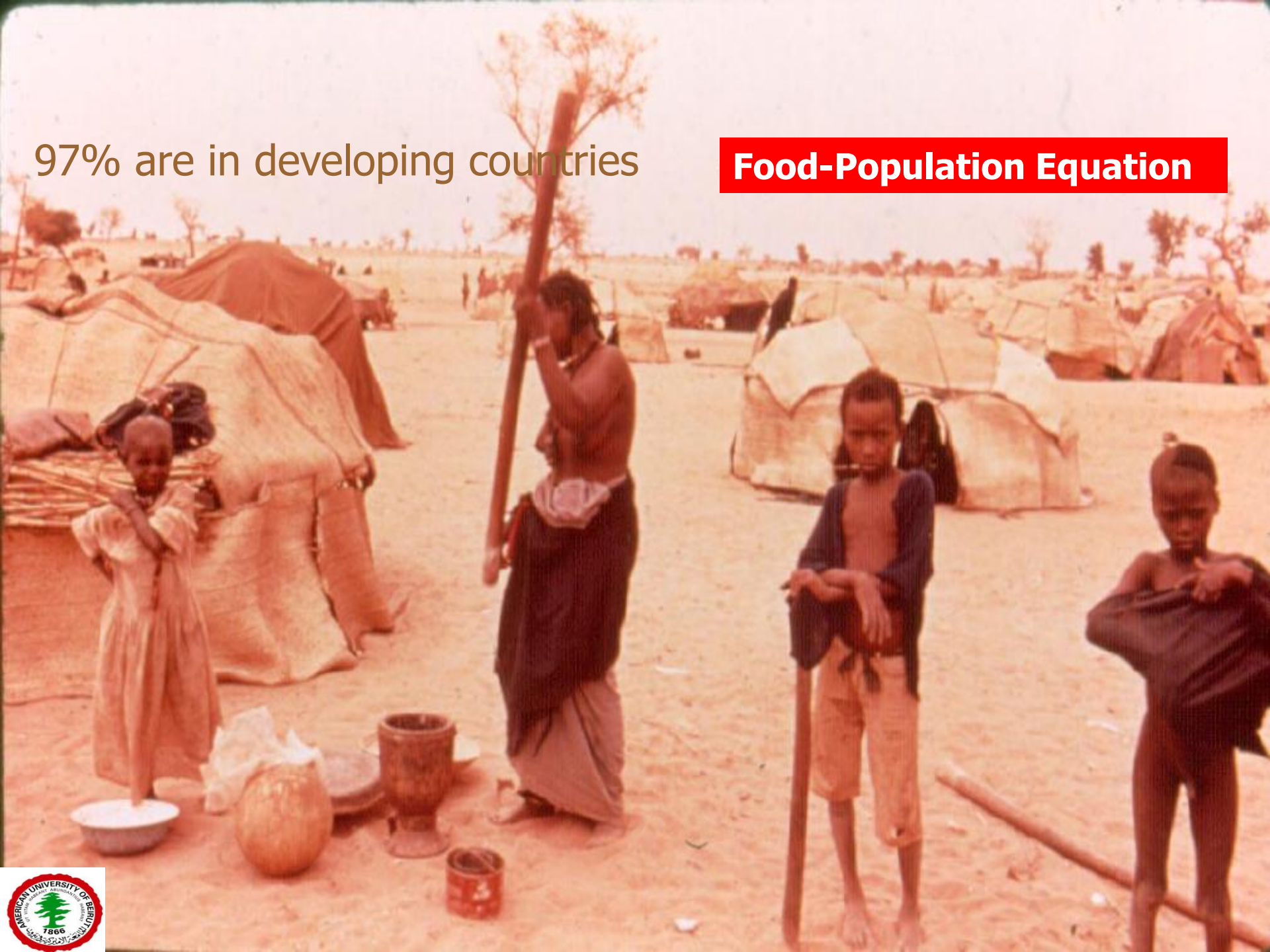
- Around 870 million people fail to meet food needs-(FAO, 2012)
- 10-20 million people die each year of starvation- 5 million children die/year



Encarta Encyclopedia, Carl Purcell/Science Source/Photo Researchers, Inc.

97% are in developing countries

Food-Population Equation





Agricultural Constraints

- Political instability, i.e., Wars, governments...
- Environmental, i.e., Desertification, drought...
- Physical, i.e., Lack of roads, communications
- Biological, i.e., Pests such as **WEEDS**, insects, pathogens, rodents, etc.

What is a weed?

"a plant out of place or growing where it is not wanted."

Blatchley 1912

"a plant that is growing where it is desired that something else shall grow."

Georgia 1916

"these obnoxious plants are known as weeds."

Robbins et al. 1942







Weeds will occupy the farm if you don't do anything about them





Weedy corn

Weeds are one of the most, if not the most, important production problem that growers face.



Dandelion field

Weeds are Pests

Weeds = Wanted Dead

Over 300,000 flowering plant spp.

Around 250 plant species are weeds (0.1%).

Only 40 plant spp. are the “World Worst Weeds” or
Noxious weeds.

70% of weed spp fall under 12 families.

Poaceae and Asteraceae are the largest weed families.



Who said that weeds are unwanted plants?

- *Once in a golden hour,
i cast to earth a seed.
upon there came a flower,
the people said--a weed.*

Alfred Lord Tennyson

- *A weed is not more than a flower
in disguise which is seen through
at once, if love give a man eyes.*

James russel Lowell 1848.

One man's flower, another woman's weed



Exotic plant in ponds or fountains, but a noxious weed in African lakes

Water Hyacinth





In Syria





Fundamental Concepts

Weeds are controversial plants.

Weeds represent a highly successful plant community.

Weeds are associated with humans. They are adapted to the agro-ecosystem.

Weeds persist in disturbed habitat-cultivated lands.

Weeds have the ability to invade, dominate and persist in disturbed habitat. WHY?



WEED CHARACTERISTICS

This is because most of them have some or all of the following nasty Characteristics:

1. Ability to reproduce at young age.
2. Ability to survive unfavorable growing conditions.
3. Rapid growth and stand establishment.
4. **Dual mode of reproduction by seeds and vegetatively-
big weed problem.**
5. **Seed dormancy-Weed seeds exhibit several modes of
seed dormancy or dispersal in time.**
6. **Different mechanisms of seed dispersal.**



WEED CHARACTERISTICS

7. Weed seed-crop similarity (Crop mimics).
8. **Abundant seed production.**
9. Ability to resist herb and harsh environment.
10. Competitive ability-weeds are very competitive for light, water and nutrients.
11. Extensive root system and large root reserves.
12. Roots have the ability to penetrate deep in soil and for several feet.

Abundant seed production

Production varies greatly with spp. ie.,

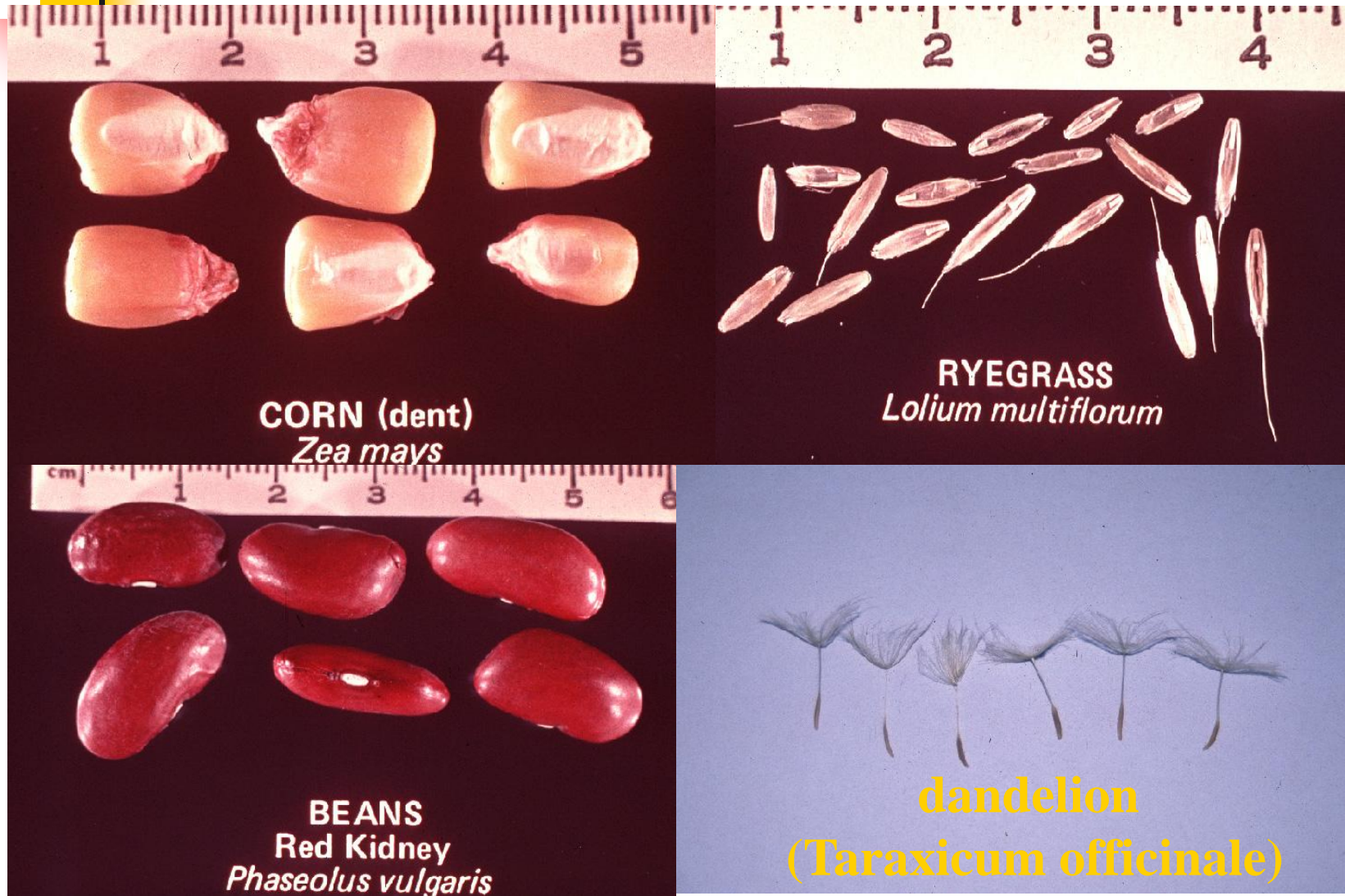
A single plants of *Artemisia biennis* produces around 1.075,000 seeds



Portulaca oleracea 193,000 seeds



Relative seed sizes for crop vs. weed





Who Worries About Weeds?

Farmers

Physicians

Property owners

Parents



WICKED WEED

© COPYRIGHT 1980
COLORADO STATE UNIVERSITY



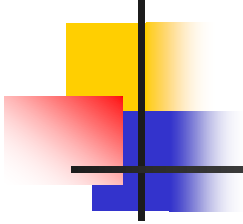
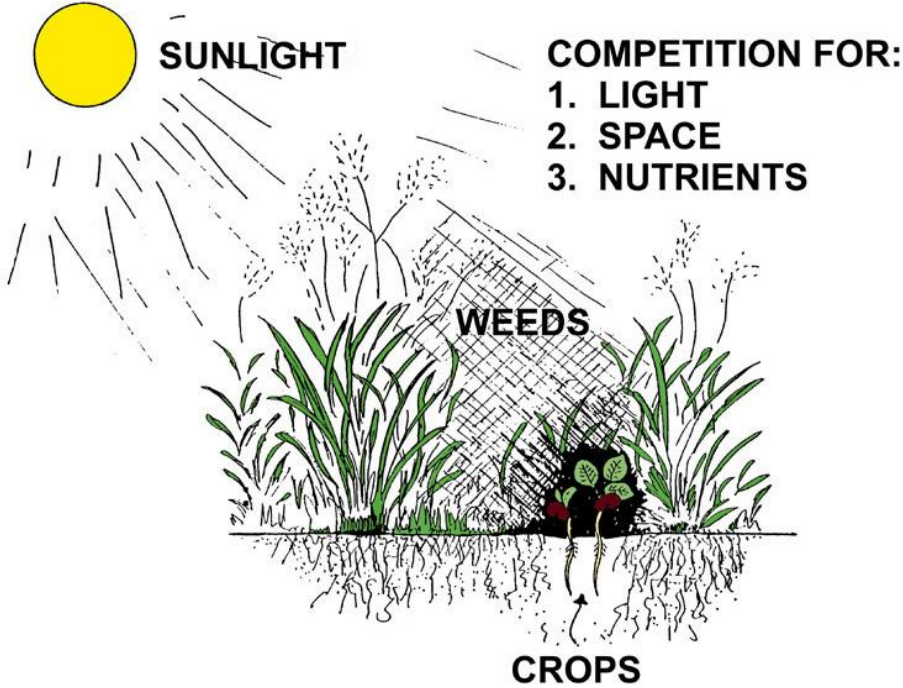


Figure 7



Weeds Compete with our
crops for **nutrients**



Compete for water



Compete for **light**





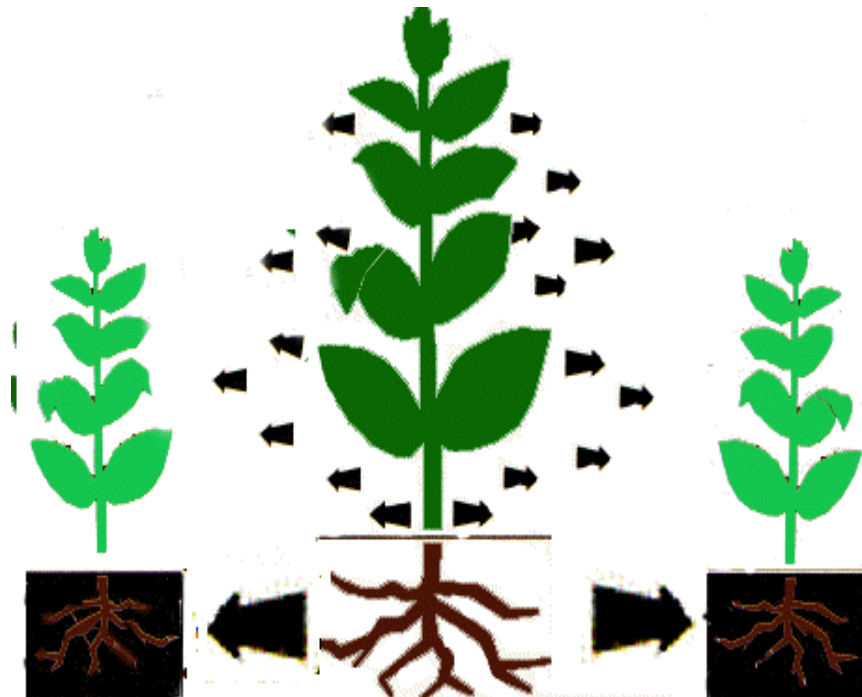
kudzu (*Pueraria lobata*)



ALLELOPATHY OR AMENSALISM

Back Off!

Plants Guard Their "Personal Space" with Poisons



Allelopathy



Neighbors killing neighbors, poisoning the environment, boosting a favored few at the expense of others.

Occurs when one plant, through living or decaying tissue, interferes with growth of another plant via the production of toxic or growth-inhibiting compounds into the soil.



Example:

Black walnut trees in Central Asia produce a simple lactone-
Juglone (5-hydroxy- α -naphthquinone) that inhibits germination and growth of many plants.





Parasitic Weeds

A parasite is a plant or animal living in, on or with another living organism (host) at whose expense it obtains food, shelter or support. *Radosevich 1994*

Developing countries worst parasitic weeds:

Cuscuta spp. (Dodder)

Orobanche spp. (Endemic in Lebanon)

Striga spp. (Not found in Lebanon)

***Cuscuta* is an annual obligate stem parasite**





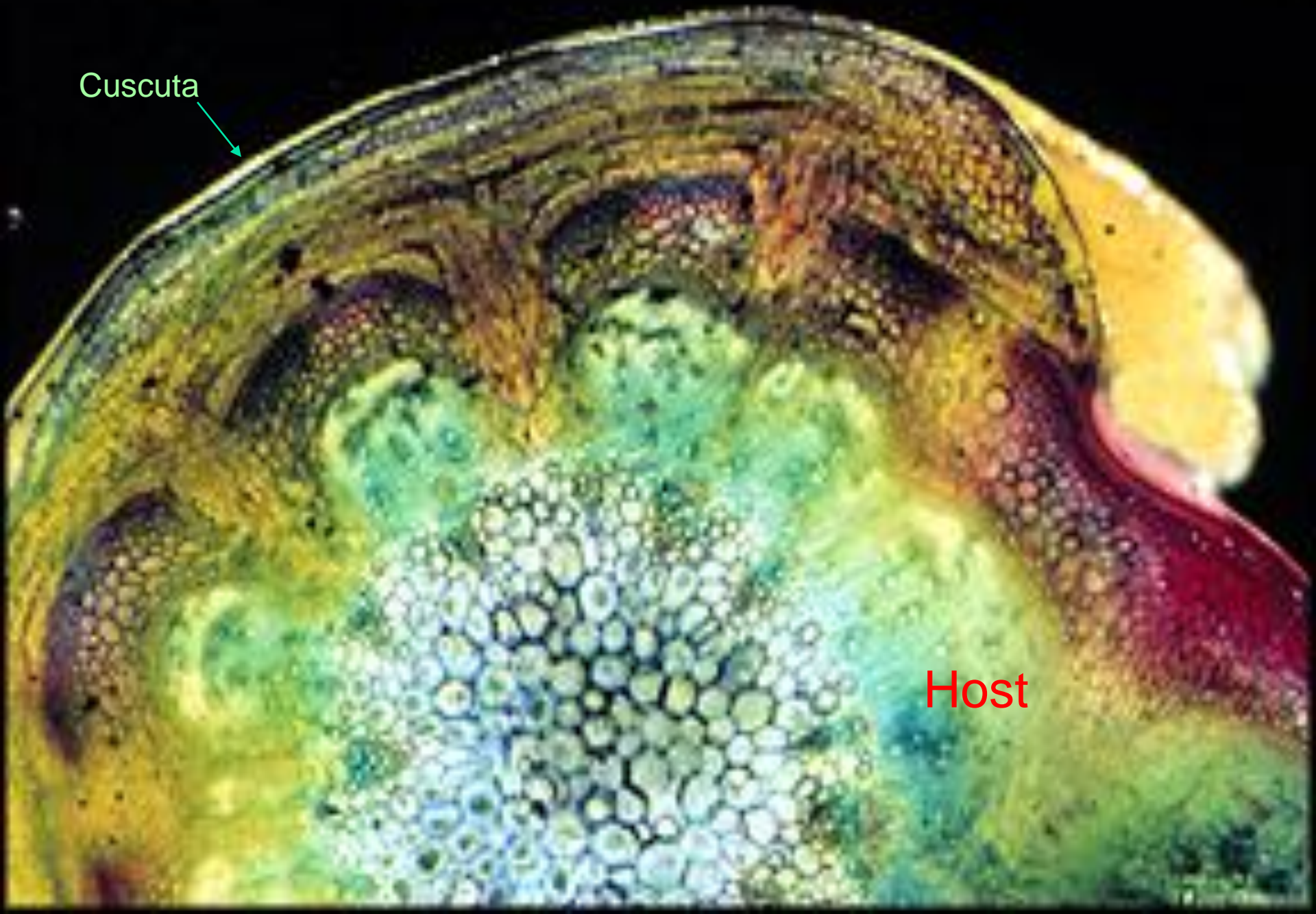
Cuscuta

Host Stem

Cuscuta



Host



Broomrape (*Orobanche crenata*) attacking broad bean.
It is an obligate root parasite.

Broad bean



Orobanche on carrot



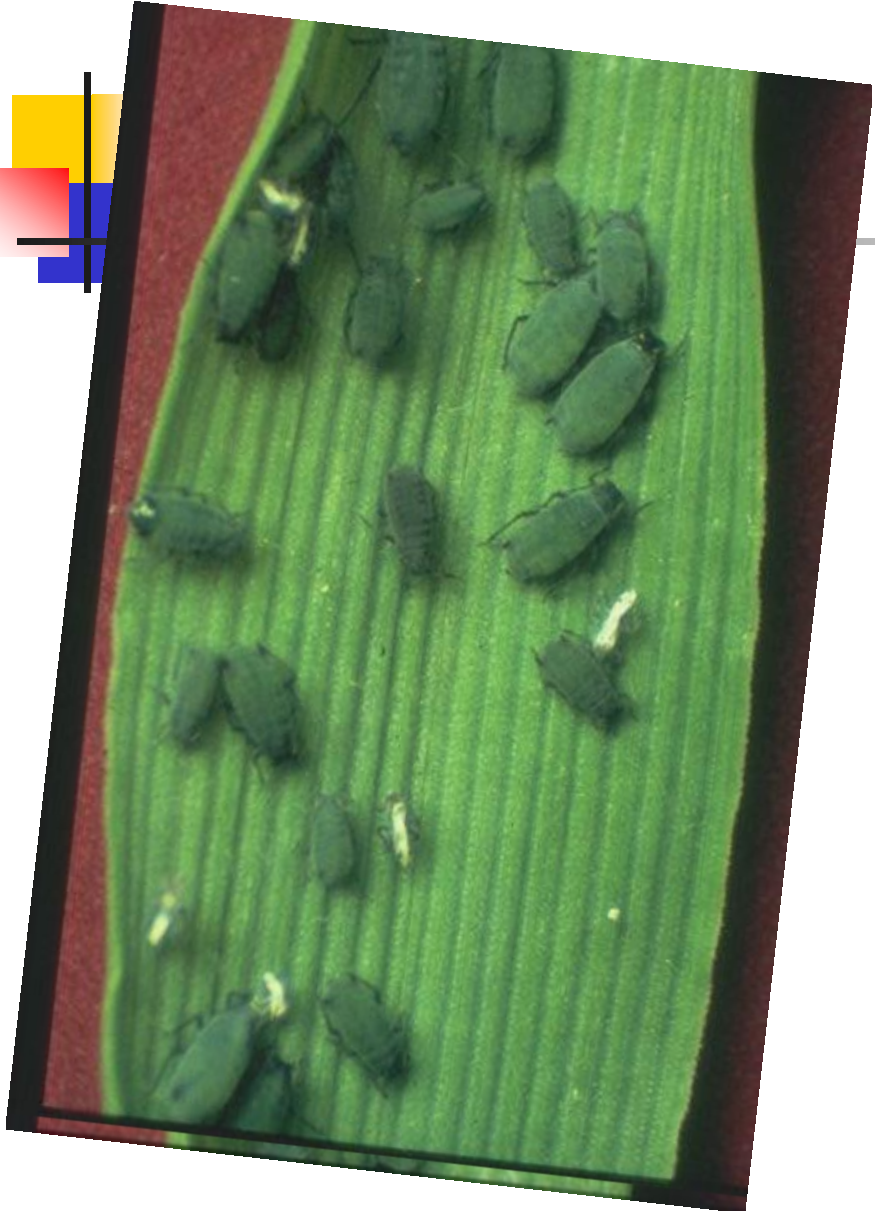


Mistletoe (*Viscum* spp.)-hemi stem parasite-attacks trees.





**WELCOME
BUGS!**



DISEASE

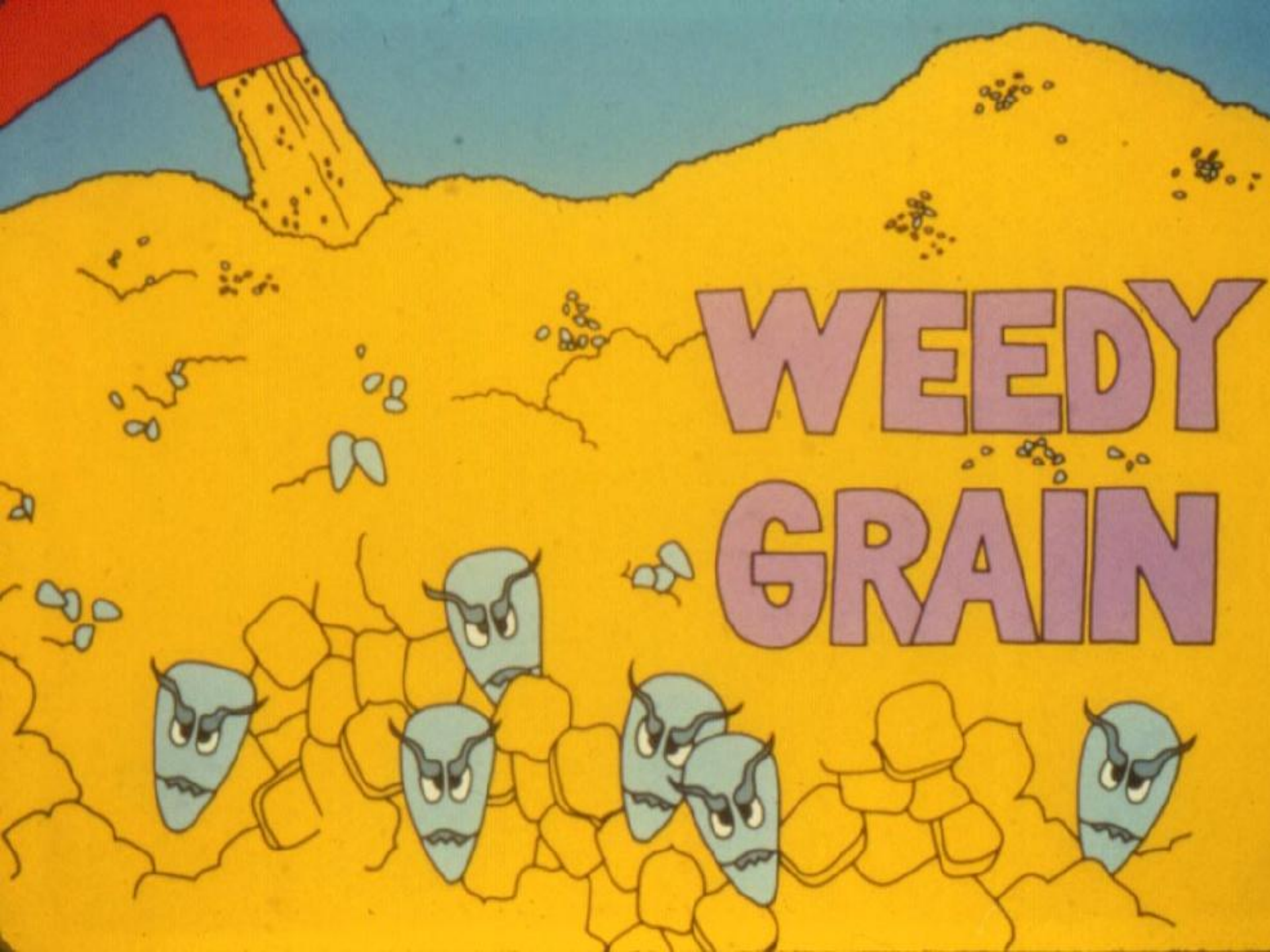


Rust





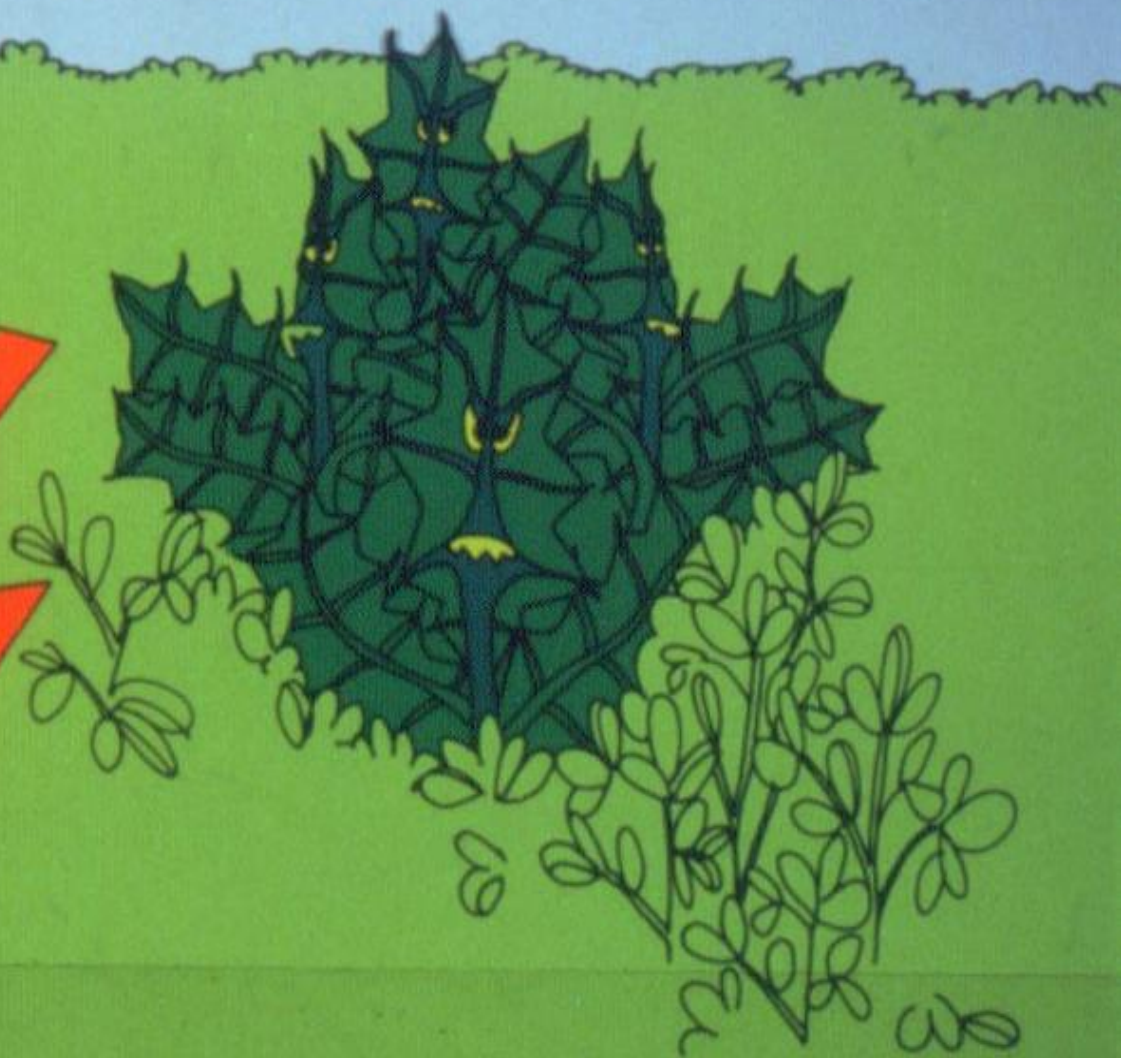




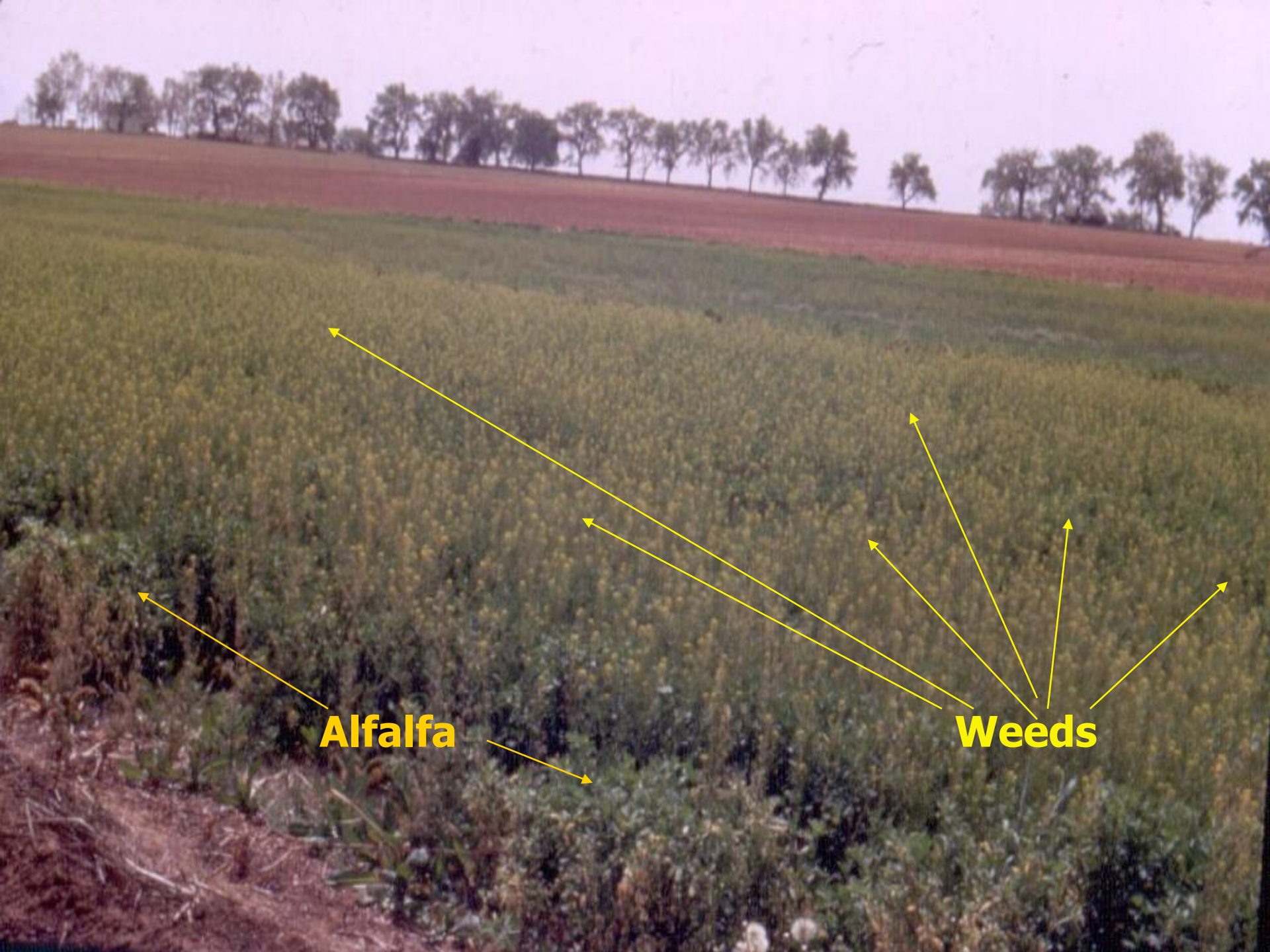
WEEDY GRAIN



WEEDY HAY







Alfalfa

Weeds

YOW











Castor bean

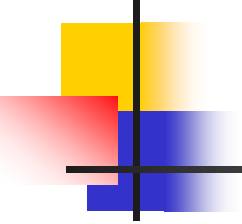
Ricinus communis



**Contains the toxin
ricin→ 10^{-6} g may
kill a 90 kg man**

Castor bean





Nerium oleander
(Oleander)-a popular and
widely planted in gardens.
All plant parts are
poisonous.

Children are the most
common victims of oleander





ECONOMIC LOSSES FROM WEEDS

- Economic losses due to weeds may include one or more of the following:
 - yield loss
 - quality loss
 - cost of control
 - equipment costs
 - crop restrictions
 - lower farm value
 - consumer losses
 - Environmental cost

CLEANING







Figure 7.

Rotary tillers used for mechanical incorporation of herbicides in the soil.











~~CORN~~ ~~WHEAT~~

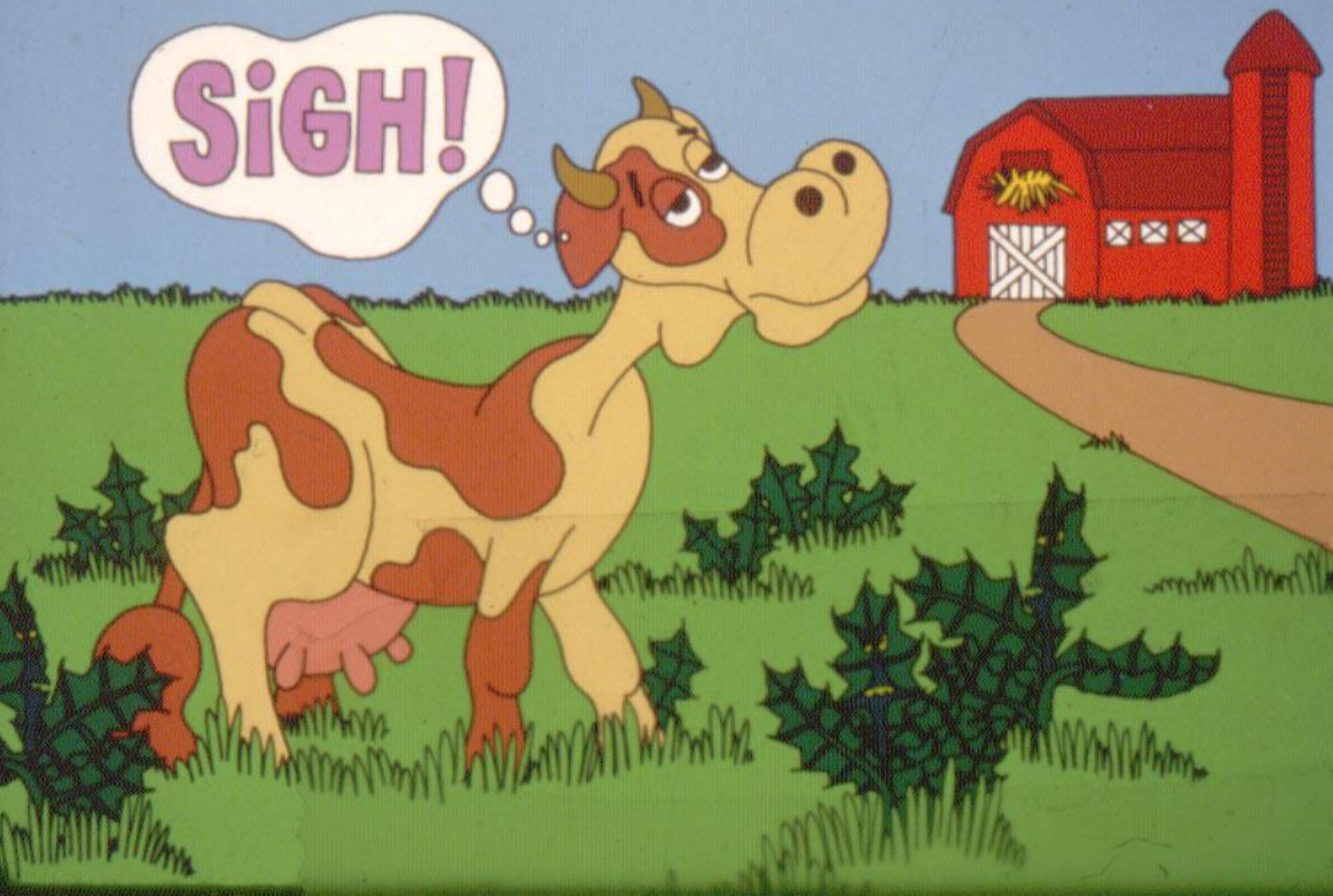
~~SOYBEANS~~

~~ALFALFA~~ ??



**FOR SALE
(CHEAP!)**

SIGH!



Fire hazards, shelter
for snakes, animals...







Conclusion

Weeds are very dangerous agricultural pests.

They **compete** with our crops for resources, reduce crop yield quantity and quality, harbor pests, some are **allelopathic or parasites**, interfere with irrigation and harvesting operations, affect animal and human health and increase production costs.



Solution

AGSC 284-Weed Science Course at AREC.

The study of weeds and their management:

Weed Identification-taxonomy

Understand Biology and Ecology of Weeds

Integrated Weed Management System (IWM)



Thanks for Listening

