Reading Weeds
Introduction to Plant Indicators

Ron Whitehurst
Rincon-Vitova Insectaries

Back to the Land

Reading signs in the city

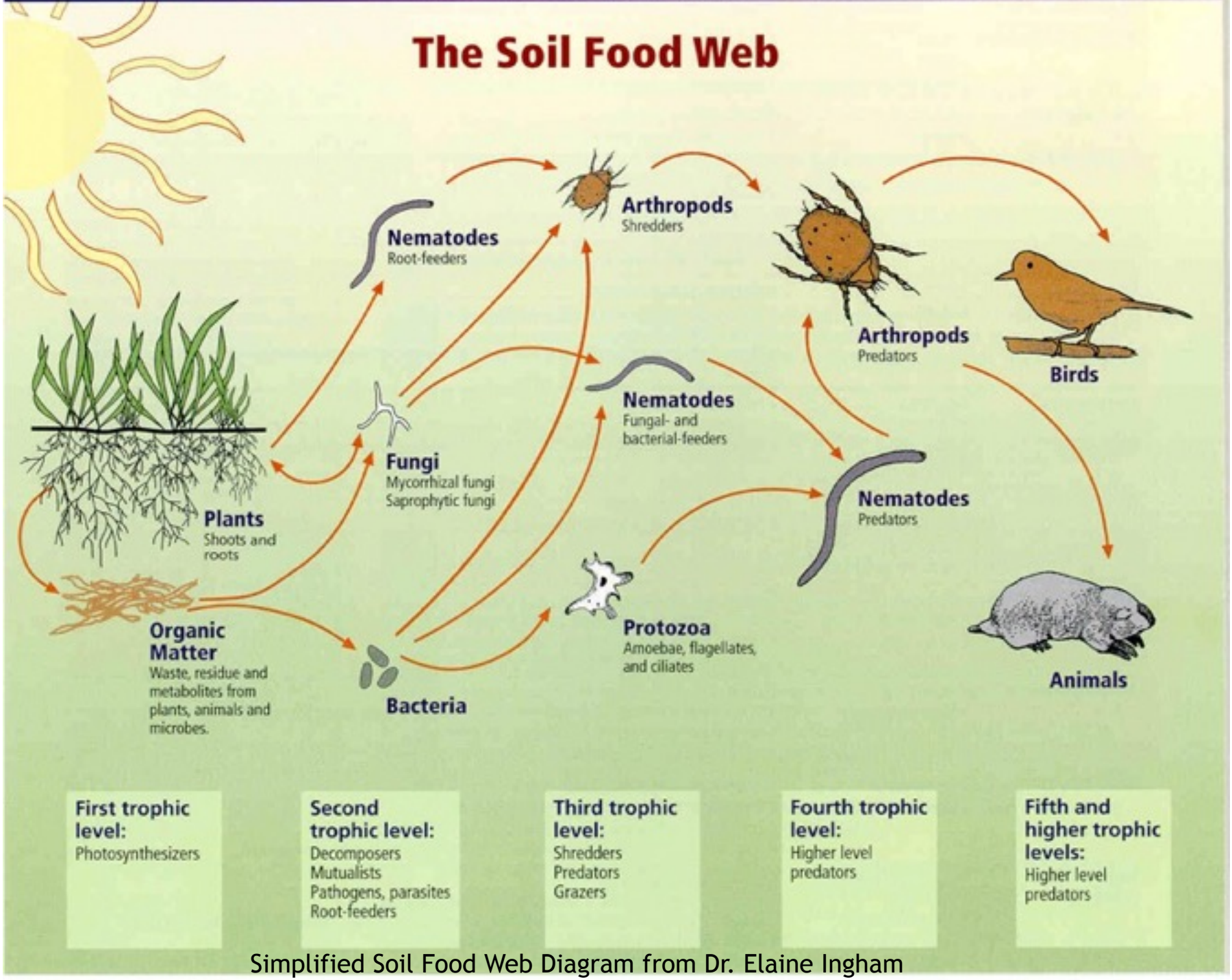
We have learned to find simulated food like substances, by reading the signs

Learning traditional skills of interpreting nature signs

Snap shot chemical test vs plants that have experienced several seasons

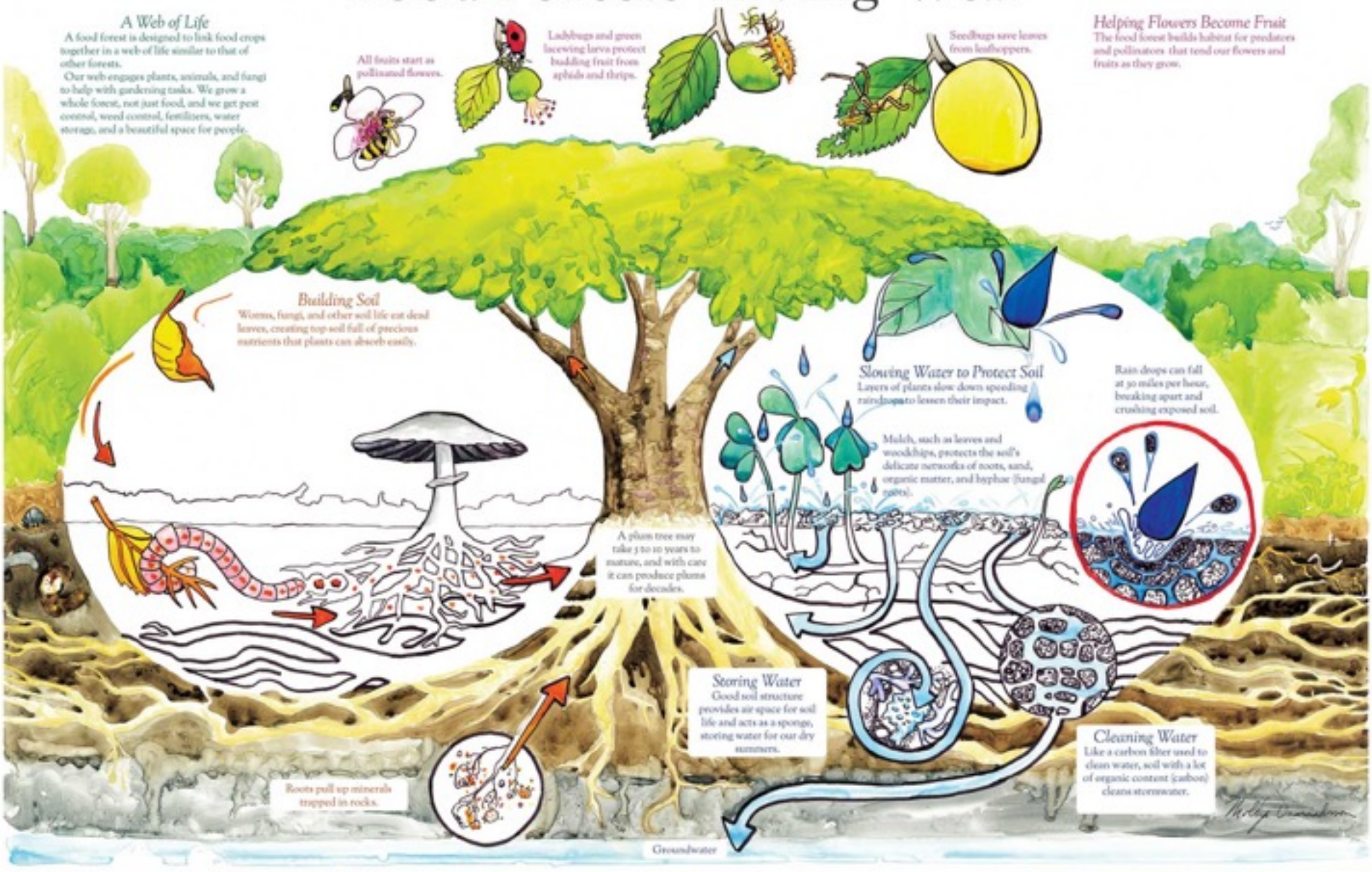
Healthy Soil: Cornerstone of Life


Arthropods
(Shredders)
Nematodes
(Root Feeders)
Plants
(Roots & Shoots)
Fungi
(Mycorrhizal
& Saphrophytic)
Organic Matter
(residue and residuals
from plants, animals,
and minerals)
Bacteria
Nematodes
(Bacterial
& Fungal
Feeders)
Protozoa
(Amoebae, Ciliates
and Flagelletes)
Arthropods
(Predators)
Birds
Animals
Nematodes
(Predators)
[Elaine's Note To Farmers
Don't til because you will
hurt the microbes. Use
cover crops to save water.
Elaine
THE SOIL FOODWEB
Our soil teams with a multitude of organisms which provide the necessary work for healthy plants to grow free from disease, pests, and infertility. These interconnected interactions and feeding relationships (quite literally "who eats who") help determine the types of nutrients present in soil, its depth, and pH, and even the types of plants which can grow.



Simplified Soil Food Web Diagram from Dr. Elaine Ingham

Food Forests' Living Web



Roots Demystified

by

Robert Kourick

Roots take on different shapes
to get nutrients and water
from different layers
of the soil

Carrot
Roots

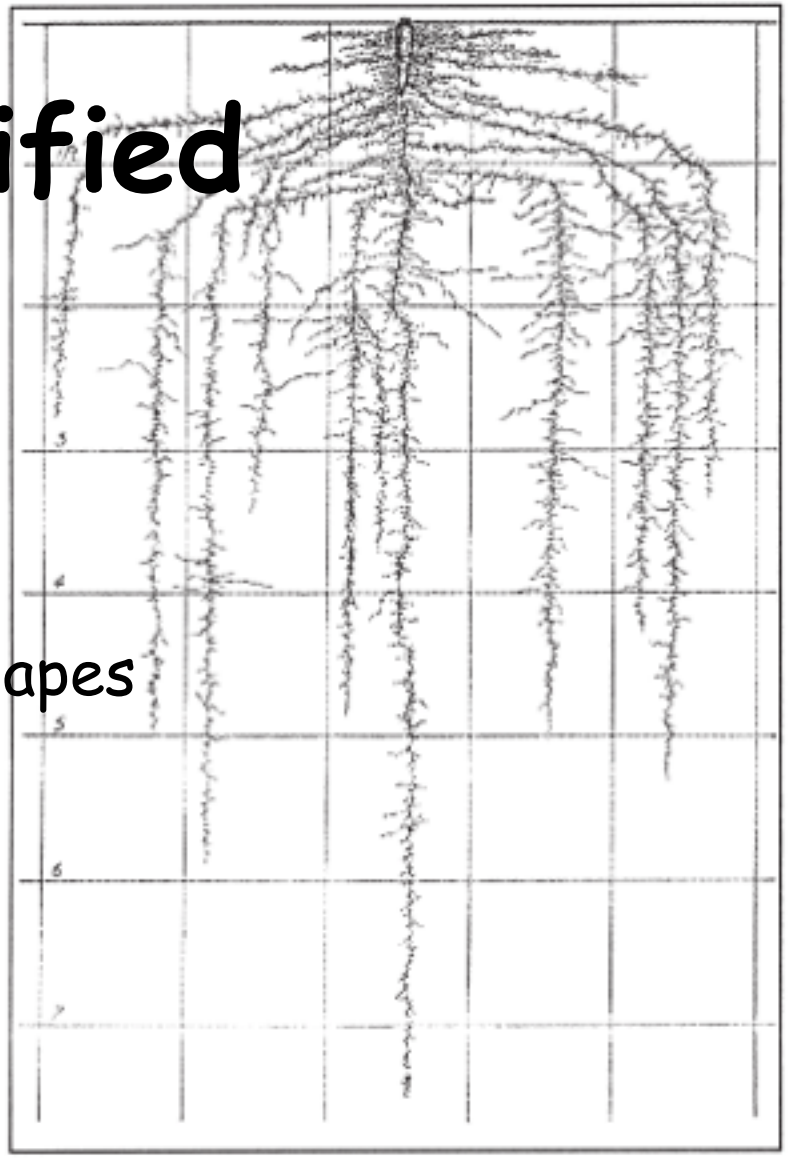


Figure #14: When you pulled that carrot from the soil, I'll bet you didn't know how many roots you left behind.

Roots
Cauliflower

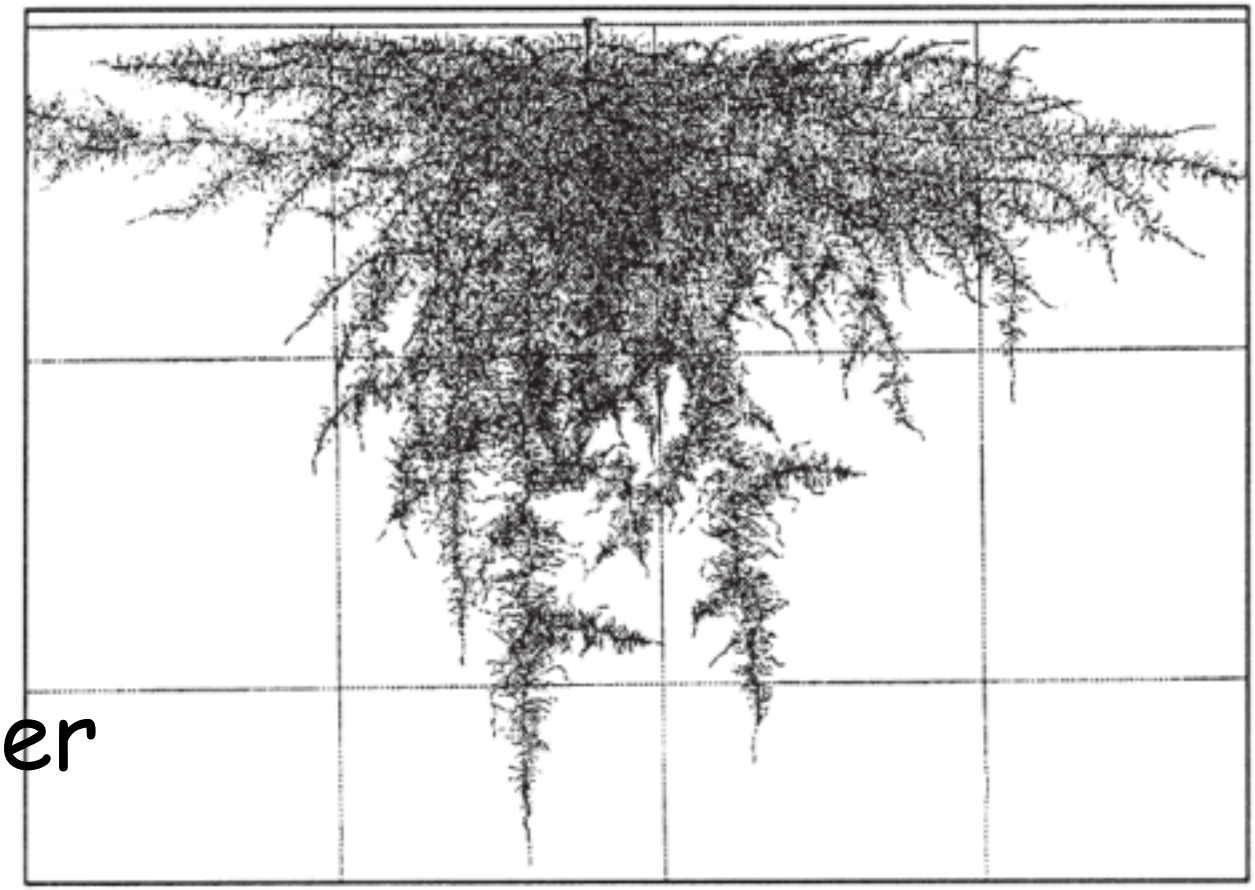
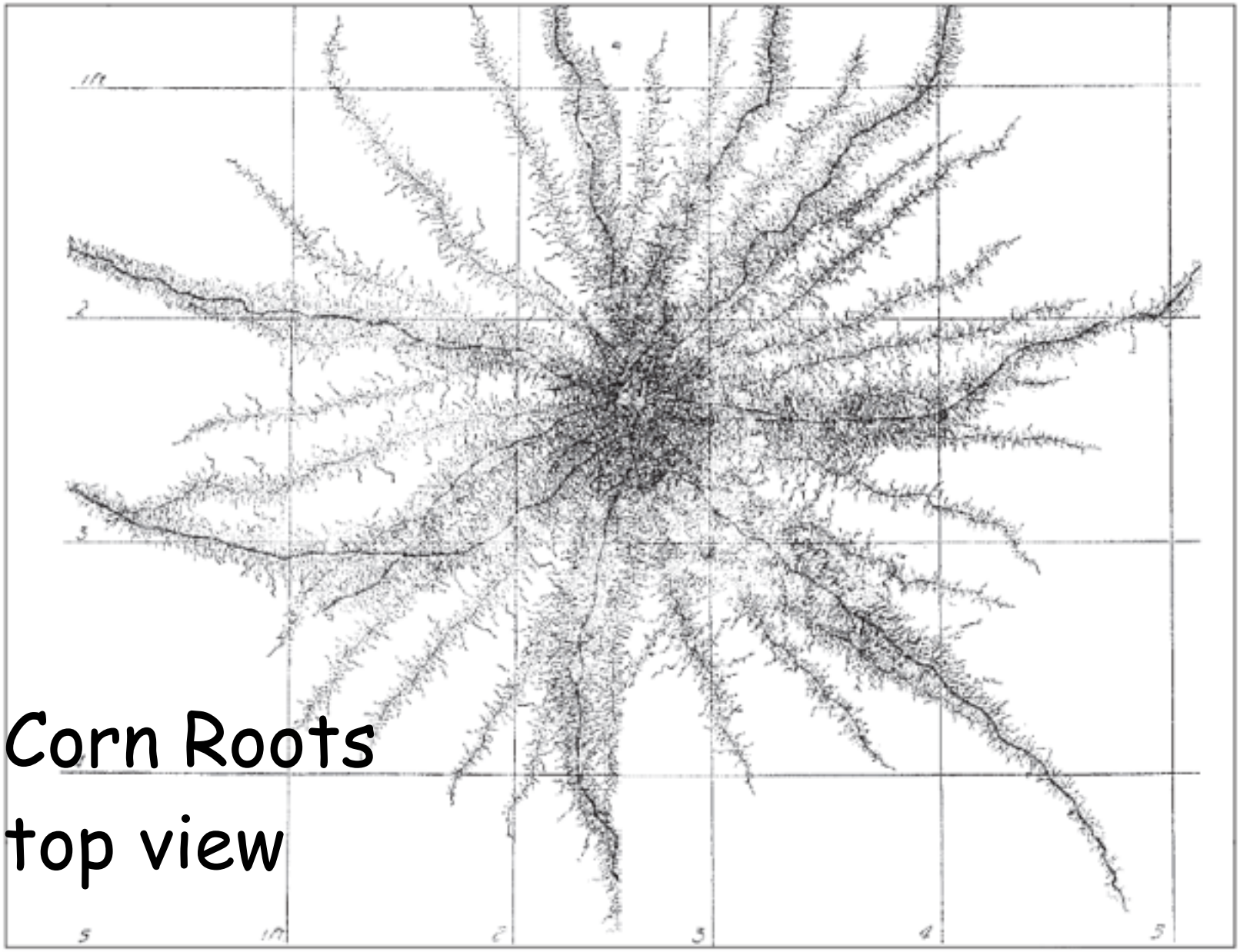
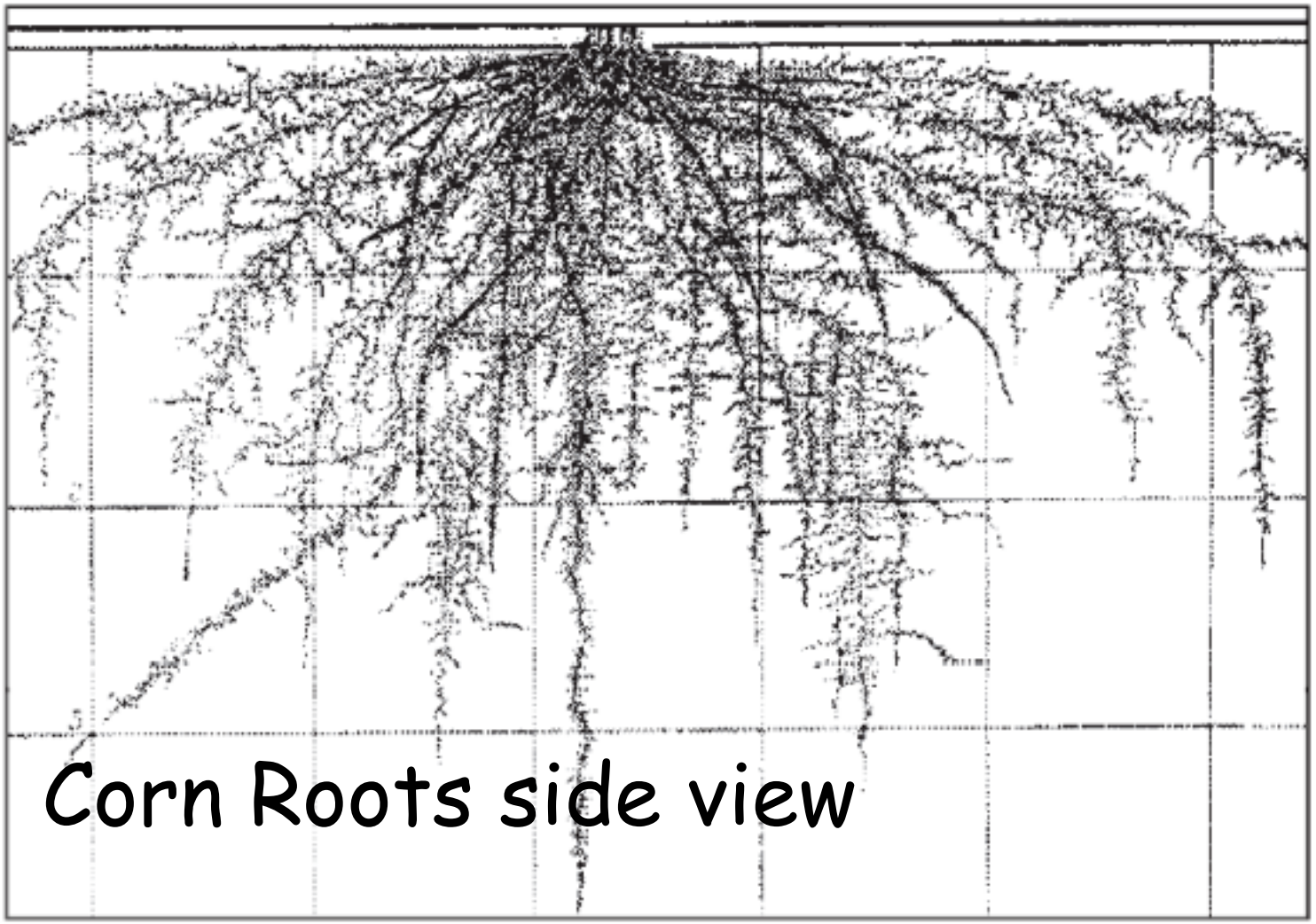


Figure #15: At only eight weeks old, the root system of this cauliflower plant is more than four feet wide and three feet deep.



Corn Roots
top view

Figure #18: This beautiful diagram re-creates the pattern (seen from above) of corn roots growing in the top six inches of soil.



Corn Roots side view

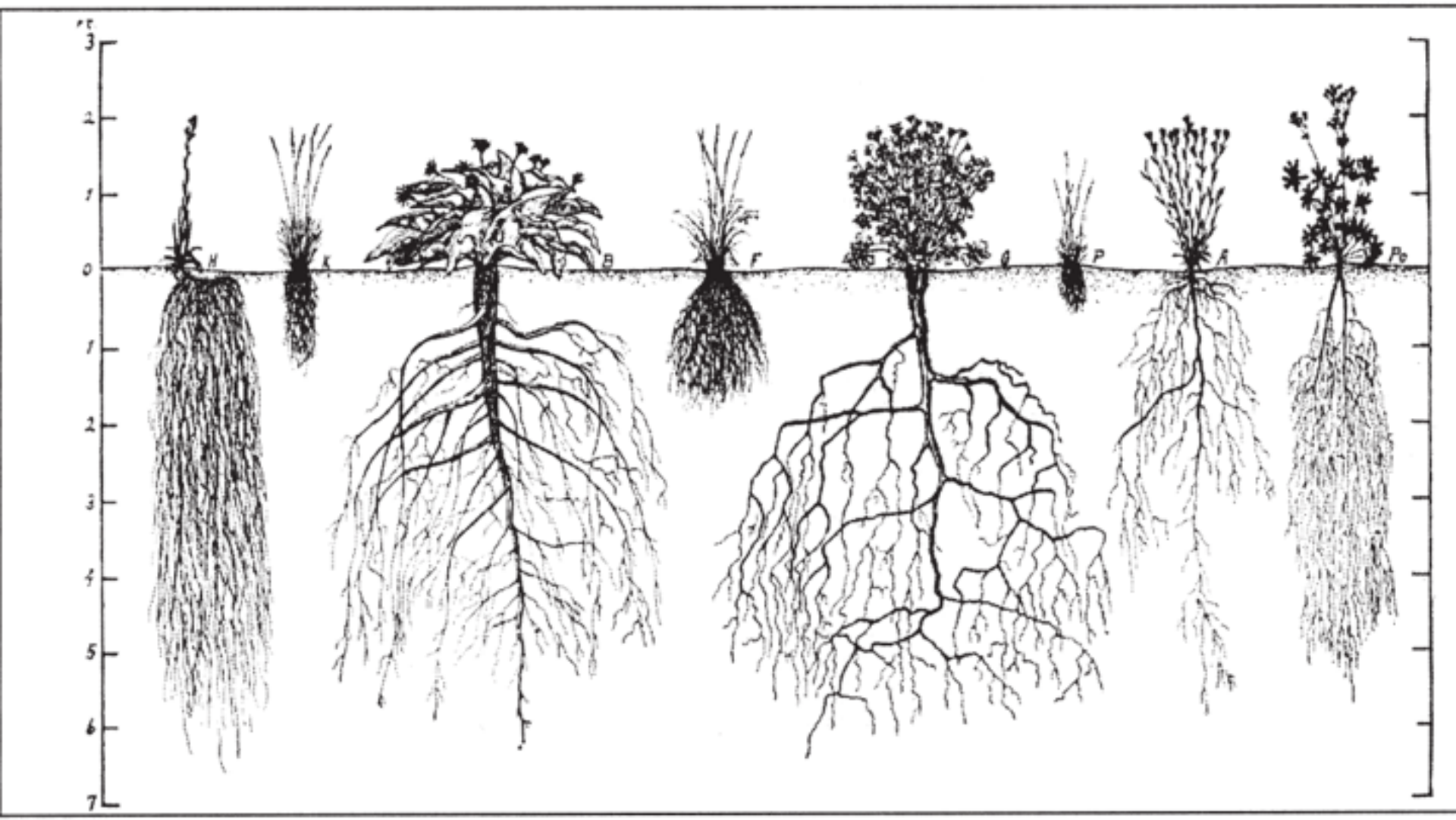


Figure #11: Prairie plants from eastern Washington. From left to right: hawkweed (*Hieracium* spp.), June grass (*Koleria* spp.), balsamroot (*Balsamorrhiza* spp.), blue bunch grass (*Festuca* spp.), Geranium, a bluegrass (*Poa secunda*), a composite (*Hoorebekia* spp.), cinquefoil (*Potentilla* spp.).

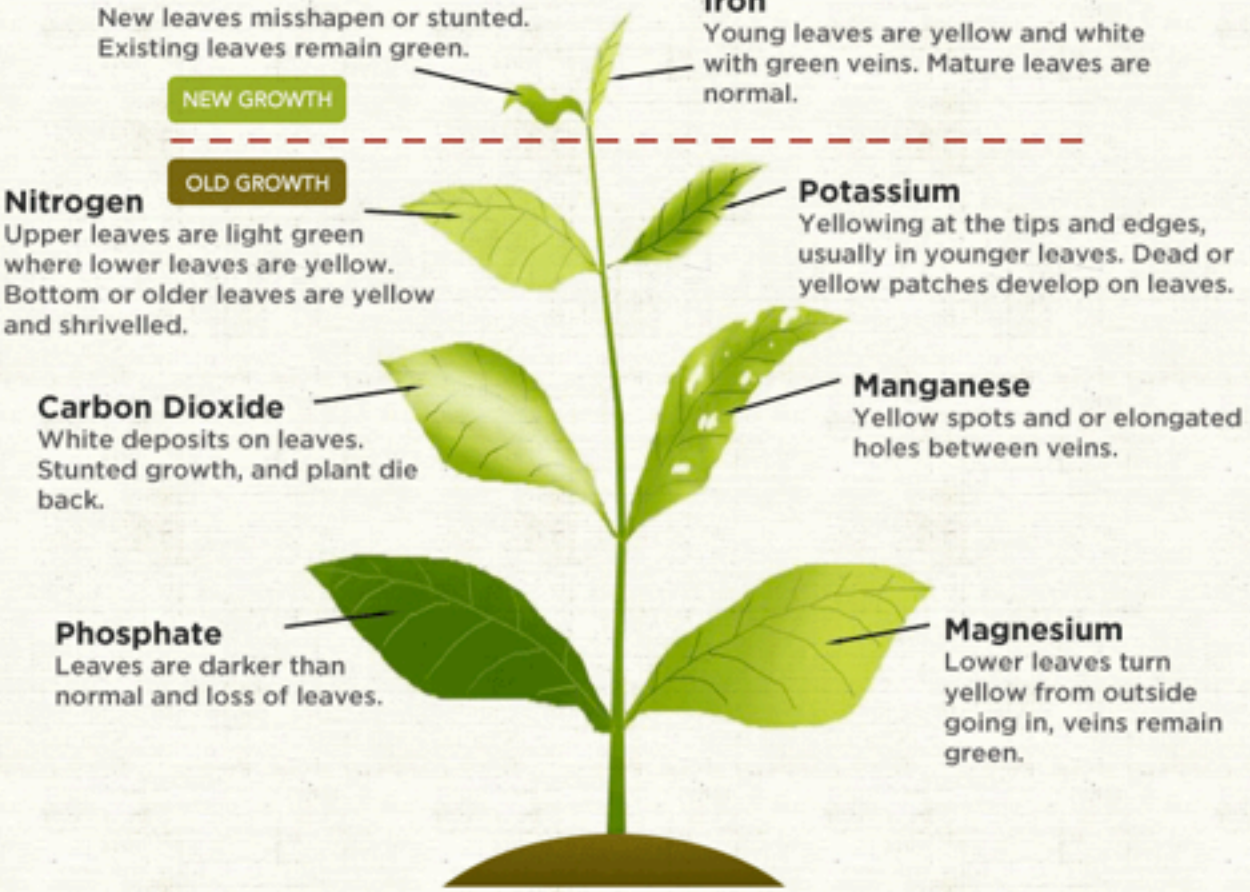
Use of Plant Indicators

Factors - climate, light, temperature, soil, nutrients, toxins.

Processes - fire, lumbering, cultivation, erosion, etc.

Practices - agriculture, forestry, grazing.

Simple PLANT DEFICIENCY Guide



Calcium
New leaves misshapen or stunted. Existing leaves remain green.

Iron
Young leaves are yellow and white with green veins. Mature leaves are normal.

Nitrogen
Upper leaves are light green where lower leaves are yellow. Bottom or older leaves are yellow and shrivelled.

Potassium
Yellowing at the tips and edges, usually in younger leaves. Dead or yellow patches develop on leaves.

Carbon Dioxide
White deposits on leaves. Stunted growth, and plant die back.

Manganese
Yellow spots and or elongated holes between veins.

Phosphate
Leaves are darker than normal and loss of leaves.

Magnesium
Lower leaves turn yellow from outside going in, veins remain green.

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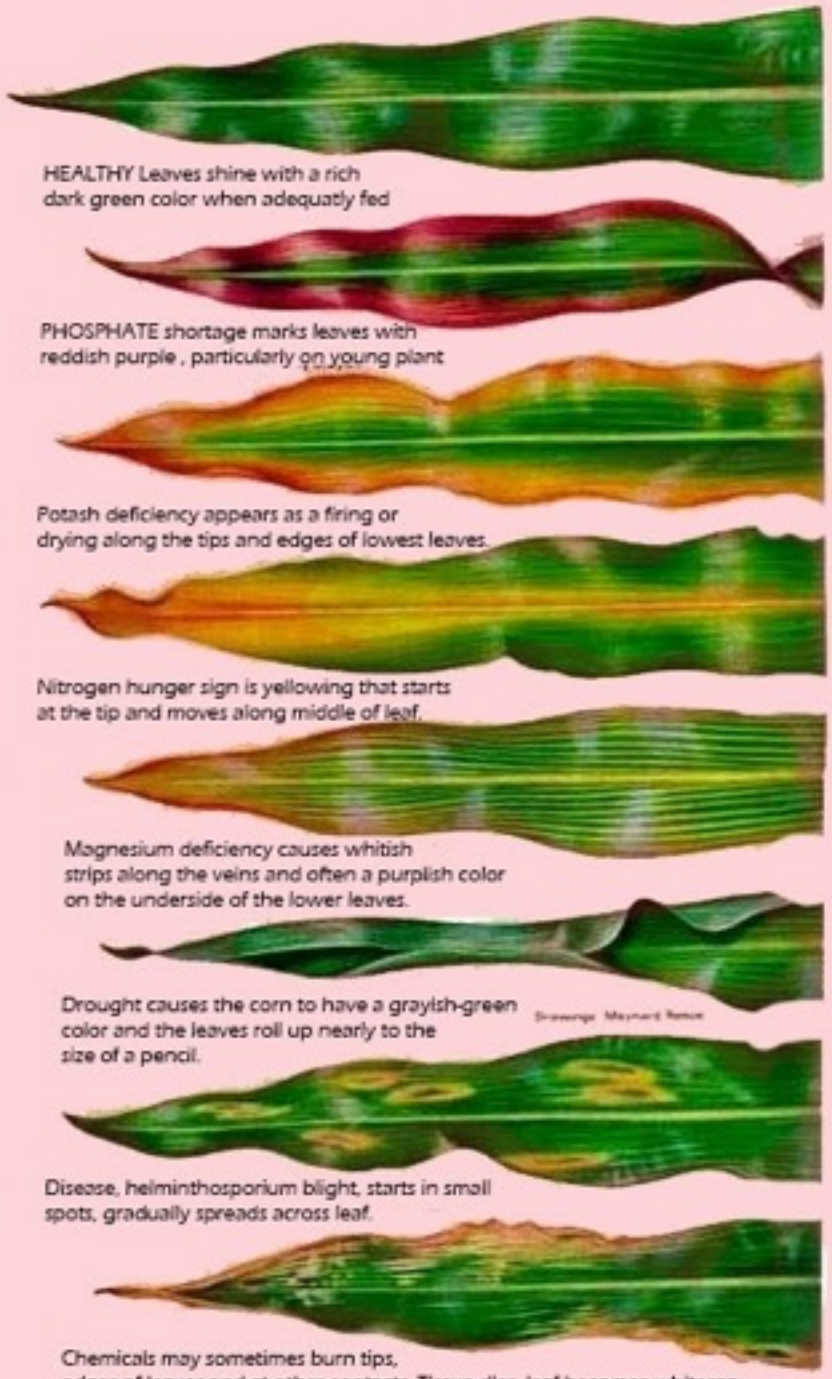
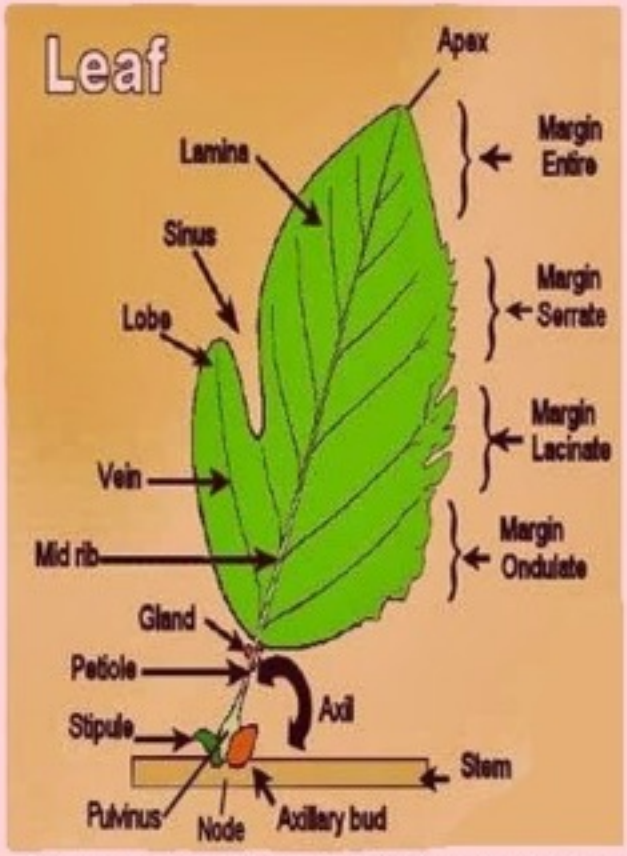
Nutrient Deficiency Problems





Aquaponics Survival Communities

Deficiency Chart of Micronutrients

Boron: Discoloration of leaf buds. Breaking and dropping of buds

Sulphur: Leaves light green. Veins pale green. No spots.

Manganese: Leaves pale in color. Veins and venules dark green and reticulated

Zinc: Leaves pale, narrow and short Veins dark green. Dark spots on leaves and edges.

Magnesium: Paleness from leaf edges. No spots Edges have cup shaped folds. Leaves die and drop in extreme deficiency.

Phosphorus: Plant short and dark green. In extreme deficiencies turn brown or black. Bronze colour under the leaf.

Calcium: Plant dark green. Tender leaves pale. Drying starts from the tips. Eventually leaf bunds die.

Iron: Leaves pale. No spots. Major veins green.

Copper: Pale pink between the veins. Wilt and drop.

Molybdenum: Leaves light green/ lemon yellow/ornge. Spots on whole leaf except veins. Sticky secretions from under the leaf.

Potassium: Small spots on the tips, edges of pale leaves. Spots turn rusty. Folds at tips.

Nitrogen: Stunted growth. Extremely pale color. Upright leaves with light green/yellowish.Appear burnt in extreme deficiency.

THE COLOUR REPRESENTED ARE INDICATIVE.
THEY MAY VARY FROM PLANT TO PLANT

Mobile Nutrients

symptoms start at the bottom with older fan leaves and progress up the plant


Nitrogen deficiency, (N) early stage


Nitrogen deficiency, (N) progression


Nitrogen abundance (N), early stage


Phosphorus deficiency (P), early stage


Phosphorus deficiency (P), progression


Phosphorus abundance (P), early stage


Potassium deficiency (K), early stage


Potassium deficiency (K), progression


Potassium abundance (K), early stage


Calcium deficiency (Ca), early stage


Calcium deficiency (Ca), progression


Calcium deficiency (Ca), late stage


Magnesium deficiency (Mg), early stage


Magnesium deficiency (Mg), progression


Magnesium deficiency (Mg), late stage

Immobile Nutrients

symptoms start at the top of plants with new growth


Zinc deficiency (Zn), early stage


Zinc deficiency (Zn), progression

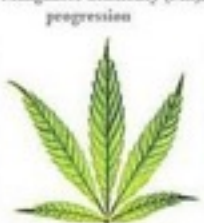

Zinc deficiency (Zn), late stage


Manganese deficiency (Mn), early stage


Manganese deficiency (Mn), progression


Manganese deficiency (Mn), late stage


Iron deficiency (Fe), early stage


Iron deficiency (Fe), progression


Iron deficiency (Fe), late stage


Sulfur deficiency (S), early stage


Sulfur deficiency (S), progression


Sulfur deficiency (S), late stage

Healthy Leaf

even shade of green, no blueish tint, no yellowing, no burned leaf tips, no spots, etc

Excess Salt - Sodium

Tip burn
Mottling
More succulent or puffier

Hardpan Soil

Field Mustard (Brassica nigra)

Horse Nettle (Solanum carolinense)

Morning Glory (Ipomoea purpurea)

Pennycress (Thlaspi arvense)

Pineapple Weed (Matricria matricariodes)

Quack Grass (Agropyron repens).

Previously Cultivated Soil

Carpet Weed (Mullugo verticillata)
Chickweed (Stellaria media)
Dandelion (Taraxacum officinate)
Lamb's Quarter (Chenopodium album)
Plantain (Plantago major)
Purslane (Portulaca oleracea)
Ragweed (Ambrosia artemisiifolia)
Rough Pigweed (Aramanthus sp.)

Acid Soil

eastern Bracken (Pteridium aquifolium)
Buggenum buttercup (Ranunculus spp.)
Chamomile-German (Chamomilla pecutita)
Curly Dock (Rumex crispus)
English Daisy (Bellis perennis)
Ox-Eye Daisy (Chrysanthemum leucanthemum)
Dandelion (Taraxacum officinale)
Hawkweeds (Hieracium aurantiacum and pratense)
Knapweeds (Centaurea species)
Lady's-Thumb (Polygonum persicaria)
Mayweed (Arthemis cotula)
Mosses (Musci class)
common Mullein (Verbascum thapsis)
Nettles (Urtica dioica)
Wild Pansy (Viola sp.)
Pineapple Weed (Matricria matricariodes)
Pinks (Dianthus sp.)
Plantain (Plantago major)
Prostrate Knotweed (Poly-aviculare)
Wild Radish (Bapranus raphanistrum)
Rough Cinquefoil (Potentilla monspeliensis)
Sheep Sorrel (Rumex acetosella)
Silvery Cinquefoil (Potentilla argentea)
Sow Thistle (Sonchus species)
Corn Spurry (Spergula arvensis)
wild Strawberries (Fragaria species)

Alkaline Soil

Bellflower (Campanula sp.)
Bladder Campion (Silene latifolia)
Wild Carrot (Daucus carota)
Field Peppergrass (Lepidium virginicum)
Goosefoot (Chenopodium species)
Gromwell (Lithospermum officinale)
black Henbane (Hyoscyamus niger)
white Mustard (Brassica hirta)
Pennycress (Thlaspi arvense)
Salad Burnett (Poterium sanguisorba)
Scarlet Pimpernel (Anagallis arvensis)
Stinkweed (Thlaspi arvense)
Nodding Thistle (Carduus nutans)
True Chamomile (Anthemis nobilis)

Fertile soil

Burdock (Arctium minus)

Butter Print (Abutilon theophrasti)

Chickweed (Stellaria media)

Chicory (Cichorium intybus)

Dandelion (Taraxacum officinale)

Fat Hen (Atriplex hastata)

Groundsel (Senecio vulgaris)

Lamb's-Quarters (Chenopodium album)

Pigweed (Amaranthus sp.)

Pokeweed (Phytolacca americana)

Purslane (Portulaca oleracea)

Queen Anne's lace (Daucus carota)

Velvetleaf (Abutilon thoephrasti)

Poor Depleted Soil

Broom sedge (Adropogon virginicus)

Dog fennel (Eupatorium capillifolium)

Wild Radish (Bapranus raphanistrum)

Sheep Sorrel (Rumex acetosella)

Wild Parsnip (Sium suave)

Biennial Wormwood (Artemisia bennis)

Yellow toadflax (Lindaia vulgaris)

Heavy clay soil

Broadleaf Dock (Rumex obtusifolius)
Wild Carrot (Daucus carota)
Chicory (Cichorium intybus)
Creeping Buttercup (Ranunculus repens)
English Daisy (Bellis perennis)
Dandelion (Taraxacum officinale)
Mayweed (Arthemis cotula)
Milkweed (Asclepius syriaca)
Plantain (Plantago major)
Canada Thistle (Cirsium arvense)
Wild Garlic (Allium vineale)

Sandy Soil

Arrow-leafed Wild Lettuce (Lactuca pulchella)
Field Bindweed (Convolvulus arvensis)
White Cockle (Lychnis alba)
Cornflower (Centaurea cyanus)
Dog Fennel (Eupatorium capillidolium)
Goldenrods (Solidago sp.)
Maltese Thistle (Centaurea melitensis)
Sandbur (Cenchrus species)
Small Nettle (Urtica urens)
Yellow Toadflax (Linania vulgaris).

Intermittent wet

Dock
Horsetail
Foxtails
Willows
Ox-eye Daisy
Goldenrod
Poison Hemlock
Rushes
Sedges and Joe-pye

Wet Poorly Drained Soil

Hedge Bindweed (Convolvulus Sepium)
Bull sedge (Carex lasiocarpa)
Canada goldenrod (Solidago graminifolia)
Cattail (Typha latifolia)
Coltsfoot (Tussilago farfara)
Creeping buttercup (Ranunculus repens)
Curly dock (Rumex crispus)
Ox-Eye Daisy (Chrysanthemum leucanthemum)
Docks (Rumex sp.)
Foxtail (Hordeum jubatum)
Goldenrods (Solidago sp.)
Groundnut (Apios americana)
Poison Hemlock (Conium maculatum)
Horsetail (Equisetum arvense)
Jewelweed (Impatiens pallida)

Wet Poorly Drained Soil

Joe-pye weed (Eupatorium purpereum)
Lady's thumb (Polygonum persicaria)
Marsh Mallow (Althaea Officinalis)
May apple (Podophyllum peltatum)
Meadow pink (Lychnis floscuculi)
Meadow Sweet (Astilbe sp)
Mosses (all species)
Stinging Nettles (Urtica urens)
Pennsylvania smartweed (Polygonum pensylvanicum)
Ragwort Tansy (Senecio jacobaea)
Sheep sorrel (Rumex acetosella)
Silvery cinquefoil (Potentilla argentea)
Sweet flag (Acorus calamus)
Tall buttercup (Ranuculus acris)
Thyme-leafed speedwell (Veronica serpyllifolia)
Black Willow (Salix sp.)

Mallow

(Malva neglecta Wallr.) (M. rotundifolia L.)
Round-leaved mallow, cheeses, low mallow

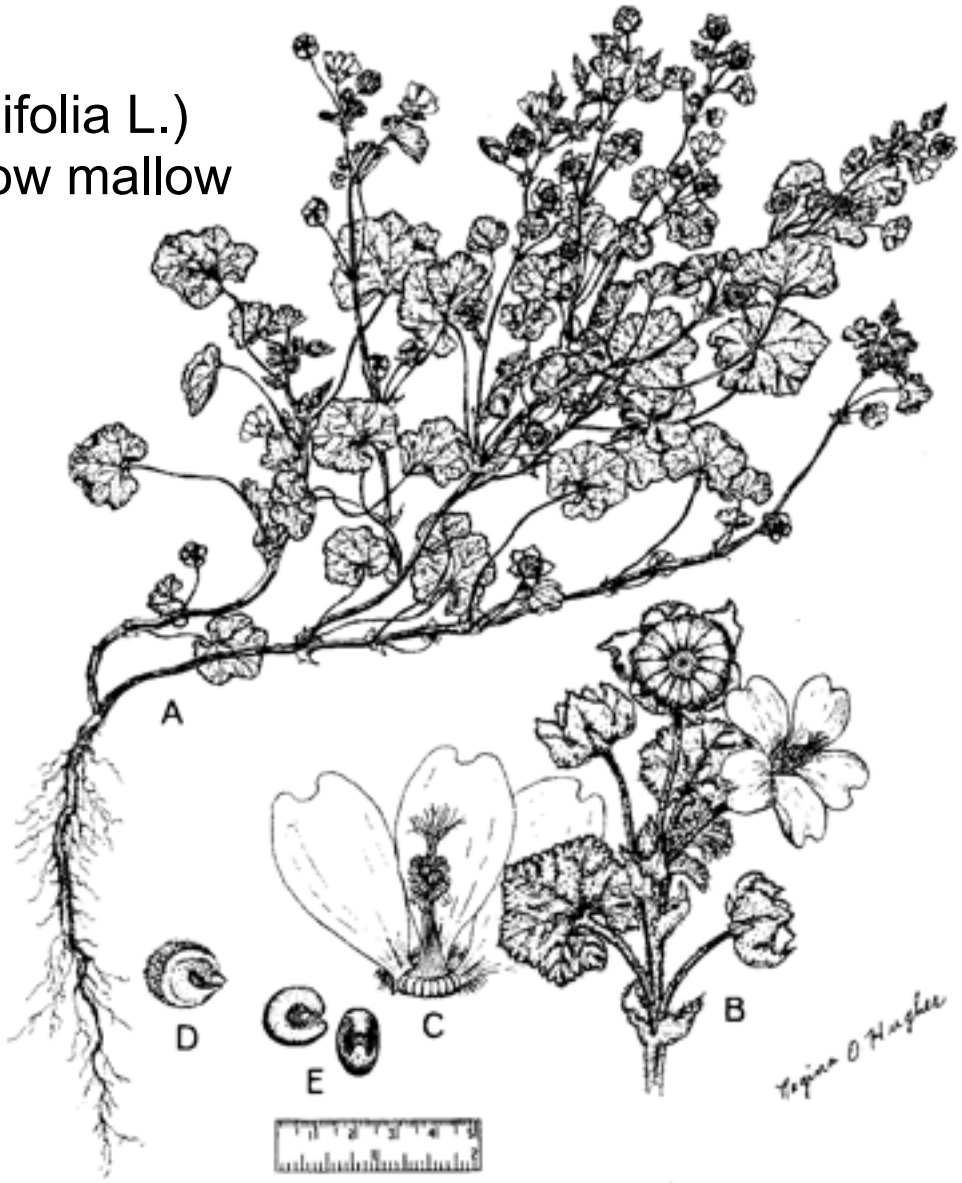
Indicates soil

very rich in nitrogen,

moisture fresh or

intermediate and

intermediate pH.



Malva neglecta Wallr. Common mallow. *A*, Habit—× 0.5; *B*, enlarged branchlet—× 2; *C*, flower diagram—× 5; *D*, carpel—× 5; *E*, seeds—× 5.

Mallow (Malva neglecta Wallr.) (M. rotundifolia L.)

- **Habitat**: Cultivated ground, pastures, new lawns.
- **Climate**: warm, continental
- **Control**: Hand weed or hoe when small, pull large plants, burn.
- **Fodder**: Palatability & value vary with locality. Bees work mallow when there is little else, it but of little value to bees.
- **Food**: Root, when cooked, sweetish mucilage used for syrup, deserts, and lotions. Fruits are edible. Young leaves in salads. Leaves to curdle milk to make cheese.
- **Use**: food, herbal, skin lotion, poultice (2300) Host butterfly, opening up hard pans
- **Discussion**: Survival food and medicine. Root and leaves poultice for infected wounds. Cooked root mucilage used as egg whites to make chiffon deserts.

Storksbill

(Erodium cicutarium L.)

Common Names: heronsbill, alfilaria, pin-weed, pin-grass

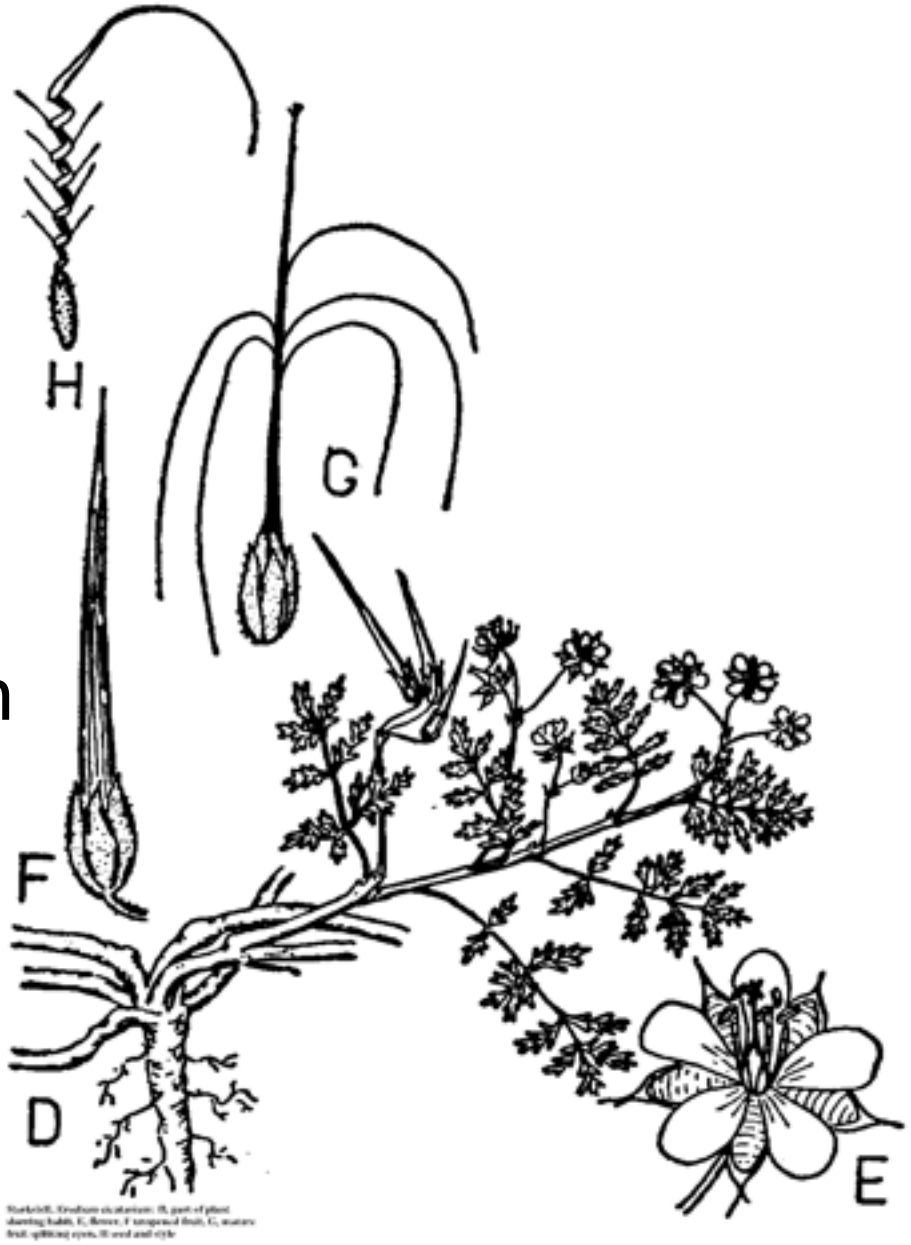
Family: geranium

Indicates

Indefinite for nitrogen,

dry soil, mostly on acid soil

although indefinite as an indicator.



Storksbill (Erodium cicutarium L.)

- **Habitat**: lawns and pastures
- **Climate**: desert, between suboceanic and sub continental
- **Germination**: Shallow cultivation of seed infested fields induces germination.
- **Control**: hoe out rosettes as soon as recognized
- **Fodder**: Storksbill excellent spring forage, birds and wildlife eat the seeds, pollen and nectar for bees, nectar has highest tested sugar concentration. Spring stimulation of hives.
- **Use**: pasture, fodder, nurse plant on hard saline soils
- **Discussion**: Storksbill withstands concentrated alkaline salts, increases soil permeability, letting salts diffuse (5110).

Sow Thistle

(Sonchus asper)

Common names: Prickly sow thistle, prickly lettuce.

Family: aster

Sow Thistle (Sonchus asper)

Soil description: Good balanced loam
Control: Clean cultivate, then hand pull, hoe, or mow weeds on waste places before seeds form. Black plastic mulch to starve weeds.
Fodder: Can be made into silage when green, makes an excellent feed for geese and pigs. Bees obtain nectar from flowers.
Food: Eaten in salads or as pot herb when young, bitter with age.
Use: food, forage

Burr clover

(Medicago hispida Gaertn.)

Common Names: California bur-clover,

toothed bur-clover

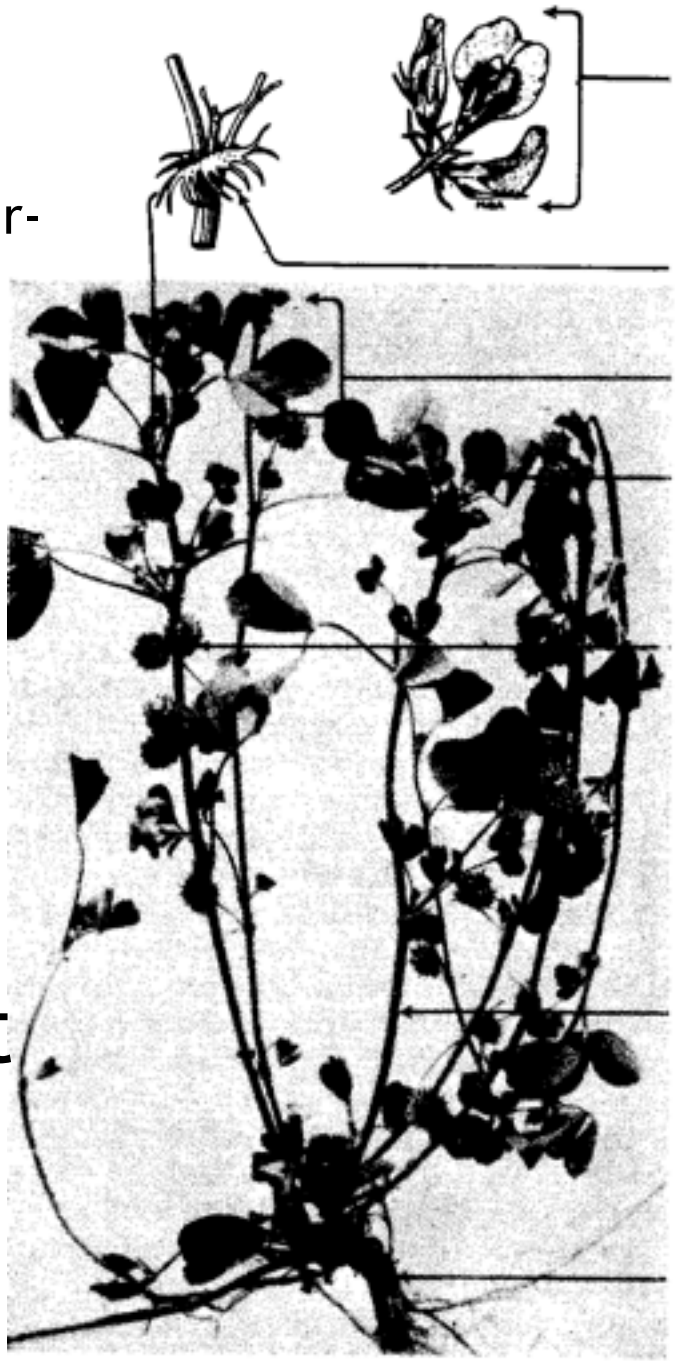
Family: pulse

Indicates

low nitrogen

and moist soil (4830)

tolerates drought (2705).



Flowers—small (less than ¼ in. long), pea-like, yellow, usually 2 to 5 in a slender-stalked cluster; stalk as long as or longer than the leaflets

Bracts (stipules)—at base of leafstalks, finely toothed

Leaves—alternate, stalked, divided (pinnately compound) into 3 segments (leaflets)

Leaflets—reverse-heart-shaped, mostly less than ¾ in. long, without splotches, the upper edges wavy and short-toothed from extension of the veins

"Bur" (pod)—2 to 3 times spirally twisted, prominently veined, several-seeded, with ridged edges bearing a double row of hooked or curved spines

Stems—several from the base, spreading and prostrate but with ends ascending, 6 to 24 in. long

Taproot—annual, occasionally with a somewhat thickened root crown

Burr clover (Medicago hispida Gaertn.)

- **Soil description**: Moist, well drained, fertile loam soil high in available nutrients (4830).
- **Control**: Increase acidity and available nitrogen.
- **Fodder**: Not palatable at first, but livestock acquire a taste for it (4830). Good for spring stimulation of bees (4700).
- **Use**: pasture, green manure, economical cover crop (4830) great value to wildlife, especially quail, stock eat pods, pods stick to sheep wool (2705).

Willow herb

(Epilobium hirsutum L.)
Common Name: willow-herb
Family: evening primrose

Indicates

rich in nitrogen,

Moist,doesn't dry out (1880)

neutral pH (1880).

Panicled willow-herb (*Epilobium paniculatum*), showing habit. A, B, two views of seed.

Willow herb (Epilobium hirsutum L.)

- **Soil description**: Gravelly, somewhat limey (4390) on low fields, especially along ditches.
- **Control**: Improve drainage, and mow as first flowers appear.
- **Fodder**: Browsed by moose and deer. Honey plant.

Chickweed (Stelaria media Cyril)

Starwort, starweed, bindweed, winter-weed, satin flower, tongue-grass

Family: pink

Indicates very nitrogen rich soil with neutral to basic pH. If stunted, low phosphorus level. Accumulates magnesium. High concentration of organic matter on the surface and moderate level of fermented organic matter.

Stellaria media (L.) Cyrillo. Common chickweed. *A*, Habit—× 0.5; *B*, flower—× 3; *C*, capsule—× 3.5; *D*, seeds—× 7.5.

Chickweed (Stelaria media Cyril)

- **Control**: Clean cultivate when seedlings are small. In lawns mow close and rake.
- **Fodder**: Pigs, poultry and birds fond of buds and seeds.
- **Food**: High in vitamin C, great in salads, lightly steamed, blended with juices.
- **Use**: food, fodder, ground cover.
- **Discussion**: Most vigorous growth during cool weather, greater moisture. Good spring ground cover in garden.

Nutgrass (Cyperus esculentus L.)

Common Names: yellow nut-grass, chufa, coco, coco sedge, rush nut, edible galingale, Earth almond

Family: sedge

Indicates wet soil, often not well aerated. The pH is on the acid side (1694).

Cyperus esculentus L. Yellow nutsedge. *A*, Habit—× 0.5; *B*, spikelet—× 5; *C*, achene—× 10.

Nutgrass (Cyperus esculentus L.)

- **Soil description**: Usually rich or sandy with poor drainage, especially low spots in fields (4390).
- **Control**: Use 2 Chinese geese to the acre (train to dig tubers), improve drainage, and clean cultivate.
- **Food**: Raw tubers delicious nutty flavor. Blend to make "nut milk" or in pancake mix. (2300)
- **Use**: food, ornamental
- **Discussion**: Aggressive invasive problem on wet soils. Flowers with triangle symmetry used in dried weed pots.

Charlock

(Brassica kaber (DC.) L. C. Wheeler)

Common Names: wild mustard, field mustard, field kale, kedlock

Family: mustard

Indicates low calcium if clubroot (5110), low potassium if stunted (2910). Neutral to basic pH (0460) with low humus (4810), and moderate to high fermented organic matter (2090). Surface usually crusted or plow pan (4810). Accumulates phosphorus, salt (5110).

Charlock (Brassica kaber)

- **Soil description**: Stressed by poor drainage, poor structure, that is sour, waterlogged, and where slime molds are growing (2090).
- **Habitat**: spring grain fields, especially oats, cultivated land, waste places.
- **Germination**: Frequent disking and wild oats stimulate the seeds to germinate (4390). Fusarium molds in soil stimulate mustards (2090).
- **Control**: Clean cultivate then hand weed. Use mustard-free seeds. In wheat, harrow on a warm dry day when wheat is 4" high.
- **Allelopathy**: Rape and beets inhibit charlocks growth (4810). Companion to fruit trees (5110).
- **Food**: Leaves good in early spring for salads and as a pot herb. The flavor is strong and spicy. (2300).
- **Use**: food, orchard ground covers
- **Discussion**: Used to decrease salt in soil, and sweeten acid soil (4810). It's extensive root system opens up heavy and compacted soils. Like other mustards good winter ground cover in orchards that are disked in spring.

Buckhorn plantain

(Plantago lanceolata L.)

Common Names: English plantain, narrow-leaved plantain, rib-grass, rib-wort, black-jacks

Family: plantain

Indicator value: Grows on soils with a range of nitrogen, water and pH (1880). Tolerates a low level of potassium, the content of the leaves is proportional to the potassium in the soil (6220). Test area for potassium availability by collecting plantain leaves and analyzing them. Usually soil is moist and acid (1880). Accumulates phosphorus and calcium (5110).

Habit for all—× 0.5. *A*, *Plantago lanceolata* L. Buckhorn plantain. *a*, Flower—× 2.5; *b*, capsule—× 3; *c*, seed—× 5. *B*, *Plantago major* L. Broadleaf plantain. *a*, Flower—× 2.5; *b*, capsule—× 3; *c*, seeds—× 5. *C*, *Plantago rugelii* Decne. Blackseed plantain. *a*, Flower—× 2.5; *b*, capsule—× 2.5; *c*, seeds—× 3.

Buckhorn plantain (Plantago lanceolata L.)

Soil description: Compacted, dense, possibly worked wet or trampled (4810).
Habitat: clover fields, meadows, lawns, paths, waste places
Control: Hoe out individual plants. If this is all your lawn will grow, till it up, fertilize, add compost, and reseed (4390). In pastures and fields plant a clean cultivated crop for 2 years then reseed.
Germination: Plantain will germinate in complete darkness (0700) and can stand dense compacted soils (4810).
Allelopathy: Associates frequently with red clover (4810).
Fodder: Cattle like to eat plantain, which is high in protein. It is good for hay and has beneficial effects on cows (4810).
Food: Wilted leaves used for cooling astringent compresses for bruises, strained joints. Seed oil fine and almost tasteless (4810).
Use: fodder, herbal
Discussion: Most tolerant cool season weed to low

Dandelion

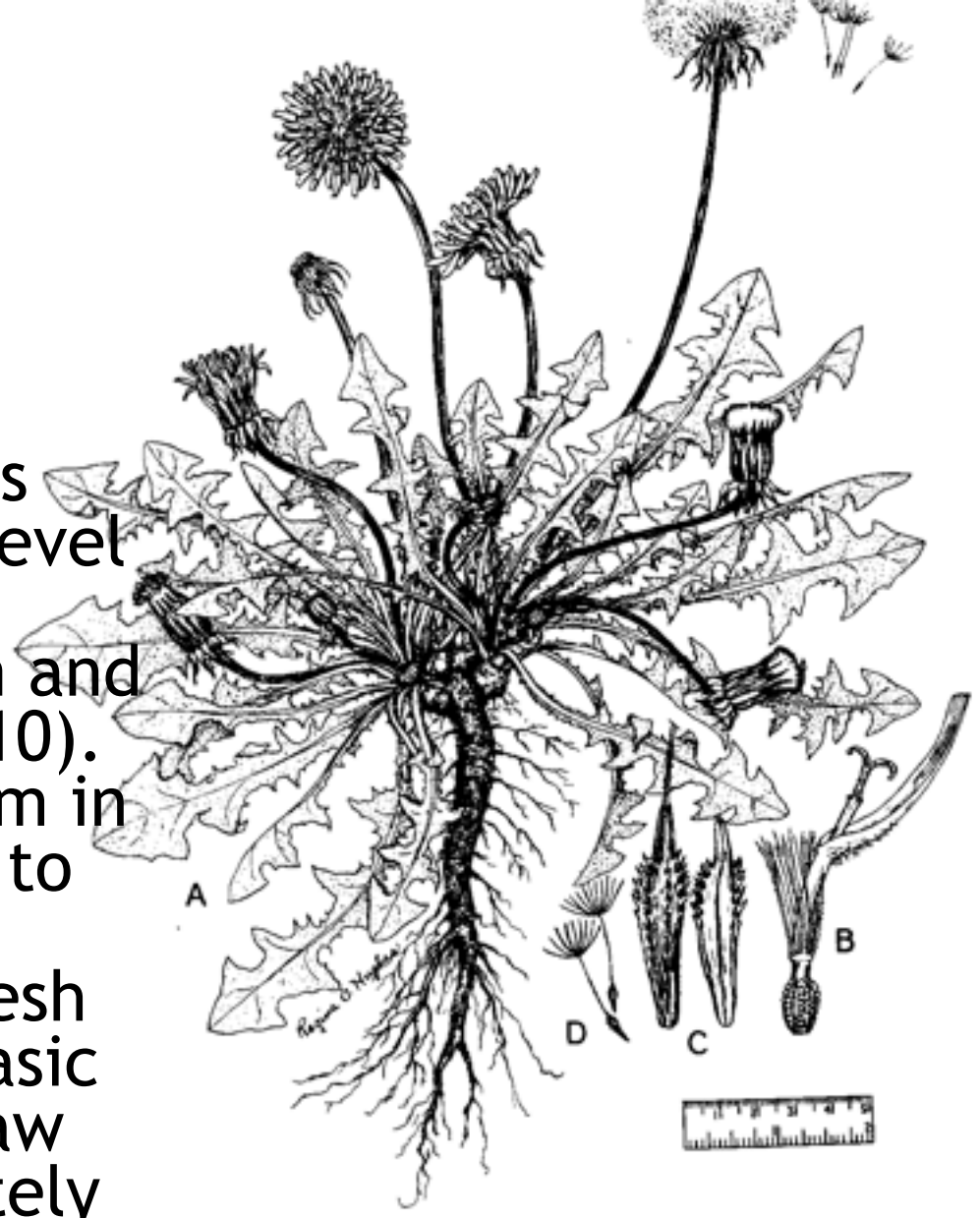
(Taraxacum officinale Webber)

Common Names: lions-tooth, blow-ball, cankerwort

Family: aster

Indicates

rich in nitrogen (1880) and phosphorus . If the plant is stunted, low phosphorus level (2910). Usually rich in magnesium and potassium and low in calcium (2090) (3610). Concentration of potassium in the leaves is proportional to the potassium in the soil (6220). Soil moisture is fresh (1880), pH is neutral to basic (0460), and the level of raw organic matter is moderately high (2090). The level of humus is low (2740).



Taraxacum officinale Weber. Dandelion. *A*, Habit—× 0.5; *B*, flower—× 3; *C*, achenes—× 3; *D*, achenes with pappus—× 1.

Dandelion (Taraxacum officinale) part 1

Soil description: clay or heavy, good deep soil (2740)

Germination Sprouts the year after adding lime to an acid plot (3610)

Control: Spud out roots. Cut off tops before seeds form and increase drainage and acidity.

Allelopathy: Dandelion is a good mother crop and companion to alfalfa (4810). Roots exude substance that attracts earthworms (5110).

Fodder: High protein content, makes good hay, protective effect for cows (5110) palatable nutritious feed for animals (5860).

Dandelion (Taraxacum officinale) part 2

Food: Leaves make excellent greens for salads or pot herb in the spring. Leaves get bitter with age but can be blanched. Sweet wine made from blossoms. The root is roasted for a coffee-like drink. Many herbal remedies. Leaves are diuretic and supply potassium. Side effects complement main action.

Use: food, beverage, herbal, soil improvement

Discussion: Root penetrates hard pans (4810) withstands concentrated alkaline salts and increases soil permeability (5110). When herbicides are sprayed on a lawn, soil fungi are killed, destroying the soil structure. So herbicides can encourage dandelions. Compost and soil acidifiers are better to discourage dandelions and stimulate grass.

Morning-glory

(Ipomoea purpurea (L.) Roth)
Common Names: morning-glory
Family: morning glory

Indicator value: Tolerates low phosphorus (5110). The surface or lower soil layers compacted (4810).

Ipomoea purpurea (L.) Roth. Tall morningglory. *A*, Habit—× 0.5; *B*, flower diagram—× 0.5; *C*, capsule—× 0.5; *D*, seeds—× 3.

Illustration from the USDA Publication Selected Weeds of the United States, 1970

Morning-glory (Ipomoea purpurea (L.)

- **Control**: Hand pull, and hoe, then use clean cultivation to keep under control. Discing encourages, mowing decreases. Cows, chickens love it.
- **Allelopathy:** Companion to corn in small quantities (1305), stimulates germination of melon seeds (4820).
- **Food**: Warn children not to eat the seeds that are hallucinogenic.
- **Use**: soil improvement, ornamental, animal fodder.
- **Discussion**: Improves soil organic matter and soil texture.

Blackberry

Rubus sp.

Family: rose

Indicates dry soil, pH range of 4.5 to 8.0 (1694), neutral pH (1880) accumulates high levels of Mn 5110

FIGURE 110.—*Rubus allegheniensis* Porter. Allegheny blackberry. *A*, Primocane habit—× 0.5; *B*, floricane habit —× 0.5; *C*, fruit showing drupelets—× 0.5; *D*, seeds—× 3.

Blackberry Rubus sp

- Soil: dry, sandy, gravelly 4390
- Habit: dry places lowlands to hills, open wood, roadsides, fencerows, thickets, native
- Control: grub out scattered clumps, large areas mowed & burned, plow in autumn, disk 2-3X plant smother crop in spring, then cultivate, browse with goats
- Allellopathy: inhibited by raspberries 4820 potatoes are more susceptible to blight near raspberries 4820
- Food: tea, berries, leaves estrogen source
- Use: prepare unfavorable soil for trees 4820 wildlife habitat, add to hedgerow to make better fence

Lambsquarter

Chenopodium album L.

Family, goosefoot

Indicates mostly in soil rich in mineral nitrogen 1880, accumulates calcium 5110, the level of potassium reflects potassium in the soil 2910, tolerates saline soil 1880, dryer soil 1880, tolerates dry soil 4810, mostly acid to indeterminate for pH 0460, pH range 4.2 to 8.3 1694, high level of undecomposed organic matter if prolific 4810.

FIGURE 64.—*Chenopodium album* L. Common lambsquarters. *A*, Habit, small plant; *B*, floral spike—× 2.5; *C*, flowers—× 7.5; *D*, utricle—× 4; *E*, seed—× 4.

Lambsquarter, Chenopodium album L.

- Soil: surface loose, insufficient decomposed organic matter 4810
- Habit: gardens, cult ivated fields, grain fields, waste ground; compost piles, decaying mater
- Germination: seed from plants on N rich soil less dormant, hi N 2040, seeds different colors, darker seeds have longer dormant period, germinate in range of 1-5 years
- Control: clean cult, hand weed, harrow fields while crop small, keep compost piles free of plants 4810
- Microbe: indicates good sort of decay system, in high OM, rich, fertile soil 2090
- Allelopathy: no serious negative effects on most crops 2090
- Companion: curcubits-squash family, potatoes, though indicates too alkaline for potato 4810 top lambsquarter to get it to spread out
- Fodder: silage second to none when mixed with legumes 1305
- Food: good as salad green, steamed as potherb
- Use: excellent green manure, brings up nutrients 1305, can be used as living mulch if topped 5110

Sorrel
Oxalis cernua Thumb.
Common Names: wood sorrel, oxalis
Family: wood sorrel

Indicates:

N - N,6,1880

Water - N,4,1880

Ph - X,1880

gravelly or sandy 4390 cult fields, roadsides, waste places, sandy or gravelly soil

Fig. 164. Bermuda buttercup (*Oxalis cernua*).

Curly Dock

Rumex crispus L.

Common Names: dock

Family: buckwheat
N - N,5,1880
P - N,2,5110
Ca - T,1,2910
Silica - A,5110
Water - N,6,1880
pH - X,1880, N,3,4810, N,9,0460
Compaction - P,4810
Description - sour wet patches, hard pan 4810
Habit - meadows, pastures, lawns, waste places; sour wet patches & insufficient drainage
Control - pastures, lawns; remove scattered plants incl all roots, if field overrun, plow, clean cult; reduce acid, break hard pan

Purslane

Portulaca oleracea L.

Common Names: purslane, pusley, pursley

Family: portulaca

N - N,7,1880, A,7,6850 when available

K - P,6,2910

Description - rich soil 4390 gardens, cult fields, waste places, mostly on rich soil

Temp ave - 5-29 tf8,3

Temp figure - 2mr-10xw

Rainfall - 2-42

Control - kill in seedling stage by freq & continued cult from when appear (late) til frost, remove mature plants & compost o burn

FORM	LEAF_GREEN	LEAF_WATER	SOCIAL
T	S	9	3.3	7

Companion - corn - covers ground,

Toxic - toxic levels of NO3 & oxalate, presence of high N 6850

Food - fresh in salad, boiled green, soups, stews, casseroles, stems pickled, seed fl 2290

Use - good ground cover, bring nutrients up from subsoil 1305

Notes - makes ground more permeable for corn 1305

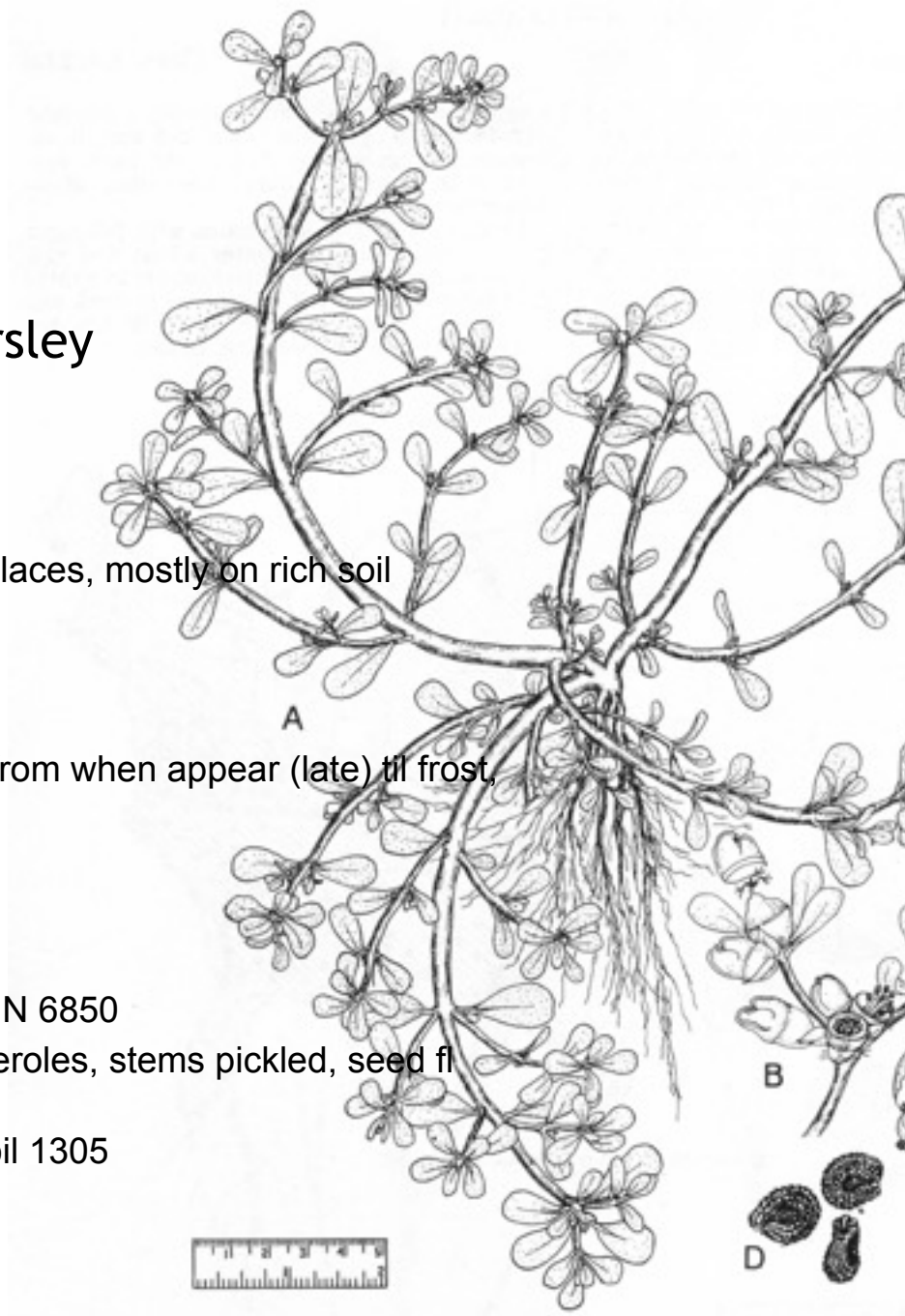


FIGURE 74.—*Portulaca oleracea* L. Common purslane. *A*, Habit—× 0.5; *B*, flowers and flower open—× 4; *D*, seeds—× 18.