

WEEDS

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Weeds have several detrimental effects—weed seed must be removed from the alfalfa seed crop, weeds require control to prevent reduction of yields, and weeds also act as hosts to insects and diseases that damage the alfalfa plants and to insects that prey on the alfalfa leafcutting bee, a beneficial pollinator.

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WEEDS REDUCE YIELDS, slow harvest, increase cleaning costs, and may contaminate other crops in the rotation. Weeds are most easily controlled as seedlings. If control at this stage is not completely successful, survivors should be destroyed before harvest, since it is practically impossible to remove all weed seeds by cleaning. Certain noxious weeds are not allowed in alfalfa seed lots offered for sale and, therefore, should be eliminated from seed fields. Under certain conditions, volunteer alfalfa plants may be considered and treated as weeds.

PROBLEM WEEDS

Weed seed found in alfalfa seed crops must be removed at the cleaning plant. Certain seeds such as dodder (*Cuscuta* spp.), field bindweed (*Convolvulus arvensis* L.), hoary cress and/or whitetop (*Cardaria* spp.), and perennial pepperweed (*Lepidium latifolium* L.) may require a rerun with a magnetic separator for their removal from alfalfa seed. This procedure may incur seed losses of 4–11% or more depending on the extent of con-

tamination, cleaning process, and type and condition of cleaning equipment.

The most difficult weed seeds to remove from alfalfa seed include: johnsongrass (*Sorghum halepense* (L.) Pers.), mustard (*Brassica* spp.), dodder, lambsquarter (*Chenopodium album* L.), knapweed (*Centaurea* spp.), perennial pepperweed, sandbur (*Cenchrus* spp.), pigweed (*Amaranthus* spp.), alkali sida (*Sida hederacea* (Dougl.) Torr.), field bindweed, curly dock (*Rumex crispus* L.), and the sweetclovers (*Melilotus* spp.).

Dodder is the most troublesome weed in many alfalfa seed fields and, where uncontrolled, has ended profitable production of alfalfa seed. Once the field is infested, dodder can be expected to be a problem for periods of 10–20 years and its control is a season-long problem. Dodder can be spread by contaminated seed, manure, farm implements, animals' hooves, shoes, irrigation water, and other related activities of humans.

Other weeds infest alfalfa seed fields. A survey was taken in 26 alfalfa fields in south central Washington during the summer of 1978; 55 different weeds were found. Prickly lettuce (*Lactuca serriola* L.) was found in 24 of these fields, Canada thistle (*Cirsium arvense* (L.) Scop.) in 21, lambsquarters in 16, barnyardgrass (*Echinochloa crus-galli* (L.) Beauv.) in 14, and 12 fields contained Russian thistle (*Salsola kali* L.), salsify (*Tragopogon* spp.), redroot pigweed (*A. retroflexus* L.), dandelion (*Taraxacum officinale* Weber), nightshade (*Solanum* spp.), and wild oat

(*Avena fatua* L.). No field was found completely weed free. The weed species found throughout the western alfalfa seed producing areas may vary, but the survey illustrated that many weeds are potential problems if allowed to go uncontrolled.

Weed blooms such as mayweed (dog fennel) (*Anthemis cotula* L.), yellow starthistle (*Centaurea solstitialis* L.), wild carrot (*Daucus carota* L.), Russian thistle, fivehook bassia (*Bassia lyssofolia* (Pall.) Ktze.), whitetop and/or hoary cress, greasewood (*Sarcobatus vermiculatus* (Hook.) Torr.), povertyweed (*Iva axillaris* Pursch.), and probably others often attract bees away from alfalfa.

Weeds also act as initial, preferred hosts to attract lygus bugs, cutworms, loopers, and armyworms into the seed field. Looper and armyworm moths are highly attracted to blue mustard (*Chorispora tenella* DC.) and lambsquarters to lay their eggs. After the caterpillars strip the weed foliage, they move onto the alfalfa. Early season development of lygus bugs is often associated with certain winter annuals. Some of the mustards, such as wild mustard (*B. kaber* (DC.) L.C. Wheeler) and flixweed (*Descurainia sophia* (L.) Webb) are early season host plants. Fivehook bassia and Russian thistle are summer annual weeds which are satisfactory host plants of lygus. Fivehook bassia is one of the preferred host plants of *Lygus elisus* Van Duzee.

Certain weeds such as Watson's willowweed (*Epilobium watsonii* Barbey), wild buckwheat (*Polygonum convolvulus* L.), smartweeds (*Polygonum* spp.), and field bindweed are excellent leaf-piece sources for construction of alfalfa leafcutting bee nest cells. Lambsquarters foliage and mayweed petals are often used by the bees, but larval mortality tends to be higher in such cells than in those formed from the other sources mentioned.

Adult checkered flower beetles (*Trichodes ornatus* Say) actively feed on the pollen of mayweed, wild carrot, sunflower (*Helianthus annuus* L.), knapweed, whitetop, and yarrow (*Achillea* spp.). Most of the female beetle's eggs do not mature until she has fed on such pollens. Removal of these weeds from seed fields and surrounding

areas helps discourage this major predator of the leafcutting bee. Adjacent crops of carrots grown for seed have also been associated with increases in checkered beetle infestation.

The benefits of weeds do not outweigh their detrimental effects. A variety of weed control methods should be practiced to reduce the adverse influence of weeds to alfalfa seed production.

A number of problem weeds are shown in the following illustrations, taken from *Selected Weeds of the United States*, U.S. Department of Agriculture, Agricultural Handbook 366, 1976 (Government Printing Office, Washington, D.C.).

CULTURAL CONTROL OF WEEDS

It is easier to control weeds before they infest a crop than afterward. Purchasing weed-free seed is a vital first step. New, troublesome weeds can be introduced into a field by planting alfalfa seed infested with weed seed or by irrigating with water carrying weed seed. Weed screens will remove many of the larger weed seeds (Fig. 1). It is possible to prevent a serious problem with perennial weeds by examining a field carefully before planting and selecting fields that are free of perennial weeds. If perennial weeds are present, control or elimination of these weeds before seeding is usually a good investment.

Moisture stress, low fertility, diseases, insects,

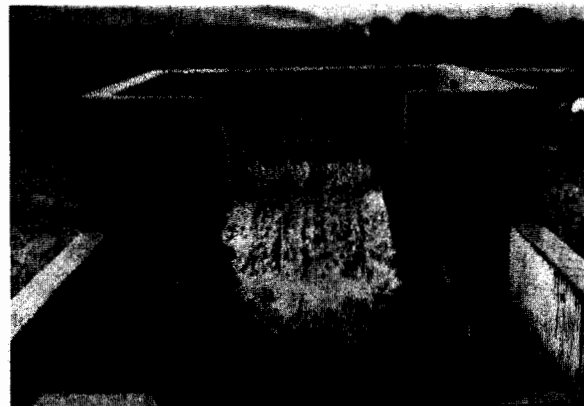
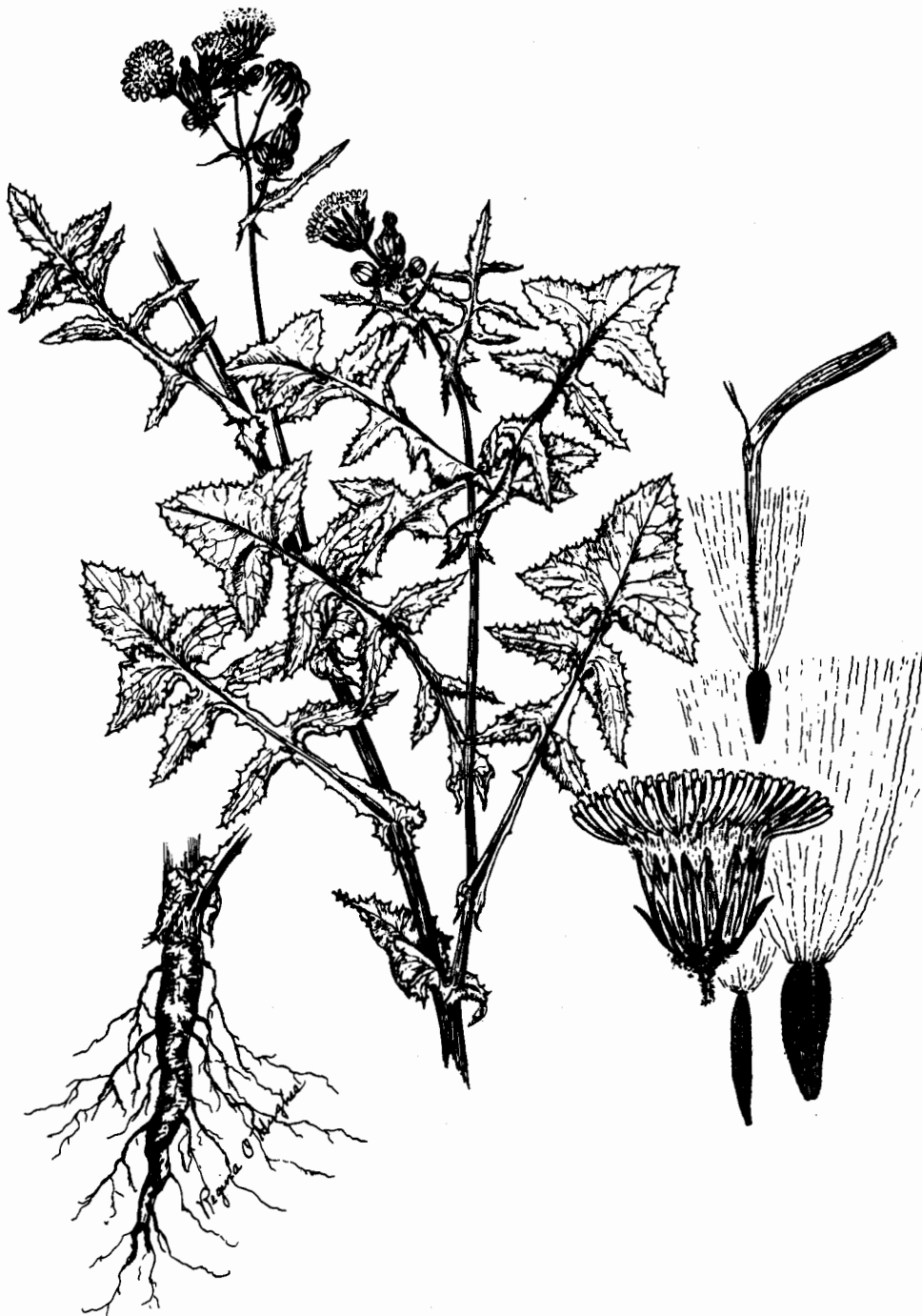


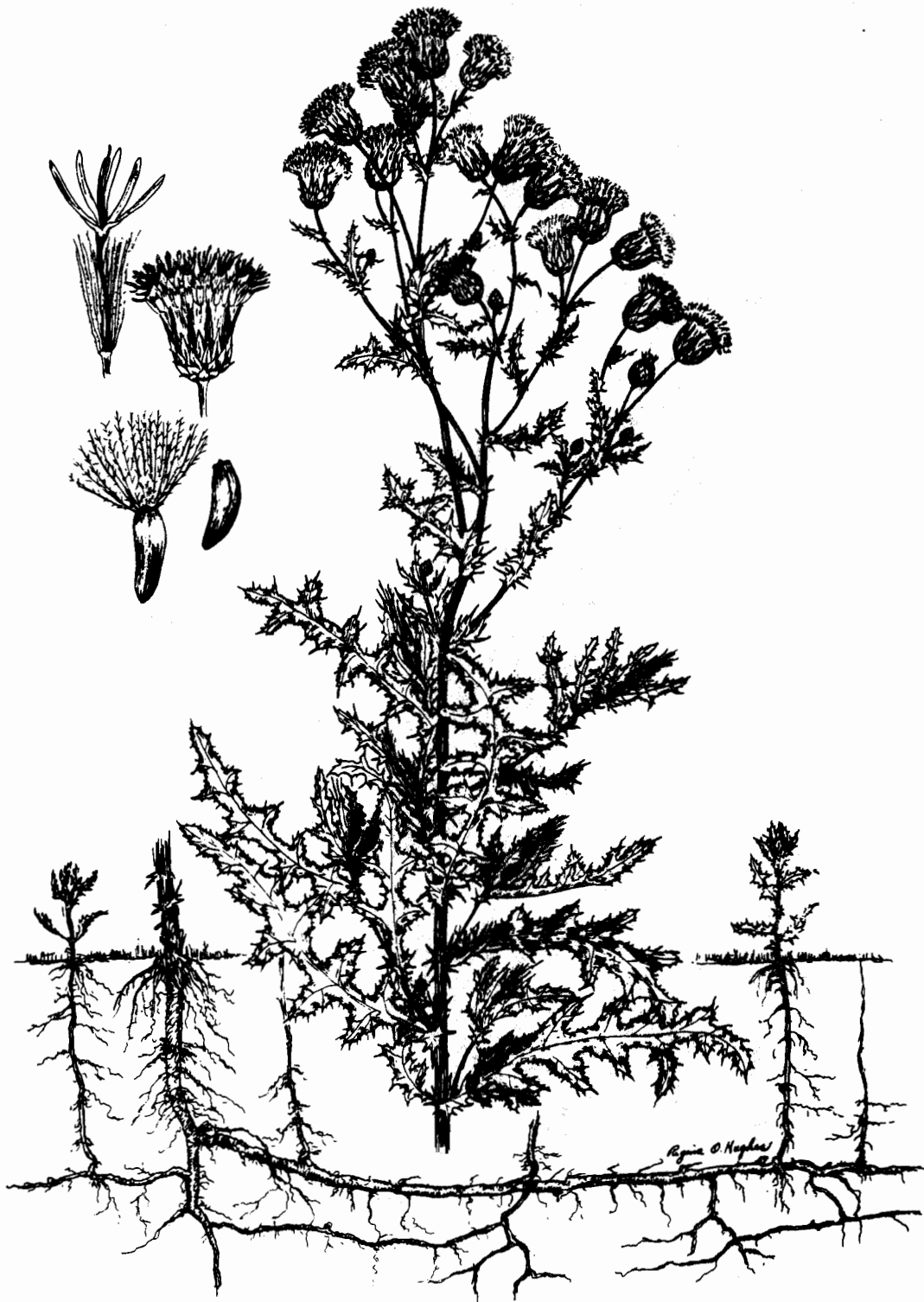
FIG. 1. A weed screen being used to remove weed seeds from irrigation water before it is applied to alfalfa seed fields.



ANNUAL SOWTHISTLE
Sonchus oleraceus L.



BARNYARDGRASS
Echinochloa crus-galli (L.) Beauv.



CANADA THISTLE
Cirsium arvense (L.) Scop.



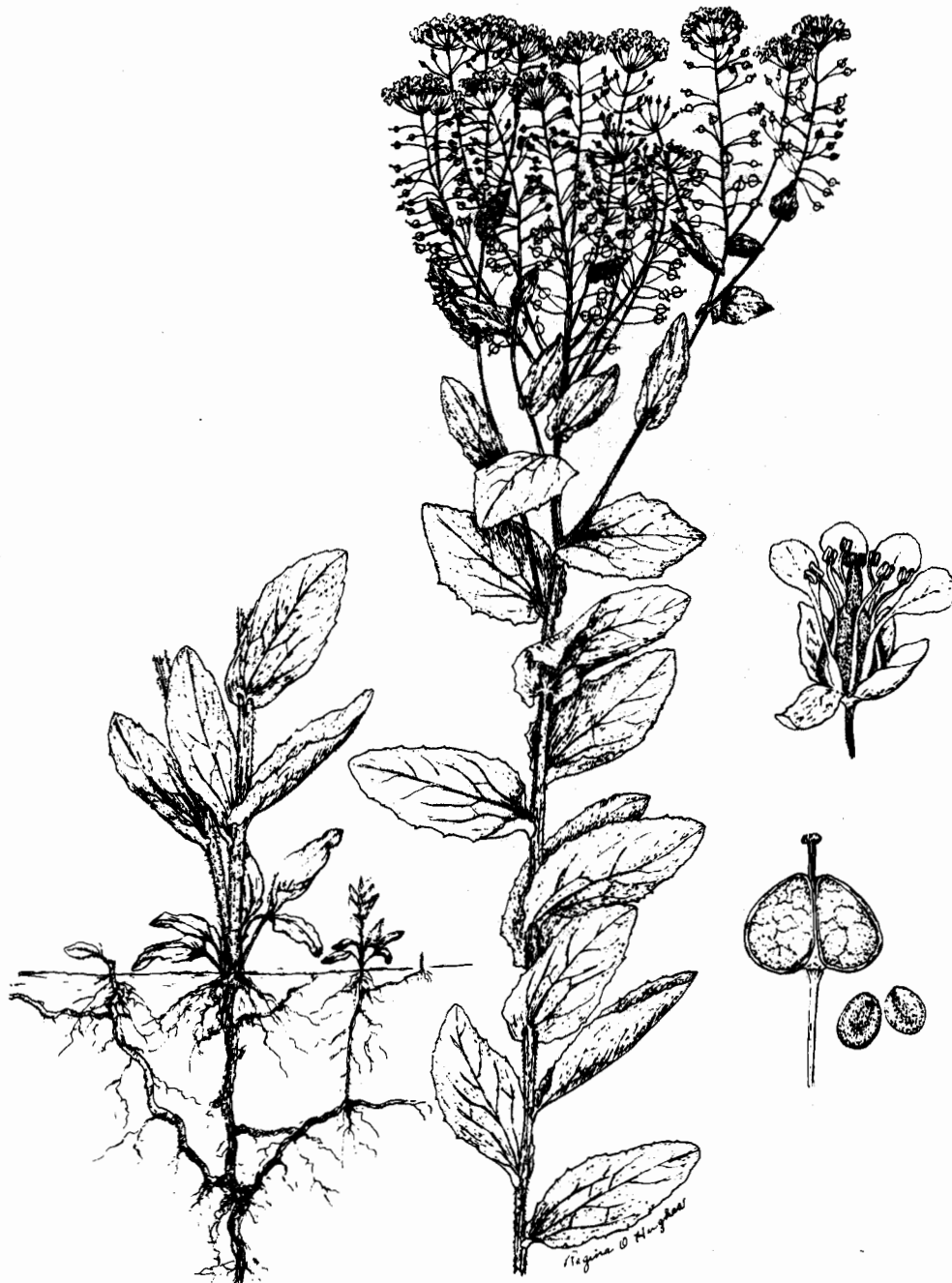
CHICORY
Cichorium intybus L.



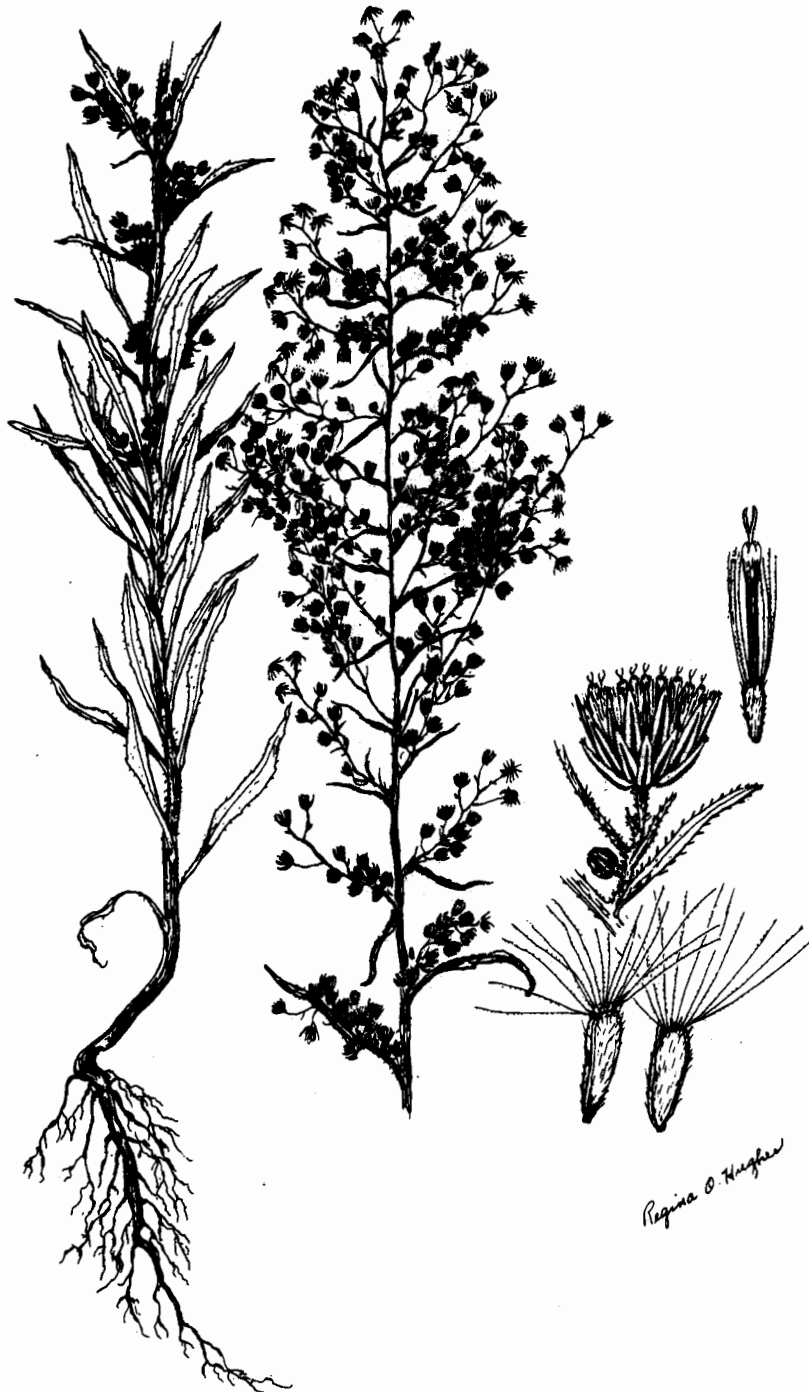
COMMON MALLOW
Malva neglecta Wallr.



DANDELION
Taraxacum officinale Weber



HOARY CRESS
Cardaria draba (L.) Desv.



Regina O. Hughes

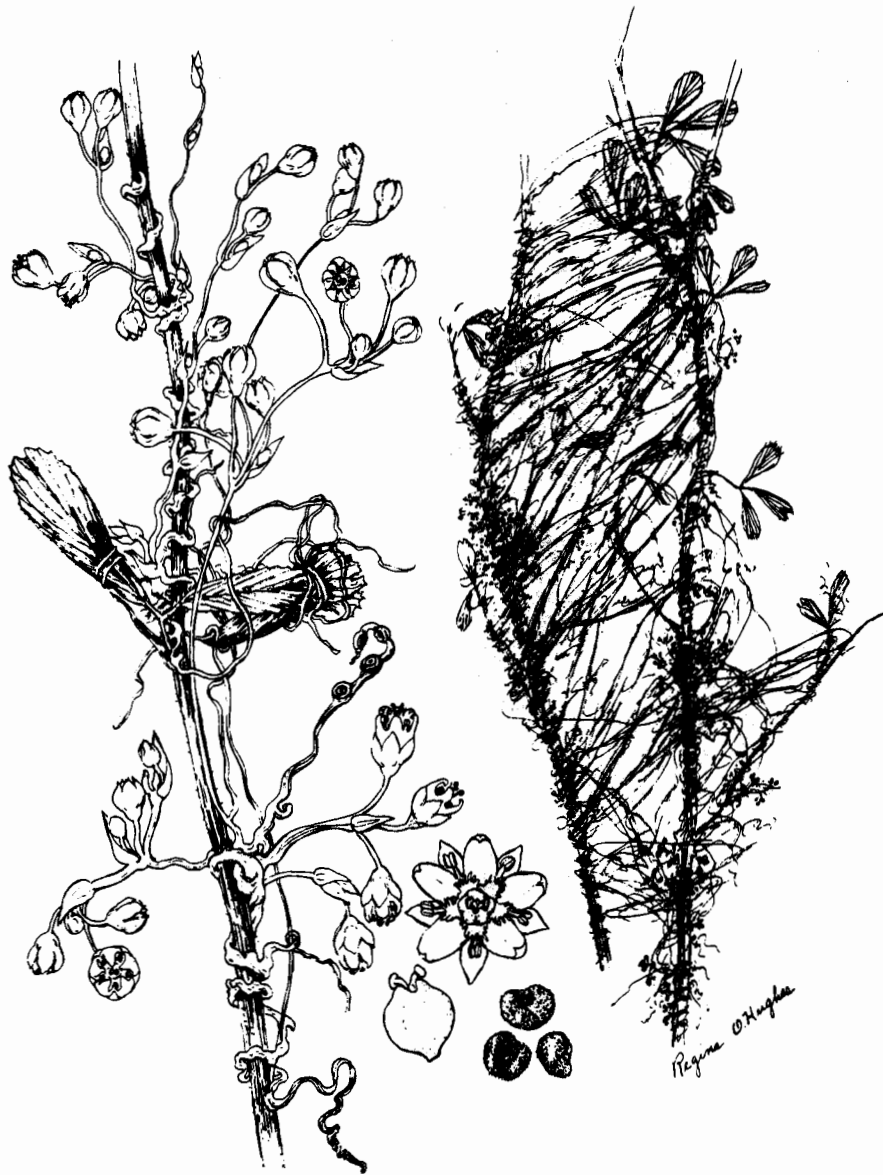
HORSEWEED
Conyza canadensis (L.) Cronq.



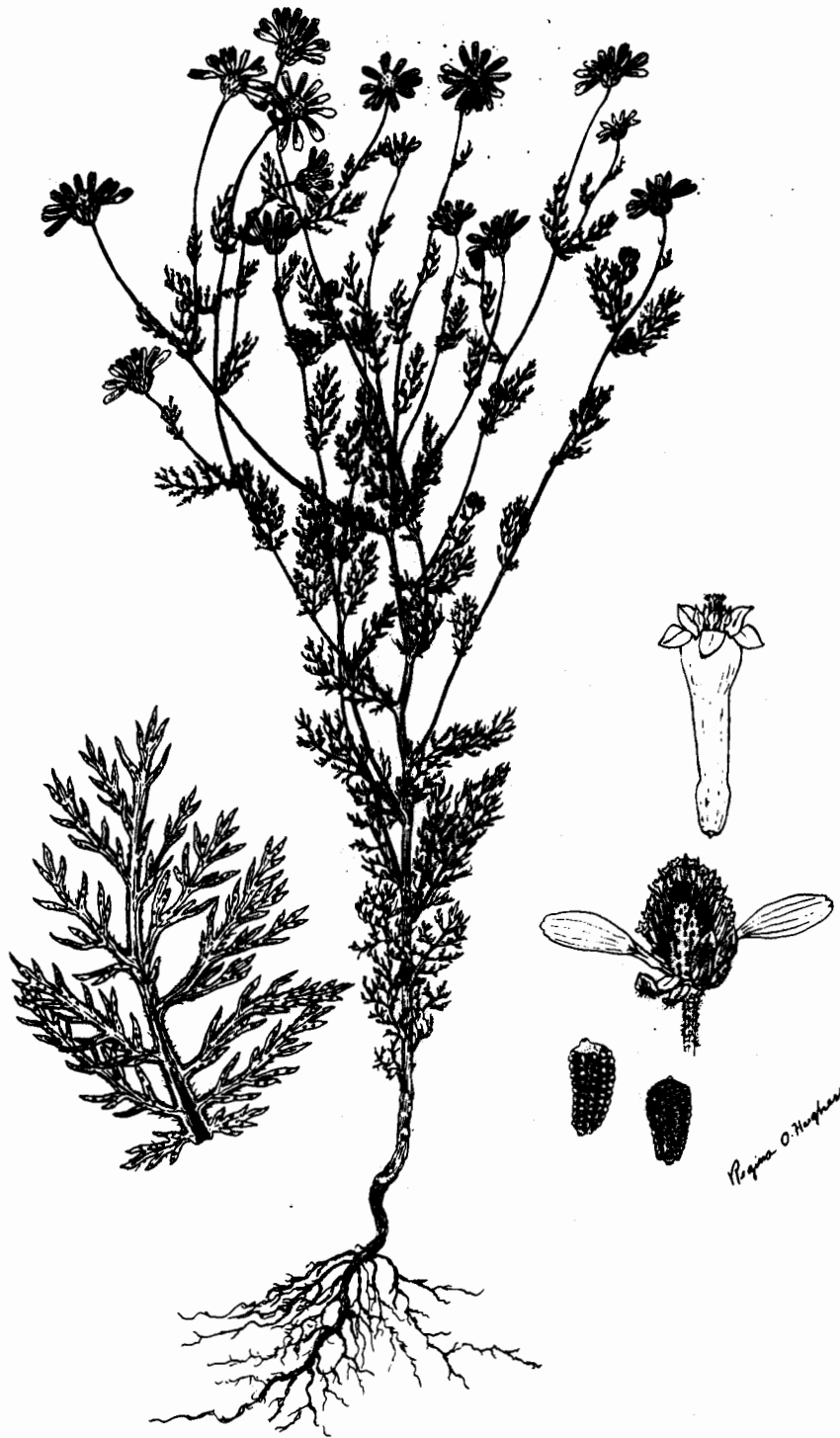
KOCHIA
Kochia scoparia (L.) Roth



LAMBSQUARTERS
Chenopodium album L.

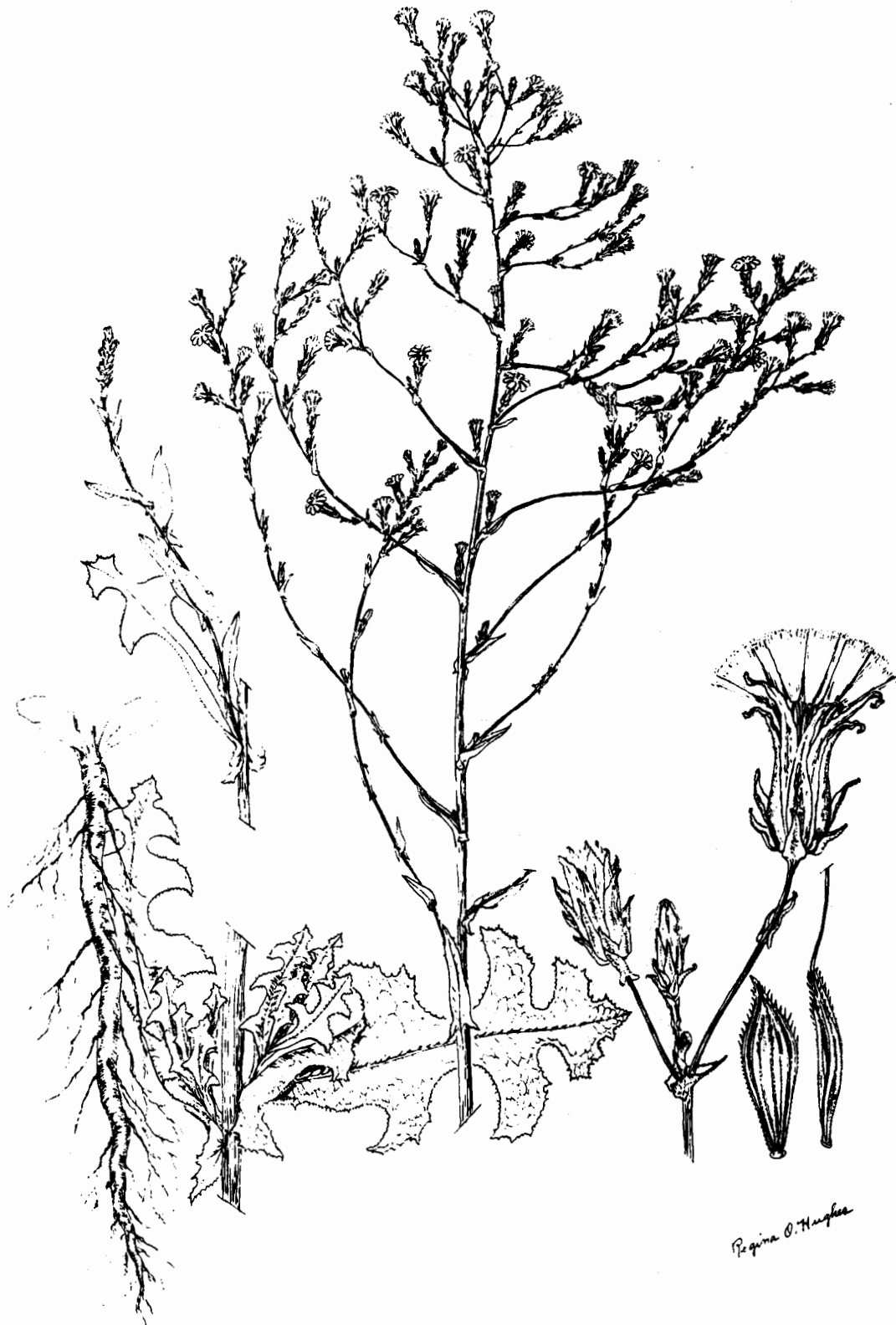


LARGESEED DODDER
Cuscuta indecora Choisy



Regina O. Hopkins

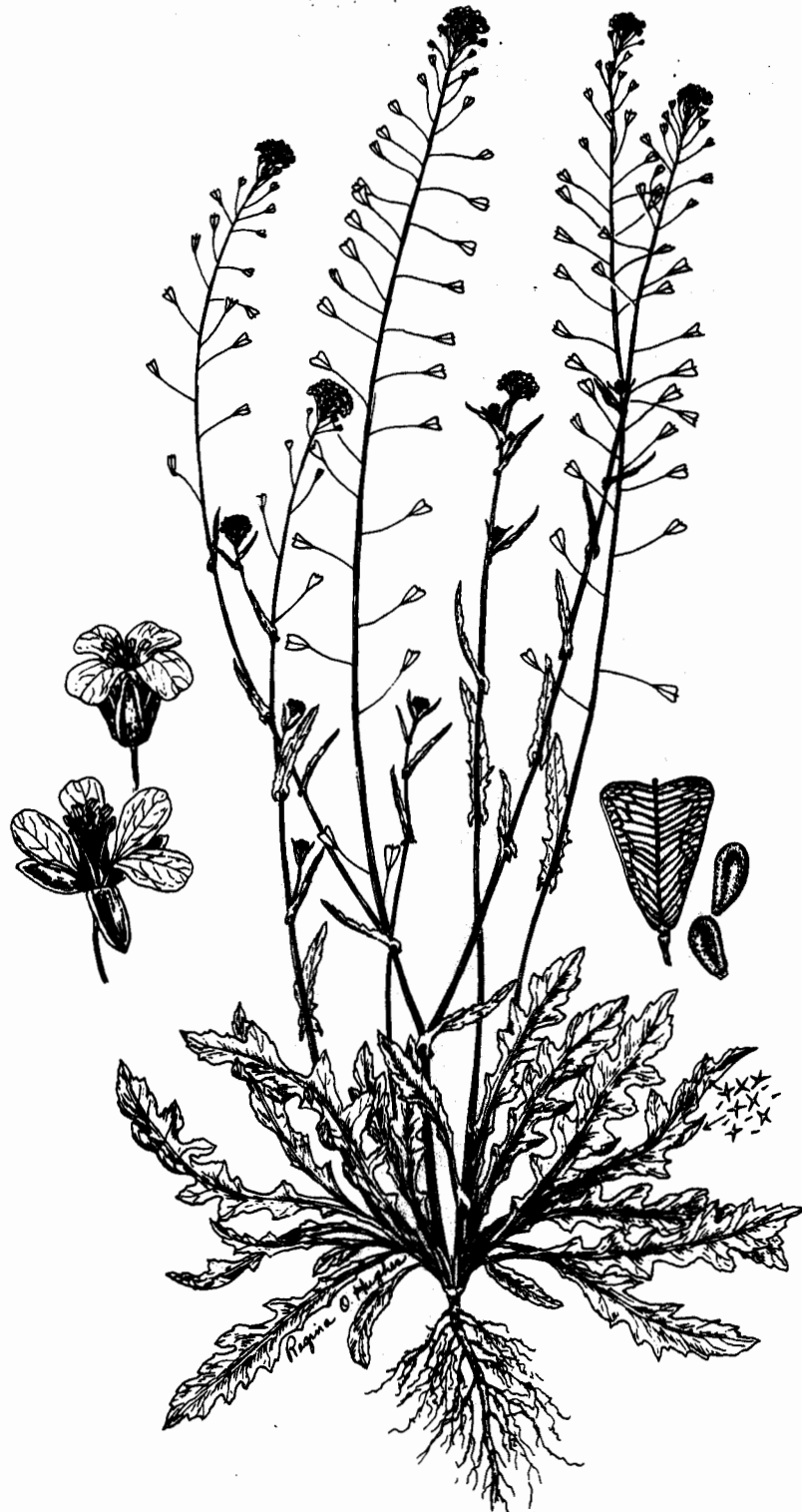
MAYWEED
Anthemis cotula L.



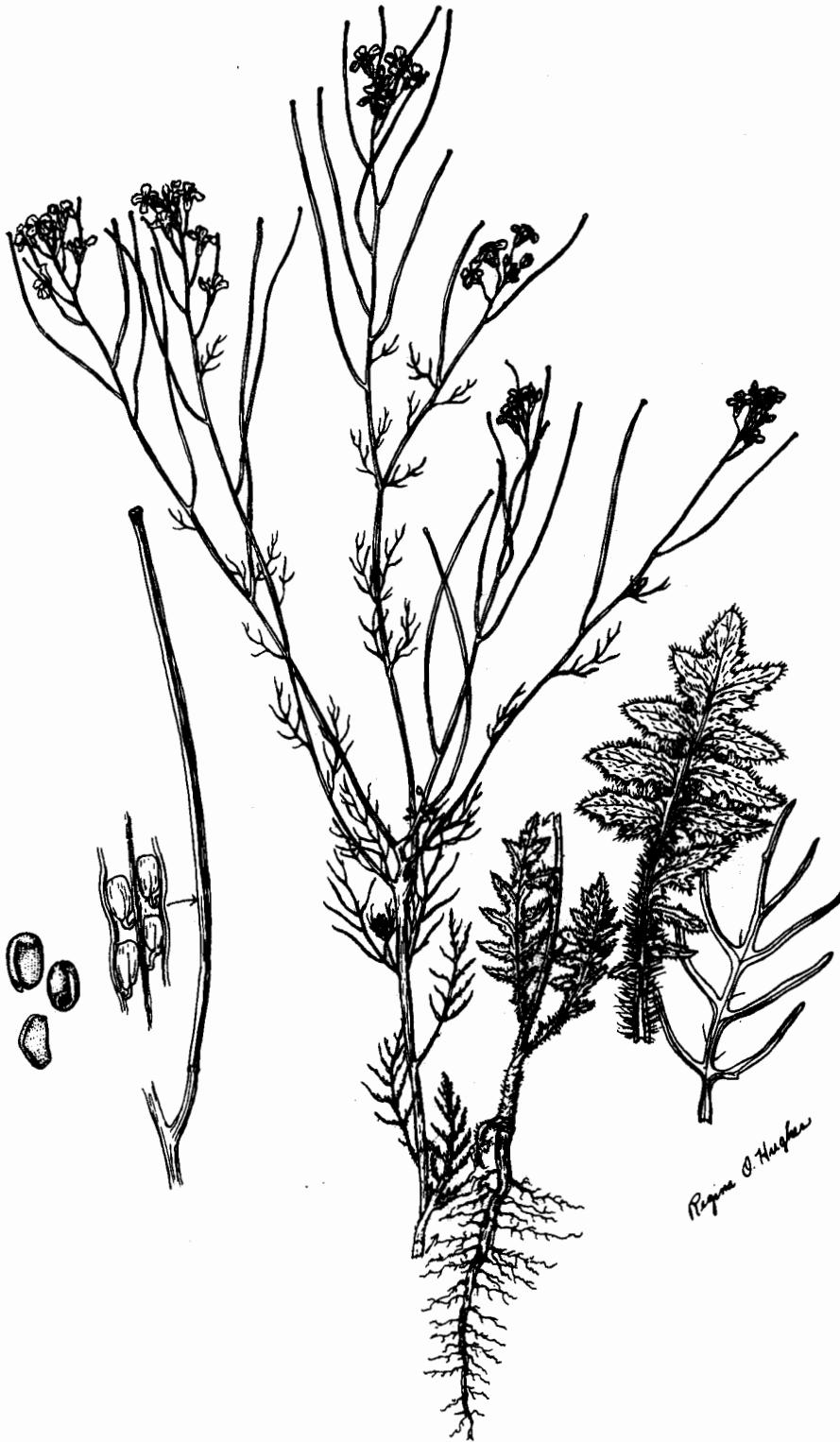
PRICKLY LETTUCE
Lactuca serriola L.



REDROOT PIGWEED
Amaranthus retroflexus L.



SHEPHERDSPURSE
Capsella bursa-pastoris (L.) Medic.



TUMBLE MUSTARD
Sisymbrium altissimum L.



WILD CARROT
Daucus carota L.

nematodes, and soil compaction all weaken alfalfa plants and contribute to weed problems. Many weed problems in alfalfa can be minimized by proper management.

MECHANICAL CONTROL OF WEEDS

Certain mechanical operations can be beneficial in reducing weed problems during establishment of alfalfa. Preirrigation or rainfall can germinate many weed seeds present in the soil. If these weeds can be killed by shallow cultivation to avoid bringing new weed seeds to the surface and if the alfalfa is seeded with little disturbance of the seedbed, the weed problem can be reduced. Initial alfalfa growth, however, is reduced by the delayed seeding.

Weeds that do become established after seeding may be controlled by clipping just above the alfalfa seedlings. Clipping equalizes the height of the tall, vigorous weeds and the alfalfa, allowing the alfalfa to compete with more opportunity for alfalfa survival.

If the alfalfa is planted in rows, cultivation will control those annual weeds growing between the rows. Such cultivations uproot young weeds but may simply transplant them when the soil is moist. Cultivation with various equipment such as a skew treader and a Triple K is effective over the row or on broadcast-seeded alfalfa. Injury to alfalfa crowns with this type of cultivation may increase stand loss from diseases that infect the injured crown.

Hand weeding or roguing is beneficial in controlling weeds that escape control methods. Rogu-

ing helps prevent a serious weed problem from becoming established in the alfalfa field.

CHEMICAL WEED CONTROL

Herbicides should be used in combination with good crop management to control weeds. Maximum benefits are obtained when herbicides are used along with recommended cultural practices. Herbicides largely have replaced the use of companion crops to control weeds in new seedings. Because herbicides eliminate competition from weeds and companion crops, they can be very helpful in establishing a vigorous stand. In established alfalfa, herbicides are also available for controlling many of the common weeds. Early awareness of the problem is essential for timely dormant applications to established stands.

Alfalfa can be injured by improper herbicide application; thus, calibration and proper application are essential for optimum safety to the crop. The herbicide label will usually list the weed species controlled and the rates for differing soil types, as well as precautions, restrictions, and directions for use. Be sure to read the label and follow the instructions carefully when using any herbicide.

Individual herbicides are not listed in this publication because local conditions vary throughout the western states. Consult your local agricultural authorities for information regarding herbicides for use in your area. Most land-grant universities have current recommendations pertaining to weed control in alfalfa.