

# The first weed science textbooks in the United States (Part 1)

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## Intriguing World of Weeds

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### Abstract

This article reviews the first textbooks focused on weed identification published in the United States. We go on to discuss those species considered the most troublesome weeds in agriculture. Common and scientific names written in the original texts have been cross referenced to current common and scientific names.

## Introduction

Although peer-reviewed scientific evidence does not exist, Genesis 3:17-19 documents the reason weed science exists as a discipline. Many English translations of this biblical passage declare that humanity must labor (“In the sweat of thy face”) and contend with “thorns” and “thistles” that emerge from cursed soil to produce food. There are far more weeds than only thorns and thistles that must be controlled to produce food and fiber to feed and clothe the world. If a translation of this biblical passage were written by farmers in the United States today, they might list crabgrass (*Digitaria* spp.), foxtail (*Setaria* spp.), morningglory (*Ipomoea* spp.), nutsedge (*Cyperus* spp.), pigweed (*Amaranthus* spp.), and ragweed (*Ambrosia* spp.), or many others, depending on location and commodities produced. If thorns and thistles were the only groups of weeds that interfered with the production of food and fiber, weed science as a discipline might not need to exist.

## Value of Agriculture

Individuals that recognized the importance and value of agriculture formed groups to share ideas and experiences in the early developing years of the newly independent United States. These organizations were initially formed in the states of New York, Massachusetts, Pennsylvania, and South Carolina in the late 1700s (True 1925). In the city serving as the center for the federal government of the United States after the Revolutionary War (History.com 2009), the Philadelphia Society for Promoting Agriculture formed in 1785 (Anonymous 1808; True 1925). This organization compiled *Memoirs*, which were experiences and observations made by members as well as information conveyed to members from trusted sources that could be shared in attempts to improve land fertility and productivity, livestock management, forage production, seeding methods, animal and plant disease and insect management, hedge plants, crop processing, farm implements, kitchen design, and other aspects of agrarian life. Society membership was not restricted to residents of Pennsylvania but included individuals from other states as well as several foreign countries (Anonymous 1808).

## Botany and Medicine Link

Dr. Benjamin Barton, Professor of Natural History, Materia Medica and Botany at the University of Pennsylvania, was a member of the Philadelphia Society for Promoting Agriculture (Anonymous 1811). As a student at York Academy, Barton’s spare time was spent collecting and sketching plant, insect, and animal specimens (Swensen 1997). He developed an interest in medicine as a student at the College of Philadelphia and studied under the tutelage of Dr. Thomas Shippen (Swensen 1997). He continued the study of medicine abroad at the University of Edinburgh in Scotland. Swensen (1997) reported that Barton also studied medicine in Germany at the University of Göttingen, although evidence of a medical degree does not exist (Yokota 2001). After returning to the United States and practicing medicine, Barton joined the University of Pennsylvania to teach botany. In that position, he published the first botany textbook (Barton 1803) in the United States (Swensen 1997). In addition to other biological publications, Barton (1798) also published a series of texts on plants with medicinal properties indigenous to the United States titled *Collections for an Essay Towards a Medica Materia of the United States*. In the *Essay*, plants with similar medicinal properties were grouped

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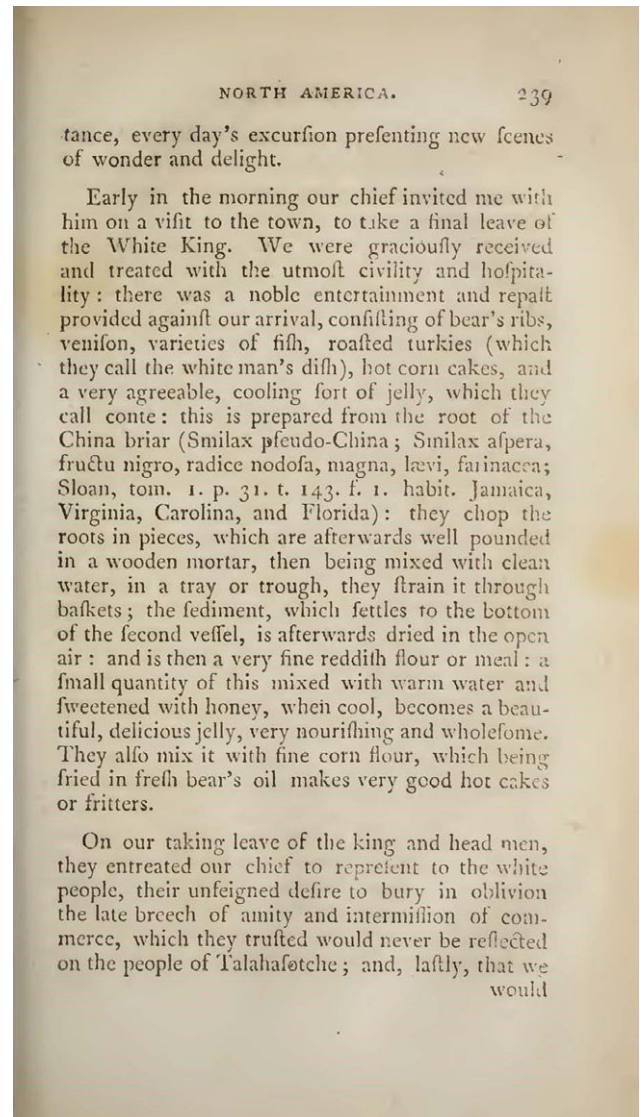


to create a reference for physicians to know which plants could be used as astringents, tonics, stimulants, errhines, salivation stimulants, emetics, cathartics, diuretics, and anthelmintics. One of Barton's collaborators was botanist and explorer William Bartram, who not only provided plant material to Barton, but shared ethnobotany of Native Americans he observed and gleaned during his explorations of the New World. One such example was food preparation from *Smilax* roots, which was originally printed in Bartram's book of explorations (Figure 1; Bartram 1793), then reprinted in Barton's *Essay* (Figure 2; Barton 1798).

One of Benjamin Barton's students who graduated from the University of Pennsylvania Medical Department was William Darlington. Like his mentor, Darlington was both botanist and physician, but he was also an elected official that represented Pennsylvania in the 14th, 16th, and 17th U.S. Congresses (Anonymous 2023a). Darlington's first significant botanical publication was a list and description of flowering plants and ferns of Chester County, Pennsylvania, which included notes of medicinal, economic, and artistic uses for plants (Darlington 1837). Ten years later, Darlington (1847) published *Agricultural Botany: An Enumeration and Description of Useful Plants and Weeds, Which Merit the Notice or Require the Attention, of American Agriculturalists*. In the Preface of the text, Darlington stated that one objective of writing the book was to encourage individuals involved in agriculture to better understand and appreciate the science of botany; therefore, he included 23 pages of botanical terms with definitions. He also stated in the Preface that although he appreciated the three economic aspects of botany (agricultural, medicinal, and artistic), his primary overall objective in writing the book was to systematically describe plants of immediate interest to the American agricultural community, especially those located in the middle states (his term; Darlington 1847). He stated that every intelligent agriculturalist should recognize the plants in *Agricultural Botany* regardless of whether they are encountered in fields, gardens, or woodlands.

### Darlington's First Edition

To achieve his overall objective, Darlington (1847) followed the method of Linnaeus to describe 485 species of plants, which included about a dozen nonflowering ferns, mushrooms, lichens, seaweed, ergot, mold, rust, and other fungi. For each of the plants, Darlington (1847) provided both genus and specific epithet as well as English and foreign common names, taxonomic description, habitat, fruiting period, whether introduced or indigenous, and observations made of the plant. Observations written about these weed species were not limited to his personal experiences but included those of others as illustrated in the observations for butter and eggs (*Linaria vulgaris* Mill.) (Figure 3), information supplied by Mr. Watson. Darlington also included a reference list of the names of 106 botanical authorities of plants in his text. Little information was provided in the text on weed management, except for a few species, aside from encouraging agriculturalists to prevent seed production, increase seeding rates of cultivated crops, and be vigilant to remove weeds. However, Darlington (1847) shared management thoughts that Canada thistle (*Cirsium arvense* Scop.), which he called field thistle, could not be controlled by plowing. His conclusion about Canada thistle control was based on weed biology observations conducted and reported to the Society instituted at Bath by William Curtis (1780), then printed in Volume 2 of Curtis' *Flora Londinensis* (1798) with the scientific name *Carduus arvensis*.



**Figure 1.** Page 239 from Bartram's (1793) *Travels Through North and South Carolina, Georgia, East and West Florida, the Cherokee Country, the Extensive Territories of the Muscogules or Creek Confederacy, and the Country of the Chactaws*.

Near the end of *Agricultural Botany*, Darlington (1847) summarized into lists plants he considered most important. He compiled a list of 57 plants already cultivated for human food production with an additional 27 species suitable, but not cultivated for that purpose. He listed 30 plants, of which only one-third were cultivated, as food for domesticated animals. A third list of 37 plants Dr. Darlington thought could be grown to produce condiments or beverage, whereas the fourth list of 35 plants contained medicinal properties but fewer than one-half were cultivated. Ninety-one plants he considered useful for domestic or rural commercial art.

The last two lists compiled by Dr. Darlington are of particular interest to weed scientists. Figure 4 is his list of the most troublesome weeds in U.S. agriculture at that time. In this list, Darlington (1847) wrote genus and specific epithets of the 73 plants he considered the most "pernicious and troublesome" weeds, assuming that these plants should be eradicated from U.S. agriculture. Webster (1828) defined pernicious as "destructive" with "the quality of killing, destroying, or injuring." Table 1 lists



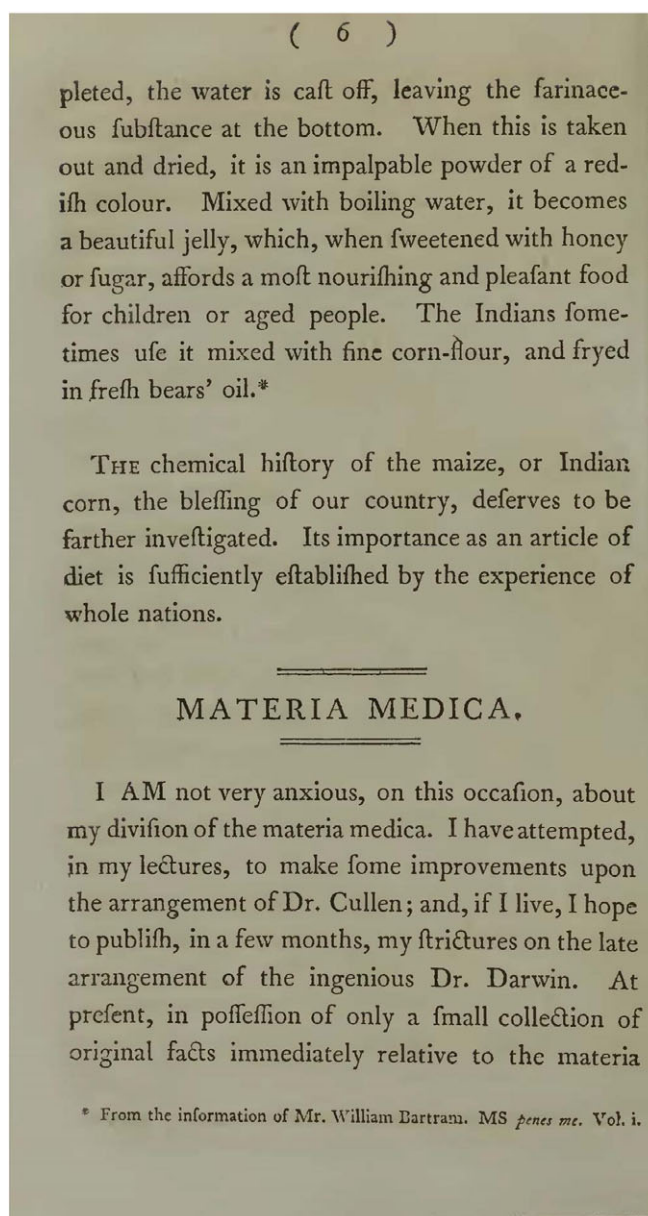
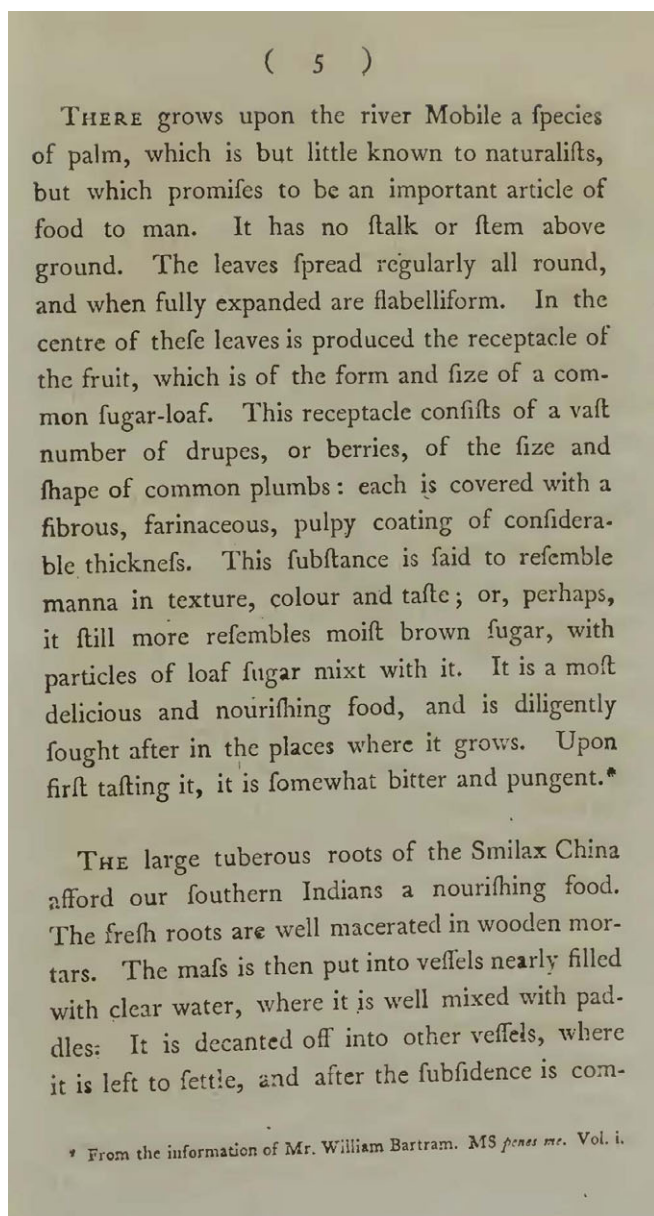


Figure 2. Pages 6 and 7 from Barton's (1798) Collections for an Essay Towards a Materia Medica of the United States.

these plants along with Darlington's proposed common name, popular common name as well as current scientific name and common name. Among the 73 pernicious and troublesome weeds, Darlington considered 15 the worst of the worst. These 15 plants, which he described as "eminently pernicious" are shown in Table 2, also with Darlington's proposed and popular common names and current scientific and common names. Figure 5 and Table 3 show Dr. Darlington's list of plants he described as "mere" weeds on farms. Although he listed only 39 weeds specifically by scientific name, among several genera described by Torrey and Gray (1838), Darlington (1847) opined that all species should be considered weeds: *Aster*, *Carex*, *Cirsium*, *Cyperus*, *Equisetum*, *Erigeron*, *Eupatorium*, *Euphorbia*, *Juncus*, *Lobelia*, *Oenothera*, *Panicum*, *Polygonum*, *Pteris* (and all ferns), *Rubus* (all wild species), *Scirpus*, *Solidago*, and *Sphagnum* (and all other mosses) should be viewed as

weeds when emerged in agricultural habitats. Thus, he considered the total list "about" 120 species of plants.

### The Second Edition

A second edition of Darlington's book was published in 1859. However, due to Darlington's failing health, updates to the text were done by George Thurber (Darlington and Thurber 1859), Lecturer of botany and materia medica at New York College of Pharmacy and later Chair of botany and horticulture at Michigan College of Agriculture (Anonymous 2023b). Thurber listed and described, in the same manner as the first edition, 164 additional plant species. Artists were used to sketch 140 images of plants or plant parts that were carved into wooden blocks for printing to aid botanical understanding and plant identification (Darlington and Thurber 1859). Drawings



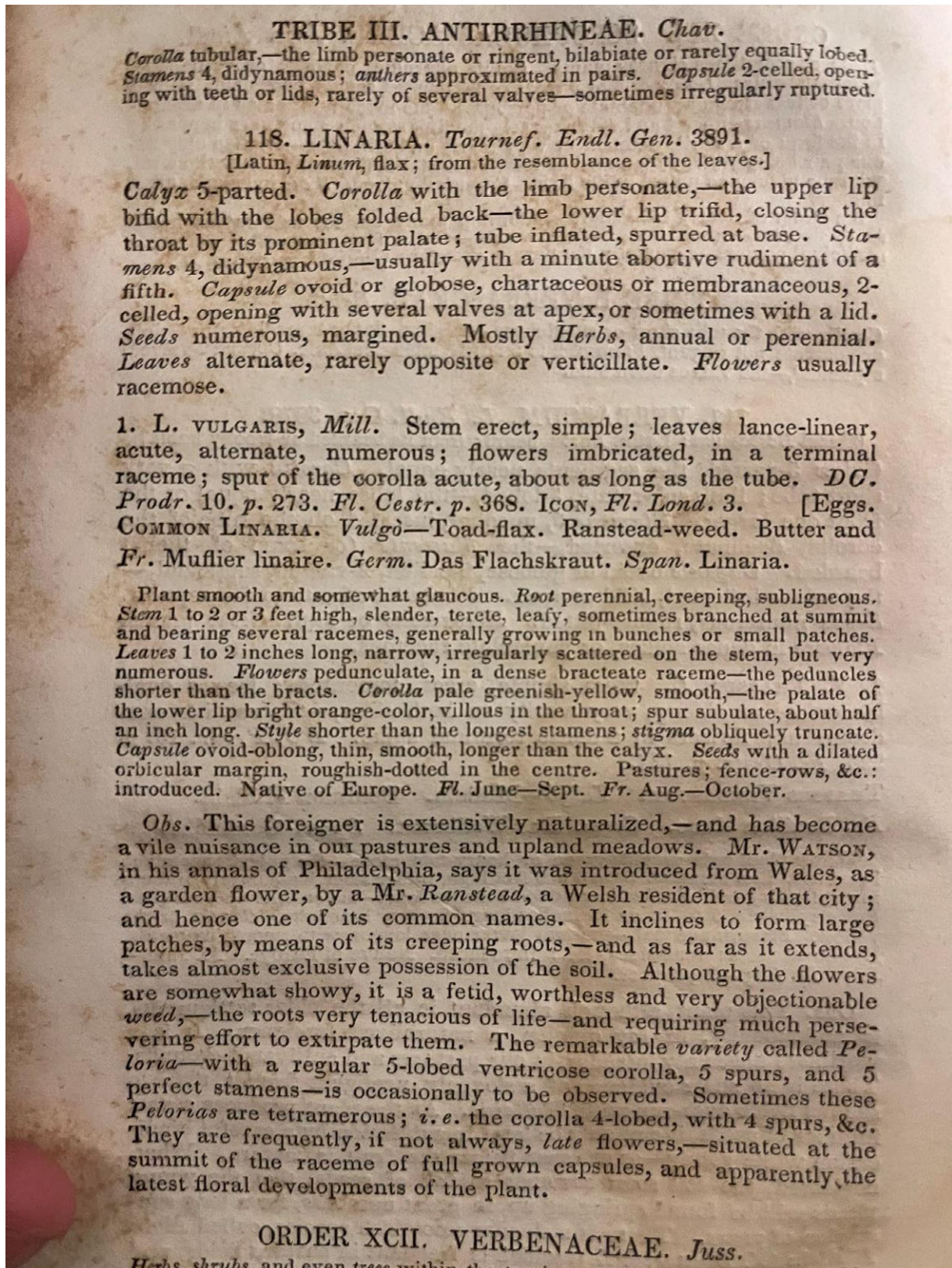


Figure 3. Entry for butter and eggs (*Linaria vulgaris* L. (USDA 2023) showing botanical description and observations of this species (Darlington 1847).



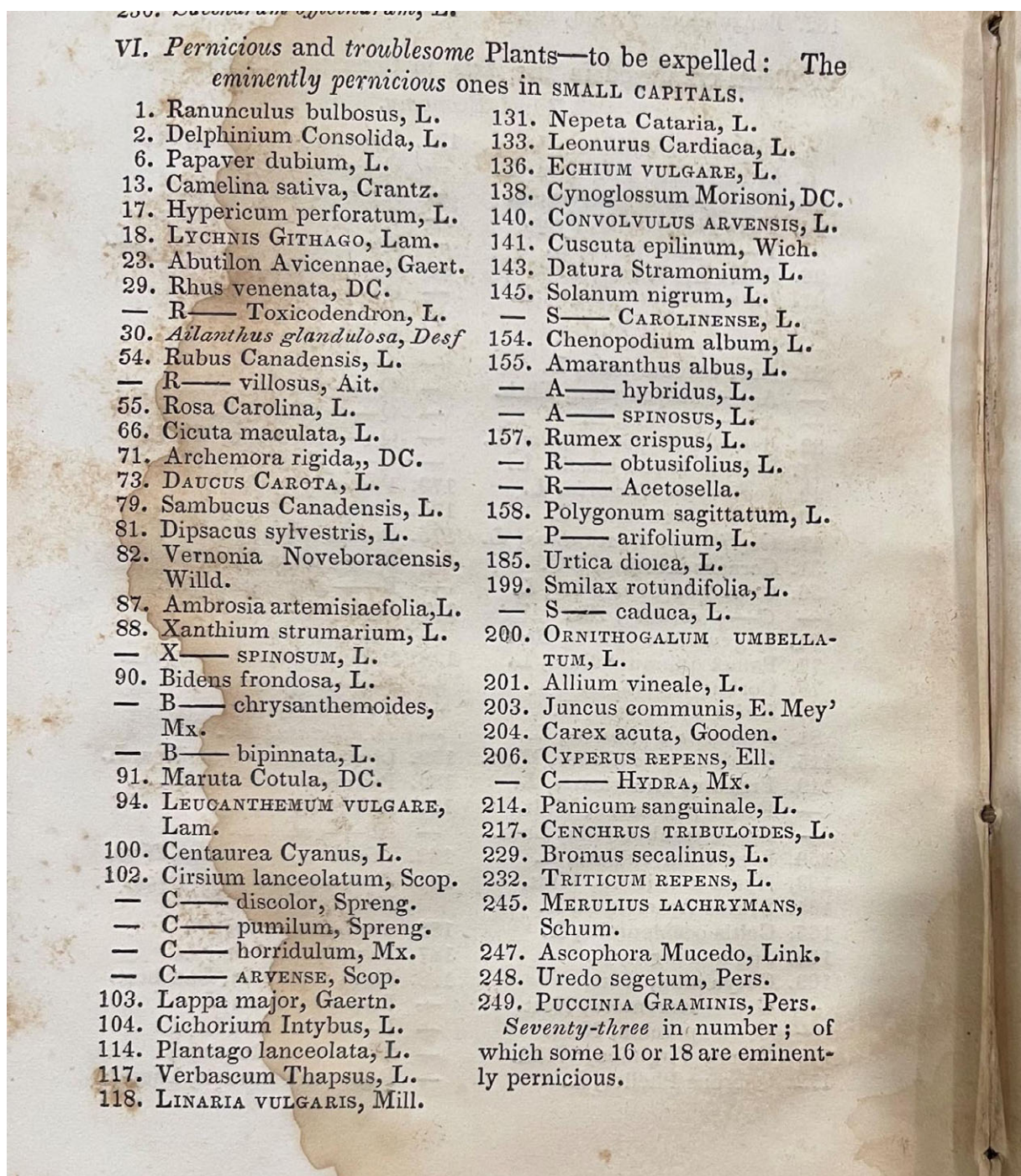


Figure 4. Image of Darlington's (1847) List VI *Pernicious and troublesome plants* from *Agricultural Botany: An Enumeration and Description of Useful Plants and Weeds, Which Merit the Notice, or Require the Attention, of American Agriculturalists*.

used to illustrate this edition included 140 images, among which one was of an enlarged grass floret; 65 were plants useful for lumber, live hedges, ornamental, medicinal, food, or other benefits to humanity; and the remaining 74 images were plants considered weeds. An example is shown in Figure 6 of giant ragweed, called great ragweed in the text (*Ambrosia trifida* L.). This 2nd edition is likely the first weed identification guide with images printed in the United States. Perhaps because of the significance of revisions made to the second edition, the title of the book was changed to *American Weeds and Useful Plants:*

*Being a Second and Illustrated Edition of Agricultural Botany: An Enumeration and Description of Useful Plants and Weeds, Which Merit the Notice or Require the Attention, of American Agriculturalists* (Darlington and Thurber 1859). Multiple publishers printed the revised edition, as the senior author has seen at least three different publishers listed on title pages of *American Weeds*.

*American Weeds* does not contain the lists of weeds nor plant uses published in Darlington's first edition. However, four pages of text titled "Weeds" that provide an overview of weed management

**Table 1.** Darlington's (1847) list of "pernicious and troublesome" weeds from Agricultural Botany: An Enumeration and Description of Useful Plants and Weeds, Which Merit the Notice, or Require the Attention, of American Agriculturalists with proposed and popular common names of the period and current nomenclature and common names. Blank cells indicate no name provided.

Scientific name	Proposed common name	Popular common name	Current scientific name	Current common name
Darlington (1847) <i>Ranunculus bulbosus</i> L.	Bulbous ranunculus	Butter-cups, crow-foot	(USDA NRCS 2023) <sup>a</sup> <i>Ranunculus bulbosus</i> L.	St. Anthony's turnip
<i>Delphinium consolida</i> L.	Solder delphinium	Lark-spur	<i>Consolida regalis</i> Gray	Royal knight's spur
<i>Papaver dubium</i> L.	Dubious papaver	Poppy, field poppy	<i>Papaver dubium</i> L.	Blindeyes
<i>Camelina sativa</i> Crantz.	Cultivated camelina	Wild flax, gold of pleasure	<i>Camelina sativa</i> (L.) Crantz.	False flax
<i>Hypericum perforatum</i> L.	Perforated hypericum	St. John's wort	<i>Hypericum perforatum</i> L.	Common St. Johnswort
<i>Abutilon avicennae</i> Gaert.	Avicenna's abutilon	Indian mallow, velvet-leaf	<i>Abutilon theophrasti</i> Medik.	Velvetleaf
<i>Rhus venenata</i> DC	Poisonous rhus	Poison sumach, poison elder	<i>Toxicodendron vernix</i> (L.) Kuntze (Govaerts et al. 2021)	Poison sumac
<i>Rhus toxicodendron</i> <sup>b</sup> L.	Poison-tree rhus	Poison oak	<i>Toxicodendron pubescens</i> Mill.	Atlantic poison oak
<i>Rhus radicans</i> L.	Poison-tree rhus	Poison vine, poison oak, poison ivy	<i>Toxicodendron radicans</i> (L.) Kuntze ssp. <i>Radicans</i>	Eastern poison ivy
<i>Ailanthus glandulosa</i> Desf	Glandular ailanthus	Chinese sumac, tree of heaven	<i>Ailanthus altissima</i> (Mill.) Swingle	Tree of heaven
<i>Rubus canadensis</i> L.	Canadian rubus	Dewberry, running brier	<i>Rubus canadensis</i> L.	Smooth blackberry
<i>Rubus villosus</i> Ait.	Villous rubus	Blackberry, common brier, bramble	<i>Rubus flagellaris</i> Willd.	Northern dewberry
<i>Rosa carolina</i> L.	Carolina rosa	Swamp rose	<i>Rosa carolina</i> L.	Carolina rose
<i>Cicuta maculata</i> L.	Spotted cicuta	Spotted cow-bane, water hemlock	<i>Cicuta maculata</i> L.	Spotted water hemlock
<i>Archemora rigida</i> DC	Rigid or stiff archemora	Cow-bane, wild parsnep	<i>Oxyopolis rigidior</i> (L.) Raf. (WFO 2023d)	Stiff cowbane
<i>Sambucus canadensis</i> L.	Canadian sambucus	Elder bush, common elder	<i>Sambucus nigra</i> L. ssp. <i>canadensis</i> (L.) R. Bolli	American black elderberry
<i>Dipsacus sylvestris</i> L.	Wild dipsacus	Teasel, wild teasel	<i>Dipsacus fullonum</i> L.	Fuller's teasel
<i>Vernonia noveboracensis</i> Willd.	New York vernonia	Iron-weed	<i>Vernonia noveboracensis</i> (L.) Michx.	New York ironweed
<i>Ambrosia artemisiaefolia</i> L.	Artemisia-leaved ambrosia	Bitter-weed, rag-weed	<i>Ambrosia artemisiifolia</i> L.	Annual ragweed
<i>Xanthium strumarium</i> L.	Scrophulous xanthium	Clot-bur, cockle bur	<i>Xanthium strumarium</i> L.	Rough cocklebur
<i>Bidens frondosa</i> L.	Frondose bidens	Bur marigold	<i>Bidens frondosa</i> L.	Devil's beggarticks
<i>Bidens chrysanthemoides</i> Mx.	Chrysanthemum-like bidens	Beggar-ticks	<i>Bidens laevis</i> (L.) Britton, Sterns, & Poggenb.	Smooth beggartick
<i>Bidens bipinnata</i> L.	Bipinnate bidens	Spanish needles	<i>Bidens bipinnata</i> L.	Spanish needles
<i>Maruta cotula</i> DC	Anthemis cotula	Stinking chamomile, dog's fennel, or May-weed	<i>Anthemis cotula</i> L.	Stinking chamomile
<i>Centaurea cyanus</i> L.	Blue centaurea	Blue-bottle, ragged robin, blue bonnets	<i>Centaurea cyanus</i> L.	Garden cornflower
<i>Cirsium lanceolatum</i> Scop.	Lanceolate cirsium	Common thistle	<i>Cirsium vulgare</i> (Savi) Ten.	Bull thistle
<i>Cirsium discolor</i> Spreng.	Two-colored cirsium		<i>Cirsium discolor</i> (Muhl. ex Willd.) Spreng.	Field thistle
<i>Cirsium pumilum</i> Spreng.	Low or dwarf cirsium		<i>Cirsium pumilum</i> Spreng.	Pasture thistle
<i>Cirsium horridulum</i> Mx.	Somewhat rugged cirsium	Yellow thistle	<i>Cirsium horridulum</i> Michx.	Yellow thistle
<i>Lappa major</i> Gaertn.	Greater lappa	Bur-dock	<i>Arctium lappa</i> L.	Greater burdock
<i>Cichorium intybus</i> L.		Wild succory, chicory	<i>Cichorium intybus</i> L.	Chicory
<i>Plantago lanceolata</i> L.	Lanceolate plantago	English plantain, buckhorn plantain	<i>Plantago lanceolata</i> L.	Narrowleaf plantain
<i>Verbascum thapsus</i> L.	Thapsus verbascum	Mullein, common mullein	<i>Verbascum thapsus</i> L.	Common mullein
<i>Nepeta cataria</i> L.	Cat nepeta	Cat-mint, cat-nep	<i>Nepeta cataria</i> L.	Catnip
<i>Leonurus cardiaca</i> L.	Cardiac leonurus	Motherwort	<i>Leonurus cardiaca</i> L.	Common motherwort
<i>Cynoglossum morisoni</i> DC	Morison's cynoglossum	Beggar's lice	<i>Hackelia virginiana</i> (L.) I.M. Johnst. (WFO 2023e)	Virginia stickseed, beggar's-lice, sticktight (USFW 2023)
<i>Cuscuta epilinum</i> Wich.	Flax cuscuta	Flax-vine, dodder	<i>Cuscuta epilinum</i> Weihe	Flax dodder
<i>Datura stramonium</i> L.		Jamestown (corruptly Jimson) weed, thorn-apple	<i>Datura stramonium</i> L.	Jimsonweed
<i>Solanum nigrum</i> L.	Black solanum	Night-shade	<i>Solanum nigrum</i> L.	Black nightshade
<i>Chenopodium album</i> L.	White chenopodium	Lamb's quarters, goose-foot	<i>Chenopodium album</i> L.	Lambsquarters
<i>Amaranthus albus</i> L.	White amaranthus		<i>Amaranthus albus</i> L.	Prostrate pigweed

(Continued)

**Table 1.** (Continued)

Scientific name	Proposed common name	Popular common name	Current scientific name	Current common name
<i>Amaranthus hybridus</i> L.	Hybrid amaranthus		<i>Amaranthus hybridus</i> L.	Slim amaranth
<i>Rumex crispus</i> L.	Curled rumex	Sour dock, curled dock	<i>Rumex crispus</i> L.	Curly dock
<i>Rumex obtusifolius</i> L.	Obtuse-leaved rumex	Bitter dock, broad-leaved dock	<i>Rumex obtusifolius</i> L.	Bitter dock
<i>Rumex acetosella</i> L.		Sheep sorrel, field sorrel	<i>Rumex acetosella</i> L.	Common sheep sorrel
<i>Polygonum sagittatum</i> L.	Sagittate polygonum	Arrow-leaved tear-thumb	<i>Polygonum sagittatum</i> L.	Arrowleaf tearthumb
<i>Polygonum arifolium</i> L.	Arum-leaved polygonum	Halbert-leaved tear-thumb	<i>Polygonum arifolium</i> L.	Halberdleaf tearthumb
<i>Urtica dioica</i> L.	Dioicous urtica	Nettle, stinging nettle	<i>Urtica dioica</i> L.	Stinging nettle
<i>Smilax rotundifolia</i> L.	Round-leaved smilax	Green-brier, rough bind-weed	<i>Smilax rotundifolia</i> L.	Roundleaf greenbrier
<i>Smilax caduca</i> L.	Caducous smilax	Green-brier	<i>Smilax rotundifolia</i> L. (WFO 2023f)	Roundleaf greenbrier
<i>Allium vineale</i> L.	Vine (or vineyard) allium	Garlic, field garlic, crow garlic	<i>Allium vineale</i> L.	Wild garlic
<i>Juncus communis</i> E. Meyer	Common juncus	Rush, soft rush	<i>Juncus effusus</i> L. (WFO 2023g)	Common rush
<i>Carex acuta</i> Gooden.	Acute (or sharp-angled) carex	Tussock sedge	<i>Carex nigra</i> (L.) Reichard	Smooth black sedge
<i>Panicum sanguinale</i> L.	Bloody (or purple) panicum	Crab-grass, finger-grass	<i>Digitaria sanguinalis</i> (L.) Scop.	Hairy crabgrass
<i>Bromus secalinus</i> L.	Rye brome	Cheat, chess, brome-grass	<i>Bromus secalinus</i> L.	Rye brome

<sup>a</sup>Unless otherwise stated.

<sup>b</sup>Only *R. toxicodendron* stated in Darlington's (1847) list of pernicious weeds; however, in the text it is combined with *R. radicans* as Torrey and Gray (1838) list as a single species of climbing and not climbing in The Flora of North America.

**Table 2.** Eminently pernicious weeds from Agricultural Botany: An Enumeration and Description of Useful Plants and Weeds, Which Merit the Notice, or Require the Attention, of American Agriculturalists (Darlington 1847) with proposed and popular common names of the period and current nomenclature and common names. Blank cells indicate no name provided.

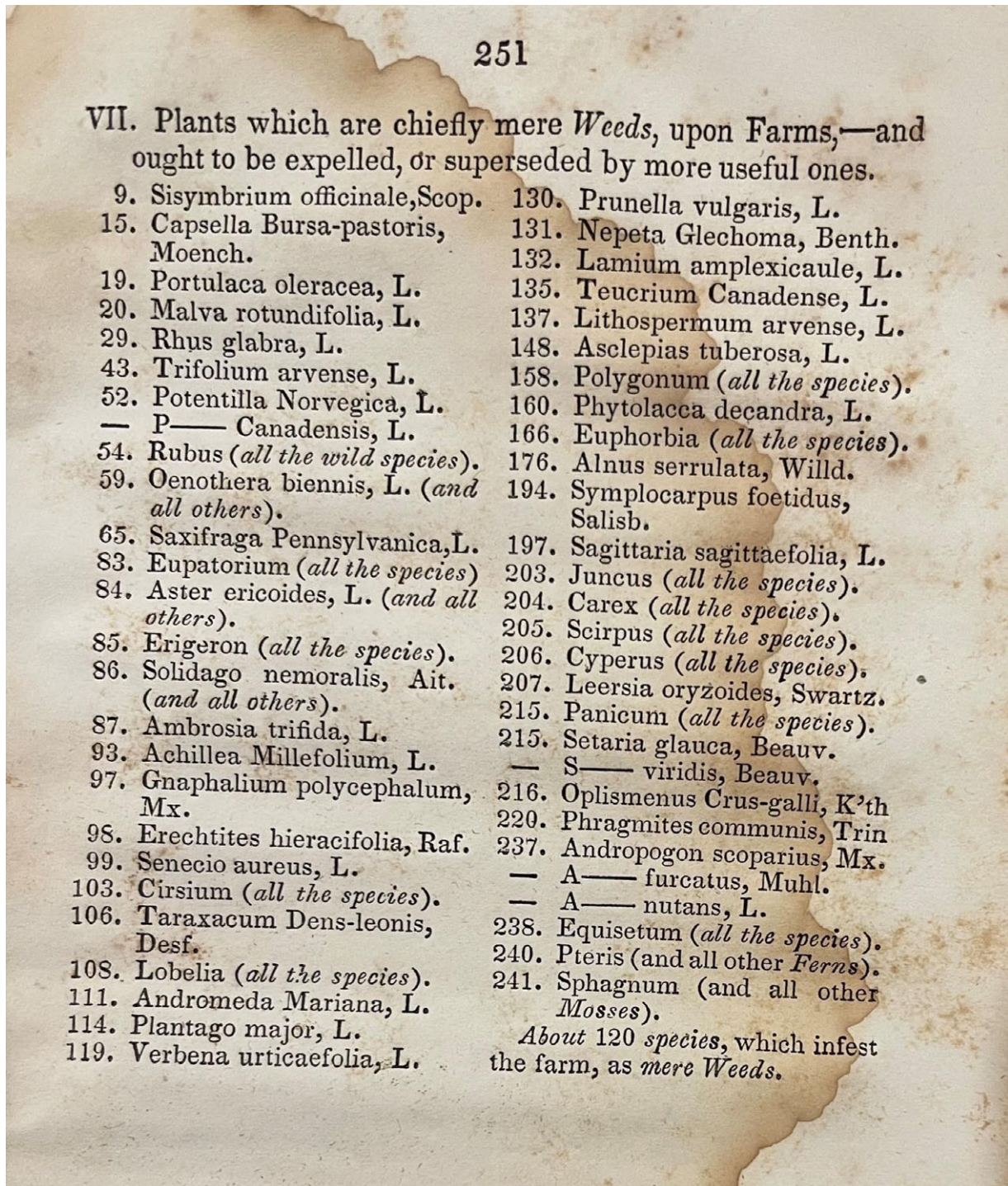
Scientific name	Proposed common name	Popular common name(s)	Current scientific name	Current common name
Darlington (1847)			(USDA NRCS 2023) <sup>a</sup>	
<i>Lychnis githago</i> Lam.		Cockle, corn cockle	<i>Agrostemma githago</i> L. (WFO 2023c)	Common corn cockle
<i>Daucus carota</i> L.	Carot daucus	Carrot, wild carrot	<i>Daucus carota</i> L.	Queen Anne's lace
<i>Xanthium spinosum</i> L.	Spinose xanthium	Thorny clot-bur	<i>Xanthium spinosum</i> L.	Spiny cocklebur
<i>Leucanthemum vulgare</i> Lam.	Common leucanthemum	Daisy, oxeye daisy, white weed	<i>Leucanthemum vulgare</i> Lam.	Oxeye daisy
<i>Cirsium arvense</i> Scop.	Field cirsium	Canada thistle, cursed thistle	<i>Cirsium arvense</i> (L.) Scop.	Canada thistle
<i>Linaria vulgaris</i> Mill.	Common linaria	Toad-flax, ranstead-weed, butter and eggs	<i>Linaria vulgaris</i> Mill.	Butter and eggs
<i>Echium vulgare</i> L.	Common echium	Blue-weed, viper's bugloss, blue devils	<i>Echium vulgare</i> L.	Common viper's bugloss
<i>Convolvulus arvensis</i> L.	Field convolvulus	Bind-weed	<i>Convolvulus arvensis</i> L.	Field bindweed
<i>Solanum carolinense</i> L.	Carolinian solanum	Horse nettle	<i>Solanum carolinense</i> L.	Carolina horsenettle
<i>Amaranthus spinosus</i> L.	Thorny amaranthus		<i>Amaranthus spinosus</i> L.	Spiny amaranth
<i>Ornithogalum umbellatum</i> L.	Umbellate ornithogalum	Ten o'clock	<i>Ornithogalum umbellatum</i> L.	Star of Bethlehem
<i>Cyperus repens</i> Ell.	Creeping cyperus	"Nut-grass" of Florida	<i>Cyperus esculentus</i> L. (WFO 2023h)	Yellow nutsedge
<i>Cyperus hydra</i> Mx.	Hydra cyperus	"Nut-grass" of South Carolina, "coco-grass"	<i>Cyperus rotundus</i> L. (WFO 2023i)	Purple nutsedge
<i>Cenchrus tribuloides</i> L.	Tribulus-like cenchrus	Bur-grass, hedge-hog grass	<i>Cenchrus tribuloides</i> L.	Sanddune sandbur
<i>Triticum repens</i> L.	Creeping triticum	Couch-grass, quitch-grass	<i>Elymus repens</i> (L.) Gould	Quackgrass

<sup>a</sup>Unless otherwise stated.

suggestions were included in the second edition. Whether this section was written by William Darlington or George Thurber is not stated. Many of these concepts are basic weed management principles, but this book may be the first to put these in print. In this section titled "Weeds" is provided the best definition for a weed is "the old one", "a plant out of place" (Darlington and

Thurber 1859). The authors also stated that the weeds most problematic in American agriculture were those that either migrated from the Old World or warmer parts of the United States (Darlington and Thurber 1859). The authors introduce the text by asserting that farmers primarily want two questions about weeds answered: how weeds get on the farm and how to get them





**Figure 5.** Image of Darlington's (1847) List VII Plants that are chiefly mere *Weeds*, from *Agricultural Botany: An Enumeration and Description of Useful Plants and Weeds, Which Merit the Notice, or Require the Attention, of American Agriculturalists*.

off the farm (Darlington and Thurber 1859). To help address these questions, the authors offered several recommendations. For the first weed management recommendation, these physicians drew a parallel to a healthy human body fighting disease: weeds cannot be avoided by good farming methods, but good farmers remove weeds when they appear on the farm. The authors present the concept that soil not occupied with desirable plants provides open space for weeds to emerge; therefore, make every effort to maximize areas

occupied with desirable plants and use production practices that enable desirable plants to compete with weeds (Darlington and Thurber 1859). The authors declare that some weeds emerge because crop seed or manure is contaminated with weed seed, whereas other weeds produce seed equipped with natural dispersal mechanisms that facilitate movement by wind or animals (Darlington and Thurber 1859). They affirm that weed seeds remain viable when buried in soil at depths unfavorable for



**Table 3.** Darlington's (1847) list of "mere" weeds from Agricultural Botany: An Enumeration and Description of Useful Plants and Weeds, Which Merit the Notice, or Require the Attention, of American Agriculturalists with proposed and popular common names of the period and current nomenclature and common names. Blank cells indicate no name provided.

Scientific name	Proposed common name	Popular common name(s)	Current scientific name	Current common name
Darlington (1847)			(USDA NRCS 2023) <sup>a</sup>	
<i>Sisymbrium officinale</i> Scop.	Officinal sisymbrium	Hedge mustard	<i>Sisymbrium officinale</i> (L.) Scop.	Hedgemustard
<i>Capsella bursa-pastoris</i> Moench.	Shepherd's purse capsella	Shepherd's purse	<i>Capsella bursa-pastoris</i> (L.) Medik.	Shepherd's purse
<i>Portulaca oleracea</i> L.	Pot-herb portulaca	Purslane	<i>Portulaca oleracea</i> L.	Little hogweed
<i>Malva rotundifolia</i> L.	Round-leaved malva	Running mallows, low mallows	<i>Malva neglecta</i> Wallr. <i>Malva pusilla</i> Sm.	Common mallow Low mallow
<i>Rhus glabra</i> L.	Glabrous rhus	Common, or smooth sumac	<i>Rhus × borealis</i> Greene [ <i>glabra</i> × <i>typhina</i> ] <i>Rhus glabra</i> L.	Hybrid sumac Smooth sumac
<i>Trifolium arvense</i> L.	Field trifolium	Stone clover, Welsh clover, rabbit-foot	<i>Trifolium arvense</i> L.	Rabbitfoot clover
<i>Potentilla norvegica</i> L.	Norwegian potentilla		<i>Potentilla norvegica</i> L.	Norwegian cinquefoil
<i>Potentilla canadensis</i> L.	Canadian potentilla	Cinquefoil, five-finger	<i>Potentilla canadensis</i> L.	Dwarf cinquefoil
<i>Rubus</i> (all the species)				
<i>Rubus odoratus</i> L.	Odorous rubus	Rose-flowering raspberry	<i>Rubus odoratus</i> L.	Purpleflowering raspberry
<i>Rubus occidentalis</i> L.	Western rubus	Wild or black raspberry, thimble-berry	<i>Rubus occidentalis</i> L.	Black raspberry
<i>Oenothera biennis</i> L. (and all others)	Biennial oenothera	Evening primrose, night willow-herb	<i>Oenothera biennis</i> L.	Common evening primrose
<i>Saxifraga pennsylvanica</i> L.	Pennsylvania saxifrage	Tall saxifrage	<i>Saxifraga pennsylvanica</i> L.	Eastern swamp saxifrage
<i>Eupatorium</i> (all the species)				
<i>Eupatorium perfoliatum</i> L.	Perfoliate eupatorium	Thorough-stem, bone-set, Indian sage	<i>Eupatorium perfoliatum</i> L.	Common boneset
<i>Aster ericoides</i> L. (and all others)	Erica, or heath-like aster		<i>Symphotrichum ericoides</i> (L.) G.L. Nesom var. <i>ericoides</i>	White heath aster
<i>Erigeron</i> (all the species)				
<i>Erigeron canadense</i> L.	Canadian erigeron	Horse-weed, butter-weed	<i>Erigeron canadensis</i> L. (WFO 2023j)	Canadian horseweed
<i>Erigeron annuum</i> Pers.	Annual erigeron	Flea-bane, daisy	<i>Erigeron annuus</i> (L.) Pers.	Eastern daisy fleabane
<i>Erigeron strigosus</i> Muhl.	Strigose erigeron	Flea-bane, daisy	<i>Erigeron strigosus</i> Muhl. ex Willd.	Prairie fleabane
<i>Solidago nemoralis</i> Ait. (and all others)	Wood or grove solidago	Golden rod	<i>Solidago nemoralis</i> Aiton	Gray goldenrod
<i>Ambrosia trifida</i> L.	Trifid ambrosia		<i>Ambrosia trifida</i> L.	Great ragweed
<i>Achillea millefolium</i> L.	Thousand-leaf achillea	Yarrow, milfoil	<i>Achillea millefolium</i> L.	Common yarrow
<i>Gnaphalium polycephalum</i> Mx.	Many-headed gnaphalium	Life-everlasting	<i>Gnaphalium</i> L.	Cudweed
<i>Erechtites hieracifolia</i> Raf.	Hieracium-leaved erechtites	Fire-weed	<i>Erechtites hieracifolius</i> (L.) Raf. ex DC.	American burnweed
<i>Senecio aureus</i> L.	Golden senecio	Groundsel, squaw-weed	<i>Packera aurea</i> (L.) Á. Löve & D. Löve	Golden ragwort
<i>Cirsium</i> (all the species)				
<i>Taraxacum dens-leonis</i> Desf.	Lion-tooth taraxacum	Dandelion	<i>Taraxacum campyloides</i> <sup>b</sup> G.E.Haglund (WFO 2023k)	Common dandelion
<i>Lobelia</i> (all the species)				
<i>Lobelia inflata</i> L.	Inflated lobelia	Eye-bright, Indian tobacco	<i>Lobelia inflata</i> L.	Indian-tobacco
<i>Andromeda mariana</i> L.	Maryland andromeda	Stagger-bush	<i>Pieris mariana</i> <sup>c</sup> (DC.) Benth. & Hook.f. (WFO 2023l)	Piedmont staggerbush
<i>Plantago major</i> L.	Greater plantago	Common plantain, way-bread	<i>Plantago major</i> L.	Common plantain
<i>Verbena urticifolia</i> L.	Nettle-leaved verbena	Common vervain	<i>Verbena urticifolia</i> L.	White vervain
<i>Prunella vulgaris</i> L.	Common prunella	Heal-all, self-heal	<i>Prunella vulgaris</i> L.	Common selfheal
<i>Nepeta glechoma</i> Benth.		Ground-ivy, ale-hoof, gill	<i>Glechoma hederacea</i> L.	Ground ivy
<i>Lamium amplexicaule</i> L.	Stem-clasping lamium	Dead-nettle, hen-bit	<i>Lamium amplexicaule</i> L.	Henbit deadnettle
<i>Teucrium canadense</i> L.	Canadian teucrium	Wood sage, germander	<i>Teucrium canadense</i> L.	Canada germander
<i>Lithospermum arvense</i> L.	Field lithospermum	Stone-weed, gromwell	<i>Buglossoides arvensis</i> (L.) I.M. Johnst.	Corn gromwell
<i>Asclepias tuberosa</i> L.	Tuberous asclepias	Butterfly-weed, pleurisy-root	<i>Asclepias tuberosa</i> L.	Butterfly milkweed
<i>Polygonum</i> (all the species)				
<i>Polygonum hydropiper</i> L.	Water-pepper polygonum	Water-pepper	<i>Polygonum hydropiper</i> L.	Marshpepper knotweed
<i>Polygonum persicaria</i> L.	Peach-leaved polygonum	Lady's-thumb, spotted knotweed	<i>Polygonum persicaria</i> L.	Spotted ladythumb
<i>Polygonum pennsylvanicum</i> L.	Pennsylvania polygonum		<i>Polygonum pennsylvanicum</i> L.	Pennsylvania smartweed

(Continued)

**Table 3.** (Continued)

Scientific name	Proposed common name	Popular common name(s)	Current scientific name	Current common name
<i>Phytolacca decandra</i> L.	Decandrous phytolacca	Poke, poke-weed, pigeon-berry	<i>Phytolacca americana</i> L. var. <i>Americana</i>	American pokeweed
<i>Euphorbia</i> (all the species) <i>Euphorbia hypericifolia</i> L.	Hypericum-leaved euphorbia	Eye-bright, spurge	<i>Chamaesyce hypericifolia</i> (L.) Millsp.	Graceful sandmat
<i>Alnus serrulata</i> Willd. <i>Symplocarpus foetidus</i> Salisb.	Serrulate alnus Fetid symplocarpus	Common alder, candle alder Swamp cabbage, skunk-weed	<i>Alnus serrulata</i> (Aiton) Willd. <i>Symplocarpus foetidus</i> (L.) Salisb. ex W.P.C. Barton	Hazel alder Skunk cabbage
<i>Sagittaria sagittifolia</i> L. <i>Juncus</i> (all the species) <i>Carex</i> (all the species) <i>Carex multiflora</i> Muhl. <i>Carex tentaculate</i> Muhl.	Arrow-leaved sagittaria	Arrow-head	<i>Sagittaria sagittifolia</i> L. [excluded]	Arrowhead
<i>Scirpus</i> (all the species) <i>Scirpus triqueter</i> L. <i>Cyperus</i> (all the species) <i>Cyperus strigosus</i> L.	Many-flowered carex Tentaculate or many-beaked carex	Sedge, sedge-grass	<i>Carex vulpinoidea</i> Michx. (WFO 2023m) <i>Carex baileyi</i> Britton (WFO 2023n)	Fox sedge Bailey's sedge
<i>Scirpus</i> (all the species) <i>Scirpus triqueter</i> L. <i>Cyperus</i> (all the species) <i>Cyperus strigosus</i> L.	Three-cornered scirpus	Chair-maker's rush	<i>Schoenoplectus triqueter</i> (L.) Palla	Streambank bulrush
<i>Leersia oryzoides</i> Swartz. <i>Panicum</i> (all the species) <i>Panicum capillare</i> L.	Srigose cyperus	Bristle-spiked galingale	<i>Cyperus strigosus</i> L.	Strawcolored flatsedge Rice cutgrass
<i>Leersia oryzoides</i> Swartz. <i>Panicum</i> (all the species) <i>Panicum capillare</i> L.	Oryza or rice-like leersia	Cut-grass or wild rice	<i>Leersia oryzoides</i> (L.) Sw.	Rice cutgrass
<i>Setaria glauca</i> Beauv.	Capillary or hair-like panicum	Fox-tail grass	<i>Panicum capillare</i> L.	Witchgrass
<i>Setaria viridis</i> Beauv. <i>Oplismenus crus-galli</i> Kunth	Glaucous setaria	Green foxtail, bottle-grass	<i>Setaria pumila</i> (Poir.) Roem. & Schult. ssp. <i>Pumila</i> <i>Setaria viridis</i> (L.) P. Beauv. <i>Echinochloa crus-galli</i> (L.) P. Beauv. (WFO 2023o)	Yellow foxtail Green bristlegrass Barnyardgrass
<i>Phragmites communis</i> Trin. <i>Andropogon scoparius</i> Mx.	Green setaria Cockspur oplismenus	Reed-grass Indian grass, purple wood-grass	<i>Phragmites australis</i> (Cav.) Trin. ex Steud. <i>Schizachyrium littorale</i> (Nash) E.P. Bicknell	Common reed Shore little bluestem
<i>Andropogon furcatus</i> Muhl. <i>Andropogon nutans</i> L.	Forked andropogon Nodding andropogon	Finger-spiked wood grass Wood-grass, oat-like Indian grass	<i>Andropogon gerardii</i> Vitman <i>Sorghastrum nutans</i> (L.) Nash	Big bluestem Indiangrass
<i>Equisetum</i> (all the species) <i>Equisetum hyemale</i> L.	Winter equisetum	Scouring rush	<i>Equisetum hyemale</i> L.	Scouringrush horsetail
<i>Pteris</i> (and all other ferns) <i>Pteris aquilina</i> L.	Aquiline or eagle pteris	Brake, bracken	<i>Pteridium aquilinum</i> (L.) Kuhn (WFO 2023p)	Western brackenfern
<i>Sphagnum</i> (and all other mosses) <i>Sphagnum palustre</i> L.	Marsh sphagnum	Bog-moss	<i>Sphagnum palustre</i> L.	Prairie sphagnum

<sup>a</sup>Unless otherwise stated.

<sup>b</sup>Synonym of *Taraxacum officinale* F.H. Wigg. ssp. *officinale* on USDA NRCS 2023.

<sup>c</sup>Synonym of *Lyonia mariana* (L.) D. Don on USDA NRCS 2023.

germination; therefore, weeds should be controlled before seeds form (Darlington and Thurber 1859). The concept published by Jethro Tull (1733) more than a century before Thurber revised Darlington's book, that weeds that spread vegetatively by roots and underground stems are more difficult to control than annual weeds, is stated for agriculturalists in the United States. The authors suggested that the best strategy to conquer perennial weeds is to control them before they develop underground stems capable of producing new shoots (Darlington and Thurber 1859). In addition, they suggested that every piece of perennial root or stem fragmented by tillage be removed from fields to reduce weed spreading caused by scattering plant parts. They went on to suggest that the only effective method to control perennial weeds is to completely exhaust reserves stored in vegetative fragments (Darlington and Thurber 1859). The final suggestions offered by the authors for weed management is preventing plants from breathing by keeping the leaves removed and preventing flowering, thereby eliminating seed production (Darlington and Thurber 1859).

## Weeds of American Agriculture

A posthumous article by Dr. William Darlington (1866) on the most common and troublesome weeds in American agriculture was published in *Report of the Commissioner of Agriculture for the Year 1865*. This article, titled "Weeds of American Agriculture," asserted that the goal was for every young, aspiring, and intelligent farmer to recognize these 100 weeds and know their weedy characteristics (Darlington 1866). Whereas most of the weeds and weedy characteristics listed in this article had appeared in the two earlier publications, a few new weeds were listed: wild radish (*Raphanus raphanistrum* L.), oneseed bur cucumber (*Sicyos angulatos* L.; possible typographical error in Report, should be *Sicyos angulatus* L.), bishop's goutweed (*Ægopodium podagravia* L.; potential typographical error in Report, should be *Aegopodium podagraria* L.), European stickweed [*Echinospermum lappula* Lehm. = *Lappula squarrosa* (Retz.) Dumort.], and Canadian waterweed [*Anacharsis canadensis* Planchon, Udora, Nutt) = *Elodea canadensis* Michx.] (WFO 2023a).





**Figure 6.** Drawn image of giant ragweed (*Ambrosia trifida* L.), which the authors called great ragweed, from *American Weeds and Useful Plants: Being a Second and Illustrated Edition of Agricultural Botany: An Enumeration and Description of Useful Plants and Weeds, Which Merit the Notice, or Require the Attention, of American Agriculturalists* (Darlington and Thurber 1859).

Selective weed management options were limited at the time all three of these documents were originally published. In addition to a list of 100 weeds in the article *Weeds of American Agriculture* (Darlington 1866), general weed management suggestions were made as well as specific control suggestions for a few weeds, such as the importance to prevent seed production for weeds such as blindeyes (*Papaver dubium* L.), which had the common name field poppy in the article, common mullein (*Verbascum thapsus* L.), wild carrot (*Daucus carota* L.), and spiny cocklebur (*Xanthium spinosum*

L.), which had the common name thorny clot-bur. Various forms of mechanical control were suggested for some weeds: close grazing by sheep in the spring to control St. Anthony's turnip *Ranunculus bulbosus* L.); annual plowing to control false flax [*Camelina sativa* (L.) Crantz]; production of crops conducive to cultivation, such as hand hoeing, to control Canadian horseweed [*Erigeron canadense* (L.) = *Conyza canadensis* (L.) Cronquist.] (WFO 2023b), oxeye daisy (*Leucanthemum vulgare* Lam.), and Canada thistle. Severing the perennial rhizome with a chisel-shaped spud below the soil

surface was recommended to control common corncockle (Darlington called cockle or rose campion) (*Agrostemma githago* L.), Canada thistle, common thistle [*Cirsium lanceolatum* (Savi) Ten.], and New York ironweed [*Vernonia noveboracensis* (L.) Michx.], which Dr. Darlington called wild iron weed. Addition of lime to soil was suggested to control bitter dock (*Rumex obtusifolius* L.), which was called broad-leaved dock. A drastic control recommendation compared to hoeing or cultivation was given for arrowleaf tearthumb (*Polygonum sagittatum* L.): ditching to drain the site, meaning change the soil hydrology where populations existed, perhaps the most laborious recommendation of all that were made (Darlington 1866). Control of upright sedge (*Carex stricta* Lam.), called tussock sedge in the article, included digging plants, incinerating dried plants, then applying the ash for fertilizer. Darlington's (1866) recommendation for purple nutsedge (*Cyperus rotundus* L. = *Cyperus hydra* Mx), called coco in the article, was referenced to and quoted directly from Elliott's (1821), *A Sketch of the Botany of South Carolina and Georgia*: "to plough or hoe the spots in which it grows every day through the whole season." Fortunately, other management options now exist.

Electronic copies (pdf) of all three of these documents and others can be downloaded from the Weed Science Society of America website at Antique literature | Weed Science Society of America (wssa.net). *Agricultural Botany: An Enumeration and Description of Useful Plants and Weeds, Which Merit the Notice or Require the Attention, of American Agriculturalists* (Darlington, 1847) is at [https://wssa.net/wp-content/uploads/antique/Darlington\\_1847\\_Useful%20plants%20and%20weeds.pdf](https://wssa.net/wp-content/uploads/antique/Darlington_1847_Useful%20plants%20and%20weeds.pdf); *American Weeds and Useful Plants: Being a Second and Illustrated Edition of Agricultural Botany: An Enumeration and Description of Useful Plants and Weeds, Which Merit the Notice or Require the Attention, of American Agriculturalists* (Darlington and Thurber 1859) is at <https://wssa.net/wp-content/uploads/antique/americanweedsandusefulplants1859.pdf>; *Weeds of American Agriculture* (Darlington 1866) pages 509-519 in *Report of the Commissioner of Agriculture for the Year 1865* is at [https://wssa.net/wp-content/uploads/antique/Report\\_of\\_the\\_Commissioner\\_of\\_Agriculture\\_for\\_the\\_Year\\_1865.pdf](https://wssa.net/wp-content/uploads/antique/Report_of_the_Commissioner_of_Agriculture_for_the_Year_1865.pdf).

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