Report of
The Hay Fever Research Committee

OF THE

State Historical and Natural History Society of Colorado

By

JAMES J. WARING, M.D.

Published by the State Historical and Natural History Society of Colorado, Denver, Colorado, 1926

Among the manifold creatures of God that have all in all ages diversely entertained many excellent wits, and drawne them to the contemplation of the divine wisdom, none have provoked men's studies more, or satisfied their desires so much as Plants have done. JOHN GERARD, 1597

Foreword

A long contemplated survey of the Hay Fever Plants of Denver and vicinity had been fairly launched as a personal enterprise when I was approached by the Colorado State Historical and Natural History Society with the suggestion that this work should be done under the auspices of the Society. Accordingly an arrangement was perfected by which, although the whole responsibility for the direction of the work, for its thoroughness and accuracy rested upon myself and my office force, the Society rendered such assistance as it could. The late Professor Ellsworth Bethel and Miss Hazel Schmoll were already thoroughly absorbed by other important matters so that the chief burden of making the routine observations devolved upon Miss Maxy Pope.

It is hoped that this Survey will not only supply the physicians of Colorado with reliable data of considerable importance for the diagnosis of a common malady but will also stimulate other studies of a similar nature along different lines. J. J. Waring.

Fig. 1. Thistle (Circium sp.) rather common throughout this region, insect pollinated, therefore not a cause of Hay Fever.

Report of the Hay Fever Research Committee of the State Historical and Natural History Society of Colorado

I. PRELIMINARY REPORT

June 1, 1924-December 1, 1925.

I beg to submit herewith the report of the Hay Fever Committee of the Natural History Department of the State Historical and Natural History Society of Colorado appointed in the spring of 1924. The personnel of this committee was:

Dr. James J. Waring, *Chairman*
Mrs. James J. Waring
Professor Ellsworth Bethel
Dr. L. M. Van Stone
Miss Hazel Schmoll
Miss Maxy Pope

The field work was under the entire charge of Miss Maxy Pope and great credit is due her for its thoroughness and accuracy. We are indebted to the late Professor Ellsworth Bethel, Miss Hazel Schmoll, and Miss Glenn Stiles for much kindly assistance.

The work was begun in the spring of 1924 and for this season our efforts were confined entirely to a survey of the City and County of Denver. For the season of 1925 we were able to extend the limits of the survey to include a large portion of Central Colorado. The details of these surveys are as follows:

Surveys

Complete Survey made of the Hay Fever weeds of the City and County of Denver for 1924-1925.

Eleven vacant lots were selected in various parts of the city. These were studied once a week for the two seasons, 1924 and 1925. They are:

Lot No. 1. Newton and West 36th Avenue
Lot No. 2. Franklin and East 13th Avenue
Lot No. 3. Colorado Boulevard and East 8th Avenue
Lot No. 4. High and East 18th Avenue
Lot No. 5. Colorado Boulevard and East 28-29th Avenue
Lot No. 6. Arizona and South University

Fig. 2. Lamb's Quarters (Chenopodium album) upper portion of a plant to show character of the inflorescence.

Lot No. 7. Mississippi and South Downing
Lot No. 8. Vine and East 11th Avenue
Lot No. 9. Josephine and East 8th Avenue
Lot No. 10. Northeast portion of Mt. Calvary Cemetery
Lot No. 11. Lot between Sloan's Lake and Sheridan Boulevard

Each plant was recorded and listed as to:
Dates of pollination
Occurrence and abundance
Comparison of the pollination periods and abundance of pollination for the seasons 1924-1925
Insect or wind pollination.

In 1925 Hay Fever surveys were made of the following places which are listed alphabetically with the approximate number of troublesome weeds:

Allenspark	7	Species	Granby	3	Species
Bailey	9	"	Idaho Springs	10	"
Bendemeer	5	"	Lafayette	15	"
Berthoud	11	"	Littleton	31	"
Black Hawk	5	"	Longmont	17	"
Boulder	17	"	Loveland	18	"
Brighton	19	"	Lyons	17	"
Canon City	19	"	Morrison	16	"
Central City	7	"	Nederland	8	"
Colorado Springs	23	"	Palmer Lake	15	"
Conifer	6	"	Peaceful Valley	8	"
Deckers	4	"	Penrose	21	"
Denver	31	"	Perry Park	13	"
Estes Park	17	"	Pine	7	"
Evergreen	13	"	Pueblo	26	"
Florence	24	"	Shawnee	11	"
Fort Lupton	18	"	Silver Plume	7	"
Georgetown	8	"	Tabernash	3	"
Golden	17	"	Troutdale	8	"
Grand Lake	3	"	Ward	7	"

Plants

Total number of plants collected for the Herbarium.....800

Total number of plants mounted, stripped, labeled and filed......600

Total number of duplicate specimens filed.....200

Hay Fever Herbarium prepared for the Natural History Department of the State Historical and Natural History Society of Colorado.

Hay Fever Herbarium prepared for Dr. James J. Waring for use in office and exhibit purposes.

Hay Fever Herbarium is being prepared for the Colorado General Hospital for use in class room and clinical study.

Pollens

Pollens collected in bulk for use in diagnosis and treatment of Hay Fever:

Acnida tamariscina—Western Water-Hemp	20	Grams
Agropyron smithii—Colorado Blue Stem	10	"
Amaranthus retroflexus—Pigweed	4	"
Ambrosia elatior—Short Ragweed	10	"
Ambrosia psilostachya—Western Ragweed	20	"
Ambrosia trifida—Giant Ragweed	50	"
Atriplex canescens—Bushy Atriplex	20	"
Bromus inermis—Cheat, Brome Grass	5	"
Chenopodium album—Lamb's Quarters	20	"
Eurotia lanata—Winter Fat	5	"
Franseria acanthicarpa—False Ragweed	15	"
Franseria discolor—False Ragweed	4	"
Iva xanthifolia—Horseweed	40	"
Kochia scoparia—Summer Cypress	50	"
Pinus murrayana—Lodgepole Pine	8	"
Pinus ponderosa—Yellow Pine	10	"
Populus sargentii—Western Cottonwood	8	"
Salsola pestifer—Russian Thistle	20	"
Triglochin maritima—Arrow Grass	5	"
Typha angustifolia—Cat-tail	20	"
Typha latifolia—Cat-tail	10	"

Hay Fever Pollens were given to the Colorado General Hospital for use in diagnostic tests and treatment of Hay Fever.

One hundred pollen slides were made and added to the pollen-slide collection.

Hay Fever Plants

The most important Hay Fever plants of this section are included in the following families or groups:

I. Poaceae—Grass Family. Examples, Blue Grass (Poa pratensis), Colorado Blue Stem (Agropyron smithii) etc.

II. Salicaceae—Willow Family. Examples, Western Cottonwood (Populus sargentii) etc.

III. Chenopodiaceae—Chenopod Family. Examples, Lamb's Quarters (Chenopodium album), Summer Cypress (Kochia scoparia), Russian Thistle (Salsola pestifer) etc.

IV. Amaranthaceae—Amaranth Family. Examples, Pigweed (Amaranthus retroflexus), Western Water-Hemp (Acnida tamariscina) etc.

V. Ambrosiaceae—Ragweed Family. Examples, Giant Ragweed (Ambrosia trifida), Horseweed (Iva xanthifolia) etc.

VI. Compositae—Sage Family. Examples, Mountain Sage (Artemisia frigida), Sage Brush (Artemisia tridentata) etc.

Exhibits

Hay Fever Exhibit was prepared for display at the Annual meeting of the Colorado State Medical Association in 1924 at Denver, Colorado.

Hay Fever Exhibit was prepared for display at the meeting of the Garden Club August 10, 1925, addressed by Dr. James J. Waring.

Hay Fever Exhibit was prepared for display at the Annual meeting of the Colorado State Medical Association at Colorado Springs, Colorado, in 1925.

Photographs

One hundred photographs were taken of the Hay Fever plants by Paul Franklin Shope of the University of Colorado in the summer of 1925.

Twenty-four photomicrographs were taken of the pollen grains of the Hay Fever plants by Dr. L. M. Van Stone.

Plants Sent to Other Museums and Individuals

Plants sent to Mr. O. C. Durham, Kansas City, Missouri:

Kochia scoparia	1	Artemisia gnaphaloides	1
Artemisia frigida	1	Acnida tamariscina	1

Plants sent to the Wagner Free Institute of Science, Philadelphia:

Kochia scoparia	1	Salsola pestifer	1

Articles for Publication

Published:

A Hay Fever Plant Survey of the City and County of Denver by James J. Waring.

To be published:

A Hay Fever Survey of Estes Park, Colorado.

A Key to the Hay Fever Pollens.

A Hay Fever Survey of Central Colorado.

Comparison of the Hay Fever Survey of the City and County of Denver in 1924 and 1925.

Respectfully submitted,

James J. Waring,
Chairman Hay Fever Committee.

December 9, 1925.

II. FINAL REPORT

Foreword

The preceding preliminary report submitted by the Hay Fever Committee of the Natural History Department of the State Historical and Natural History Society of Colorado summarizes the work thus far accomplished, the details of which are given in the following pages.

Introduction

By certain easily recognizable features, the plants which cause Hay Fever may be distinguished from those which do not. Briefly, they are very numerous, widely distributed, often ubiquitous; the flowers are small and inconspicuous, devoid of nectar, without fragrance and in many cases so reduced anatomically that only the stamens and pistils remain; the pollen grains are very abundant, small, light, and dry and therefore easily carried by the wind and capable of floating in the air many hours. In a word, the Hay Fever plants are anemophilous.

On the other hand, the plants which do not cause Hay Fever are less numerous, have conspicuous brightly colored well-developed flowers, often fragrant and producing a large amount of nectar. Their pollen grains are few, large and heavy, frequently sticky, not carried far by the wind and capable of floating in the air only a short period of time. In a word, they are entomophilous, adapted for fertilization by insects attracted by the nectar, or the bright color and fragrance of the flowers.

The pollens of the Hay Fever group are further characterized by an ability to produce in sensitive persons certain disagreeable symptoms upon contact with the conjunctiva or the mucous membrane of the nose, or upon being rubbed into a scratch on the skin.

Since Hay Fever is caused by pollen floating in the air coming in contact with the eyes or some part of the respiratory tract of a sensitive person, only wind-borne pollens commonly cause the disease. The pollens of goldenrod, rose, sunflower, sweet peas and dandelion are insect-borne and not wind-borne, practically never found in the air and therefore, although popularly considered causes of Hay Fever are with the exception of the last mentioned, dandelion, of little or no importance. Dandelions sometimes cause Hay Fever in children who handle the blossoms which often thoroughly cover their natural play grounds, the lawns and vacant lots.

Purpose of Survey

Not all of the wind pollinated plants are considered offenders and the aim of this study, in progress for two seasons (1924-1925), has been to determine the most important plants in each locality and to chart them for further reference. Ultimately it is hoped to make a complete botanical survy of Colorado which will include every possible Hay Fever plant growing in the state. The plants will not only be listed but all data concerning their abundance, dates of pollination, amount of pollen produced, etc., will be available for reference. A work of this kind progresses very slowly and to date a survey of Central Colorado only has been completed. This area extends roughly from Loveland on the north to Pueblo on the south, west as far as Granby in the north and Howard in the south, and east to Masters in the north and Boone in the south. (See map of Central Colorado.)

Method of Survey

The first season's work consisted in making a complete botanical survey of the City and County of Denver. (See map of Denver.) In the second season a check was made of the first season's work, a comparison made and conclusions drawn which are incorporated in this paper. Later the limits of the survey were extended to include a larger portion of Central Colorado, the bounds of which have been given (See map of Central Colorado).

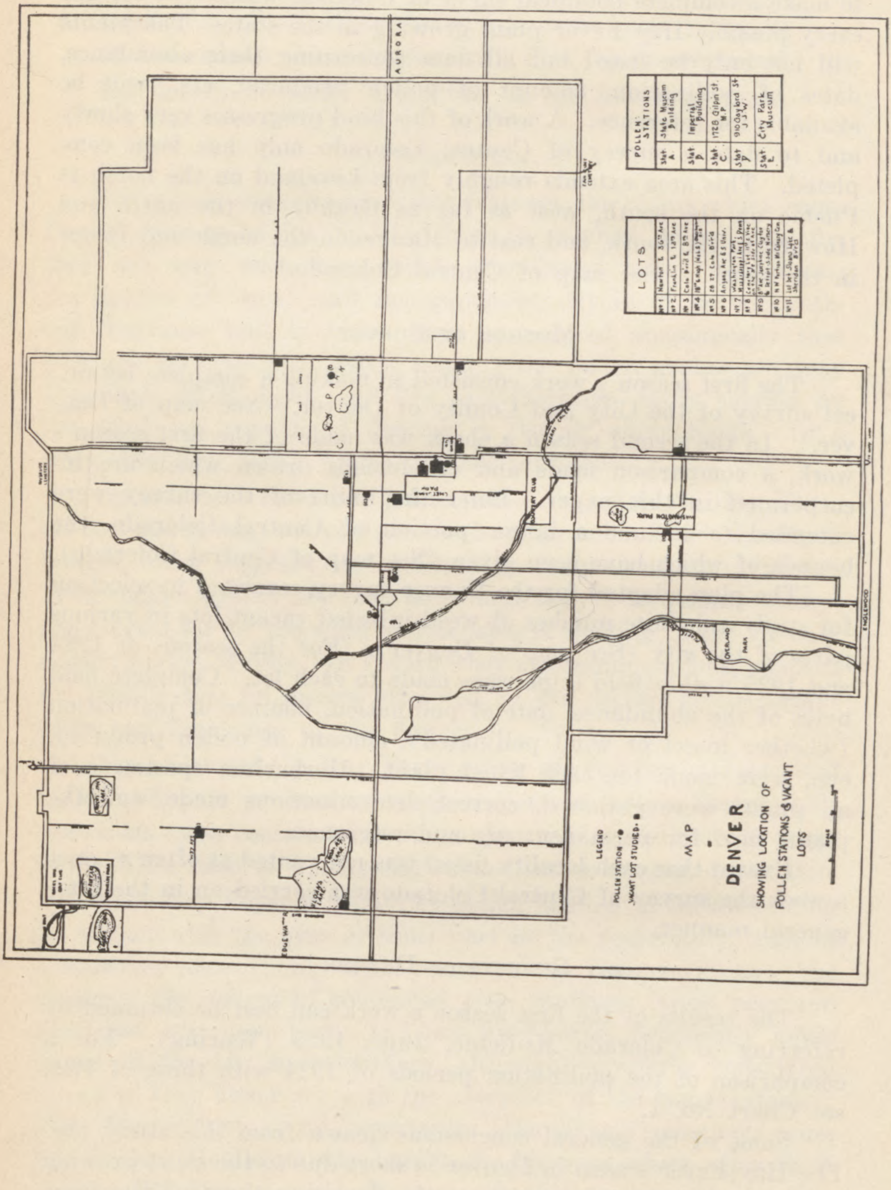
The plan adopted for the Denver survey consisted in selecting for study a definite number of weed infested vacant lots in various parts of the city (See map of Denver). For the seasons of 1924 and 1925 weekly field trips were made to each lot. Complete field notes of the abundance, date of pollination, manner of pollination (whether insect or wind pollinated), amount of pollen produced, etc., were made for each listed plant. Herbarium specimens of all plants were gathered, correct determinations made, and the plants filed for permanent use and reference.

Except that each locality listed was not visited as often as once a week the survey of Central Colorado was carried on in the same general manner.

Surveys of Denver

The results of the first season's work can best be obtained by referring to Colorado Medicine, June, 1925 (Waring). For a comparison of the pollination periods of 1924 with those of 1925 see Chart No. 1.

Some of the general conclusions drawn from this study are: The Hay Fever season in Denver is short due to the short growing period. Compare the lengths of the flowering times of Ragweed,


MAP
DENVER
SHOWING LOCATION OF
POLLEN STATIONS & VACANT
LOTS
LEGEND
POLLEN STATION
VACANT LOT STUDIED
POLLEN STATIONS
Stat. A. State Museum Building
Stat. B. Imperial Building
Stat. C. 1728 Gilpin St. M.P.
Stat. D. 910 Gaylord St. J.J.W.
Stat. E. City Park Museum
LOTS
No 1 Newton & 36th Ave
No 2 Franklin & 12th Ave
No 3 Colo Blvd & 8th Ave
No 5 26 & Colo Blvd
No 6 Arizona Ave & S Univ.
No 7 Washington Park
No 10 N W Portion Mt Calvary Cem
No 11 Lot bet. Sloans Lake & Sheridan Blvd
AURORA
ENGLEWOOD
CITY PARK
WASHINGTON PARK
COUNTRY CLUB
OVERLAND PARK

Lamb's Quarters and Western Water-Hemp in Kansas City and Denver (See Chart No. I). The spring Hay Fever period is exceedingly short and the spring types are neither severe nor common.

The flowering of the early spring and summer flora was in most cases earlier in 1925 than in 1924. This slowness of growth in 1924 was probably due to the cold wet spring. Table No. 1 gives the comparative data for total precipitation of 1924 and 1925 for the months from April to October.

TABLE NO. I

Month	1924	1925
April	1.60	0.40
May	2.62	0.43
June	0.46	1.48
July	0.33	0.74
August	0.02	1.68
September	1.44	0.99
Total	6.47	5.72

Due to the relatively dry spring the pollination periods of the July flora were slightly earlier in 1925 than in 1924.

Due undoubtedly to the increase in moisture during June, July, August and September the pollination periods of 1925 for the most of the plants were somewhat longer than for the same plants in 1924.

Of the 34 plants listed in the chart, 16 pollinated earlier, 13 at the same time, and 4 later.

A slight variation was noted in the abundance of the various Hay Fever plants in the two seasons. These differences are listed as follows:

Acnida tamariscina	more common	1925
Amaranthus retroflexus	more common	1925
Ambrosia elatior	less common	1925
Ambrosia psilostachya	more common	1925
Distichlis stricta	less common	1925
Iva axillaris	more common	1925
Stipa comata	less common	1925

SURVEY OF CENTRAL COLORADO

The towns or localities chosen for Surveys are listed in alphabetical order with an alphabetical list of the more important Hay Fever weeds of the region (See map of Central Colorado). The relative importance of these weeds in the clinical diagnosis of Hay Fever is indicated by means of the asterisk (*), as follows:

***** indicates that the Hay Fever plant is a very, very common cause of Hay Fever.

**** indicates that the Hay Fever plant is a very common cause of Hay Fever.

*** indicates that the Hay Fever plant is a common cause of Hay Fever.

** indicates that the Hay Fever plant is a rather common cause of Hay Fever.

* indicates that the plant is an occasional cause of Hay Fever.

The plants not marked by the "*" may give a positive Hay Fever reaction but because only a small amount of pollen is produced or because the pollen is not wind-borne, they are not usually causes of Hay Fever.

To avoid unnecessary repetition the descriptions of the pollen grains of each species listed are given in a condensed form in Chart No. II.

Allenspark

Altitude 8,400 Feet

1. *Artemisia camporum*—Sage. Composite Family. Rather common on the slopes and hills; small amount of pollen. August-September.
2. *Artemisia frigida*—Mountain Sage (***). Composite Family. Very, very common on the hills and slopes; moderate amount of pollen. July-September.
3. *Bouteloua procumbens*—Grama Grass (*). Grass Family. Very, very common as this species is the pastureland grass of the region; moderate amount of pollen. August-September.
4. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Rather common in all waste places especially along the roads and in old neglected gardens and fields; plants much dwarfed; moderate amount of pollen. July-August.
5. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Few plants in the waste places; plants somewhat dwarfed; large amount of pollen. August.
6. *Poa* (several species)—June Grasses (*). Grass family. Rather common in all available places; small amount of pollen. May-June.
7. *Rumex acetosella*—Sheep Sorrel (*). Buckwheat Family. Rather common along the roads and on the slopes where the Grama Grass has died out; moderate amount of pollen. August.

Bailey

Altitude 7,725 Feet

1. *Ambrosia psilostachya*—Western Ragweed (***). Ragweed Family. Few plants along the walks in the main street of the town, also a few along the roadways leading into Bailey; moderate amount of pollen. July-September.

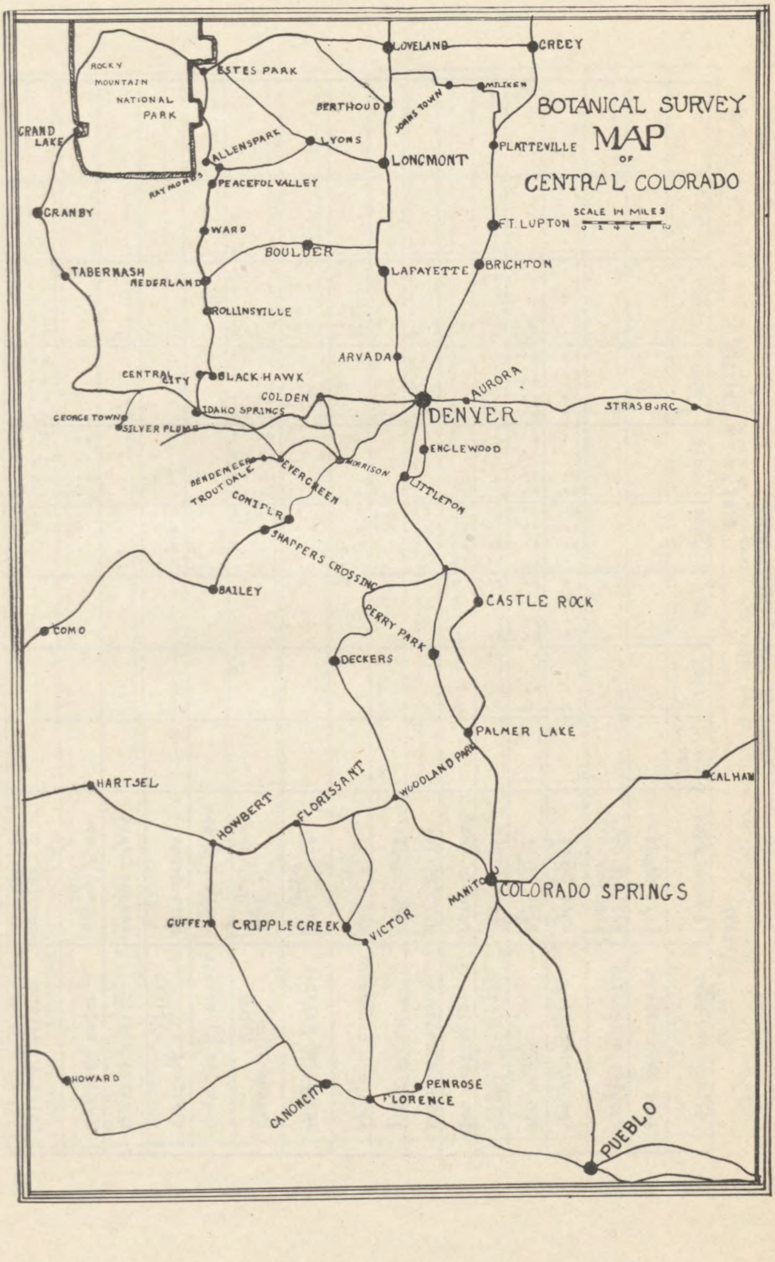

BOTANICAL SURVEY
MAP
OF
CENTRAL COLORADO
SCALE IN MILES
ROCKY MOUNTAIN NATIONAL PARK
ESTES PARK
LOVELAND
CREEY
MILLIKEN
JOHNS TOWN
BERTHOUD
GRAND LAKE
ALLENSPARK
LYONS
LONGMONT
PLATTEVILLE
RAYMONDS
PEACEFUL VALLEY
GRANBY
WARD
BOULDER
FT. LUPTON
BRIGHTON
TABERNASH
NEDERLAND
LAFAYETTE
ROLLINSVILLE
ARVADA
CENTRAL CITY
BLACK HAWK
GOLDEN
AURORA
GEORGE TOWN
IDAHO SPRINGS
DENVER
STRASBURG
SILVER PLUME
ENGLEWOOD
BENDEMEER
TROUT DALE
EVERGREEN
MORRISON
LITTLETON
CONIFER
SHAFFERS CROSSING
BAILEY
CASTLE ROCK
COMO
PERRY PARK
DECKERS
PALMER LAKE
HARTSEL
FLORISSANT
WOODLAND PARK
CALHAN
HOWBERT
MANITOU
COLORADO SPRINGS
GUFFEY
CRIPPLE CREEK
VICTOR
HOWARD
PENROSE
CANON CITY
FLORENCE
PUEBLO

CHART OF HAY-FEVER PLANTS

PLANT		TIME OF POLLINATION								
Scientific Name	Common Name	Feb.- Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	
Acer saccharinum	Soft Maple									
Populus sargentii	Western Cot- tonwood	.	+ + + . .							
Poa pratensis	June Grass	.	. . . .	. . . . .	+ + + ...	+	. . . .	. . .		
Poa annua	Blue Grass		+ + + . . .	+ + + + ...	+ + + + ...	+ + + + ...	+ + + + ...	. .		
Bromus tectorum	Brome Grass		+ .	+ + + + ... - -	+ + ... -					
Iva axillaris	Poverty Weed			. .	+ + + + . .	+				
Hordeum nodosum	Wild Barley			. .	+ + + . . .					
Stipa comata	Spear Grass			. .	+ + ... - -	+ . - -				
Atriplex canescens	Bushy Atri- plex			.	+ + . .	+				
Agropyron smithii	Colo. Blue Stem			.	+ + + ...					
Chenopodium album	Lamb's Quarters			.	+ . . . . - o o o o	+ + + + ... - - - - o o o o	+ + . - - - - o o o o	- - - - o o o o	o o o	
Dactylis glomerata	Orchard Grass			- o	+ + + . . . - - - - o o o o					
Distichlis stricta	Salt Grass				+ + + . . . - -	+ + - -				
Festuca elatior	Fescue Grass				. . . .	+	+ +			
Plantago major	Common Plan- tain				. . .	+ + + + ...				
Salsola pestifer	Russian Thistle				. . -	+ + + ... - - - -	+ + + + ... - - - -	+ + . . . - - -		

Poa compressa	Meadow Grass				.	+ + + . .	+			
Phleum pratense	Timothy				° ° ° ·–°	+ + + + ... – – – – ° °	– –			
Xanthium canadense	Cocklebur				–	+ + + + ... – – – – . °	+ . . – ° ° °			
Atriplex hastata	Fat Hen					+ + + + . . .	. .			
Atriplex hortensis	Butter-leaves					+ + + + . .	. .			
Amaranthus blitoides	Pigweed					+ + + + ...	+ + + ...			
Chaetochloa viridis	Green Fox-tail					+ + + + . . .	+ + . . .			
Amaranthus retroflexus	Beet Root Pigweed				–	+ + + . . . – – ° ° ° °	. . . .			
Ambrosia trifida	Giant Rag-weed					+ + + . . . – –	+ + + + ... – – – – ° ° ° °	. – – – – ° ° ° °	° ° ° °	
Ambrosia psilostachya	Western Rag-weed					. . .	+ + + ... ° ° °	. . ° ° °		
Kochia scoparia	Summer Cypress					+ . . . –	+ + + + ... – – – –	+ + + + ... – – – –	+ . .	
Syntherisma aestivum	Crab Grass						+ + + . . .	+ + . . .		
Ambrosia elatior	Short Ragweed					– – –	+ + . . – – – – . °	+ . . . – – – – ° ° ° °		
Iva xanthifolia	Horseweed						+ + + . . . – – – °	+ + + . . . – – – – ° ° ° °		
Acnida tamariscina	Western Water-Hemp					° °	+ + . . ° ° ° °	+ + . ° • ° °	° ° ° °	
Artemisia filifolia	Silvery Sage						+ + . .	+ + . .		
Franseria acanthicarpa	False Ragweed						+ . . – – – – –	+ + . . . – – – –	–	
Chrysothamnus graveolens	Rabbit Brush						. .	+ + + ...	+ + . . .	

CHART NO. I. Note—The plants in the above table are arranged in accordance with the dates of pollination.

Legend:

\+ equals results of Denver Survey 1924. (Waring)
. equals results of Denver Survey 1925. (Waring)
° equals results of Kansas City Survey. (Duke)
– equals results of Colorado Springs Survey. (Mullin)
Each etc. equals one week.

2. *Artemisia camporum*—Sage. Composite Family. Few plants on the slopes and hills; small amount of pollen. August-September.
3. *Artemisia frigida*—Mountain Sage (***). Composite Family. Very common on the slopes and hills; moderate amount of pollen. July-September.
4. *Artemisia rhizomata*—Sage. Composite Family. More common on the hills than Artemisia camporum, but less common than Artemisia frigida; small amount of pollen. August-September.
5. *Bouteloua procumbens*—Grama Grass (*). Grass Family. Very, very common on the slopes as a pastureland grass; moderate amount of pollen. August-September.
6. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Rather common in old reverting fields, barnyards and waste places; moderate amount of pollen. July-August.
7. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Rather common in waste places and grain fields; large amount of pollen. August.
8. *Poa* (several species)—June Grasses (*). Grass Family. Rather common along the banks of the Platte River; small amount of pollen. May-June.
9. *Salsola pestifer*—Russian Thistle (*****). Chenopod Family. Few plants in reverting fields and neglected places; moderate amount of pollen. July-September.

Bendemeer

Altitude 7,800 Feet

1. *Agropyron smithii*—Colorado Blue Stem (*). Grass Family. Rather common in small patches near the road and stream; moderate amount of pollen. July.
2. *Artemisia frigida*—Mountain Sage (***). Composite Family. Very, very common on all of the slopes; moderate amount of pollen. July-September.
3. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Few plants along the roads and in the waste places; moderate amount of pollen. July-August.
4. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Few plants in the waste places and along the road; large amount of pollen. August.
5. *Poa* (several species)—June Grasses (*). Grass Family. Rather common in all available places; small amount of pollen. May-June.

Berthoud

Altitude 4,962 Feet

1. *Amaranthus retroflexus*—Pigweed, Beet Root (*). Amaranth Family. Rather common in vacant lots, along the roads and in the waste places; small amount of pollen. July-September.

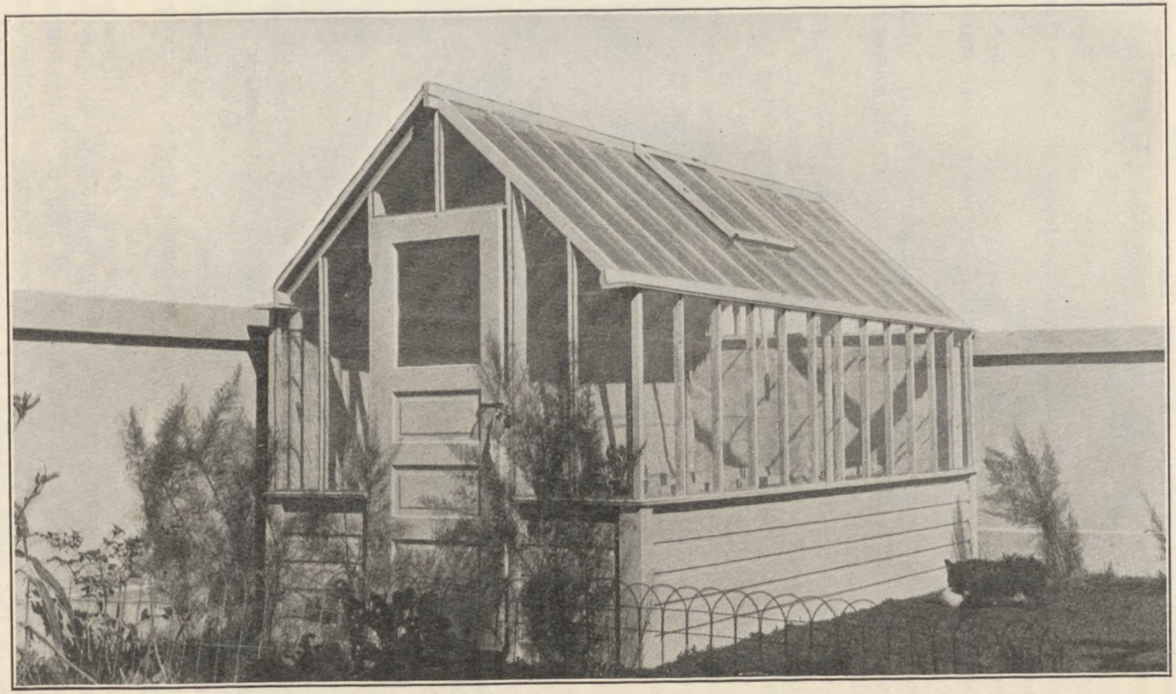


Fig. 3. View of the greenhouse into which the plants are taken, placed in large containers of water to await the shedding of the pollen. The pollen is collected on white glazed paper.

2. *Ambrosia elatior*—Short Ragweed (***). Ragweed Family. Few plants along the roads and in the vacant lots and waste fields; moderate amount of pollen. August-September.
3. *Ambrosia psilostachya*—Western Ragweed (***). Ragweed Family. Rather common along the roads and ditches; moderate amount of pollen. July-September.
4. *Ambrosia trifida*—Giant Ragweed (****). Ragweed Family. Very common along the ditches, roads and moist places; large amount of pollen. July-September.
5. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Very, very common in all of the waste places; moderate amount of pollen. June-September.
6. *Eurotia lanata*—Winter Fat. (*). Chenopod Family. Rather common on the dry plains near Berthoud; small amount of pollen. June-July.
7. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Very common along the ditches, roads and moist places, same type of habitat as Ambrosia trifida; large amount of pollen. August-September.
8. *Kochia scoparia*—Burning Bush, Summer Cypress (*****). Chenopod Family. Very, very common in all of the waste places; large amount of pollen. July-September.
9. *Poa* (several species)—June Grasses (*). Grass Family. Rather common in the lawns, along the ditches, etc.; small amount of pollen. April-August.
10. *Salsola pestifer*—Russian Thistle (*****). Chenopod Family. Very, very common in the many reverting fields; moderate amount of pollen. July-September.
11. *Xanthium pennsylvanicum*—Cocklebur, Clotbur (*). Ragweed Family. Few plants along the roads; moderate amount of pollen. July-August.

Black Hawk

Altitude 8,045 Feet

1. *Agropyron smithii*—Colorado Blue Stem (*). Grass Family. Few plants in the yards of the houses; moderate amount of pollen. July.
2. *Artemisia frigida*—Mountain Sage (***). Composite Family. Rather common on the slopes; moderate amount of pollen. July-September.
3. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. More or less common in the barnyards, vacant lots, and waste places; moderate amount of pollen. July-August.
4. *Phleum pratense*—Timothy (*). Grass Family. Rather common in the moist meadow-like places; moderate amount of pollen. July-August.
5. *Poa* (several species)—June Grasses (*). Grass Family. Rather common in all available places; small amount of pollen. July-August.

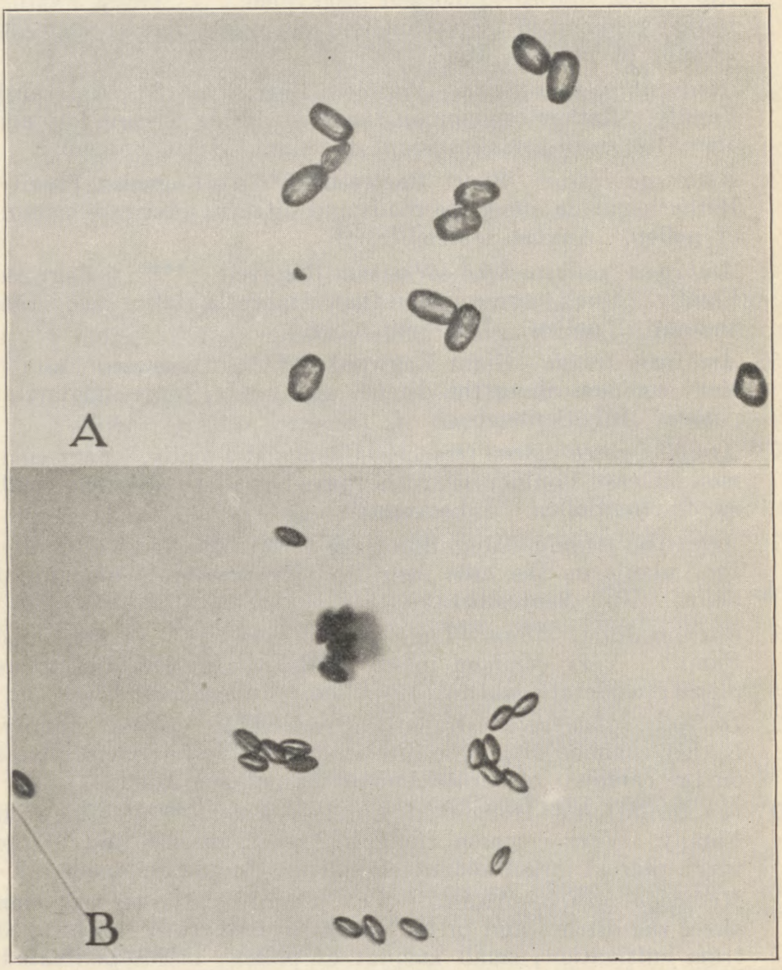


Fig. 4. A. Pollen of Alfalfa (Medicago sativa); insect pollinated, therefore not a cause of Hay Fever (x 250).

Fig. 4. B. Pollen of Bee Weed (Peritoma serrulatum); insect pollinated, therefore not a cause of Hay Fever (x 250).

Boulder

Altitude 5,350 Feet

1. *Agropyron smithii*—Colorado Blue Stem (*). Grass Family. Rather common in the vacant lots and waste places; moderate amount of pollen. June.
2. *Amaranthus retroflexus*—Pigweed, Beet Root (*). Amaranth Family. Rather common in the waste fields, vacant lots and along the roads; small amount of pollen. July-September.
3. *Ambrosia elatior*—Short Ragweed (***). Ragweed Family. Rather common along the roads and ditches; moderate amount of pollen. August-September.
4. *Ambrosia psilostachya*—Western Ragweed (***). Ragweed Family. Much more common than Ambrosia elatior; moderate amount of pollen. July-September.
5. *Ambrosia trifida*—Giant Ragweed (****). Ragweed Family. Very common along the ditches and roads; large amount of pollen. July-September.
6. *Atriplex rosea*—Rose Orache. Chenopod Family. Very common in east Boulder near the paved road to Denver; small amount of pollen. July-August.
7. *Artemisia frigida*—Mountain Sage (***). Composite Family. Few plants on the hills near Boulder; moderate amount of pollen. July-September.
8. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Very common in all of the vacant lots and waste places; moderate amount of pollen. June-September.
9. *Dactylis glomerata*—Orchard Grass (*). Grass Family. Rather common along the ditches and in the low moist places on the campus; moderate amount of pollen. June.
10. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Very common along the roads, ditches and in the waste places; large amount of pollen. August-September.
11. *Medicago sativa*—Alfalfa. Pea Family. Rather common along the ditches and in the vacant lots where it has escaped from cultivation; small amount of pollen; insect pollinated. June-September.
12. *Melilotus alba*—White Clover. Pea Family. Rather common along the ditches and sidewalks; small amount of pollen; insect pollinated. July-September.
13. *Phleum pratense*—Timothy (*). Grass Family. Few plants along the ditches and on the campus in the low moist places; moderate amount of pollen. July.
14. *Poa* (several species)—June Grasses (*). Grass Family. Very common in all parts of the city, especially Poa pratensis; small amount of pollen. April-July.
15. *Salsola pestifer*—Russian Thistle (*****). Chenopod Family.

Very, very common along the roads, in vacant lots and in old reverting fields; moderate amount of pollen. July-September.

16. *Taraxacum taraxacum*—Dandelion. Chicory Family. Very, very common in the lawns, vacant lots and along the ditches; insect pollinated; moderate amount of pollen; causes Hay Fever only on direct inhalation of the pollen from the flower; often a minor cause of Hay Fever in children. April-October.
17. *Xanthium pennsylvanicum*—Cocklebur, Clotbur (*). Ragweed Family. Rather common along the roads and in the waste places, especially in north Boulder; moderate amount of pollen. July-August.

Brighton

Altitude 4,985 Feet

1. *Acnida tamariscina*—Western Water-Hemp (*). Amaranth Family. Rather common along the roads and ditches; large amount of pollen. July.
2. *Amaranthus retroflexus*—Pigweed, Beet Root (*). Amaranth Family. Rather common in the waste fields; much more common in 1925 than in 1924; small amount of pollen. July-September.
3. *Ambrosia elatior*—Short Ragweed (***). Ragweed Ramily. Few plants along the roads and ditches; moderate amount of pollen. August-September.
4. *Ambrosia psilostachya*—Western Ragweed (***). Ragweed Family. Rather common in the waste places; moderate amount of pollen. July-September.
5. *Ambrosia trifida*—Giant Ragweed (****). Ragweed Family. Very common along the ditches, in moist places and along the roads; large amount of pollen. July-September.
6. *Artemisia filifolia*—Silvery Sage (*). Composite Family. Rather common on the plains near Brighton; moderate amount of pollen. August-September.
7. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Rather common in the waste places, along the roads and in reverting fields; moderate amount of pollen. June-September.
8. *Franseria acanthicarpa*—False Ragweed (*). Ragweed Family. Rather common along the roads; moderate amount of pollen. August-September.
9. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Very common along the roads, ditches and in the waste places; large amount of pollen. August-September.
10. *Kochia scoparia*—Burning Bush, Summer Cypress (*****). Chenopod Family. Very common along the roads and in the waste places; large amount of pollen. July-September.
11. *Medicago sativa*—Alfalfa. Pea Family. Rather common along the roads, in the waste places and on the ditch banks where

Fig. 5. Brome Grass (Bromus tectorum) very common weed, but not a cause of Hay Fever as the flowers do not open to allow the pollen to escape.

Fig. 6. A. Colorado Blue Stem (Agropyron smithii) inflorescence, note the mature anthers discharging pollen.

Fig. 6. B. Rye Grass, Darnel (Lolium perenne) inflorescence, note the arrangement of the spikelets with the edge toward the rachis.

it has escaped from cultivation; small amount of pollen; insect pollinated. June-September.

12. *Melilotus alba*—White Clover. Pea Family. Rather common along the roads and ditches; small amount of pollen; insect pollinated. July-September.
13. *Poa* (several species)—June Grasses (*). Grass Family. Rather common along the roads and ditches, and very common in the lawns, especially Poa pratensis; small amount of pollen. April-July.
14. *Rumex crispus*—Curled Dock. Buckwheat Family. Rather common along the ditches; moderate amount of pollen. June.
15. *Salsola pestifer*—Russian Thistle (*****). Chenopod Family. Very, very common along the roads, in old fields and waste places; moderate amount of pollen. July-September.
16. *Solidago sps.*—Goldenrods. Composite Family. Rather common along the ditches; moderate amount of pollen; insect pollinated; causes Hay Fever only upon direct inhalation of the pollen from the flower. August.
17. *Taraxacum taraxacum*—Dandelion. Chicory Family. Very common in the lawns and waste places; moderate amount of pollen; insect pollinated. April-October.
18. *Xanthium pennsylvanicum*—Cocklebur, Clotbur (*). Ragweed Family. Rather common along the roads; moderate amount of pollen. July-August.
19. *Ximenesia exauriculata*—Composite Family. Rather common in reverting fields and along the roads; moderate amount of pollen; insect pollinated. August-September.

Canon City

Altitude 5,332 Feet

1. *Amaranthus retroflexus*—Pigweed, Beet Root (*). Amaranth Family. Rather common in the vacant lots and waste places; small amount of pollen. July-September.
2. *Ambrosia psilostachya*—Western Ragweed (***). Ragweed Family. Rather common in the vacant lots, along the roads and ditches; moderate amount of pollen. July-September.
3. *Ambrosia trifida*—Giant Ragweed (****). Ragweed Family. Rather common along the ditches and roads; large amount of pollen. July-September.
4. *Atriplex rosea*—Rose Orache. Chenopod Family. Rather common in the low alkaline flats in northeast Canon; small amount of pollen. July.
5. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Rather common in all waste places and vacant lots; moderate amount of pollen. June-September.
6. *Dactylis glomerata*—Orchard Grass (*). Grass Family. Very common in the orchards along the ditches; moderate amount of pollen. June.

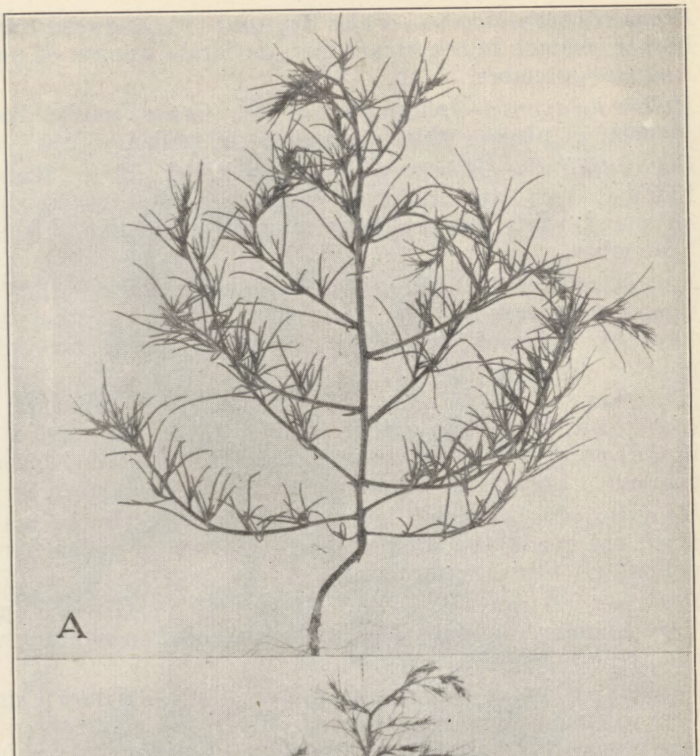


Fig. 7. A. Russian Thistle (Salsola pestifer) a plant about six weeks old.

Fig. 7. B. Russian Thistle (Salsola pestifer) mature plant to show manner of growth.

7. *Franseria acanthicarpa*—False Ragweed (*). Ragweed Family. Rather common in the vacant lots; moderate amount of pollen. August-September.
8. *Holcus halapense*—Johnson Grass (*). Grass Family. Rather common in places; moderate amount of pollen. June.
9. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Very, very common along the ditches, roads, and in all moist waste places; large amount of pollen. August-September.
10. *Kochia scoparia*—Burning Bush, Summer Cypress (*****). Chenopod Family. Very, very common in all of the vacant lots, waste places and along the roads; large amount of pollen. July-September.
11. *Medicago sativa*—Alfalfa. Pea Family. Very common as a crop plant, hence also rather common along the ditches and in the vacant lots where it has escaped from cultivation; small amount of pollen; insect pollinated. June-September.
12. *Melilotus alba*—White Clover. Pea Family. Very common along the roads and ditches; small amount of pollen; insect pollinated. June-September.
13. *Poa* (several species)—June Grasses (*). Grass Family. Very common especially Poa pratensis and Poa annua; small amount of pollen. April-August.
14. *Populus sargentii*—Western Cottonwood (*). Willow Family. Very common along the Arkansas River and along the walks and roads in the town; large amount of pollen. April-May.
15. *Rumex crispus*—Curled Dock. Buckwheat Family. Rather common along the ditches; moderate amount of pollen. June.
16. *Salsola pestifer*—Russian Thistle (*****). Chenopod Family. Very common in all of the vacant lots, waste fields and along the roads; moderate amount of pollen. July-September.
17. *Taraxacum taraxacum*—Dandelion. Chicory Family. Very, very common in all the lawns and along the ditches; moderate amount of pollen; insect pollinated. April-October.
18. *Xanthium pennsylvanicum*—Cocklebur, Clotbur (*). Ragweed Family. Rather common along the roads and in the waste places; moderate amount of pollen. July-August.
19. *Ximenesia exauriculata*—Composite Family. Rather common along the roads and in reverting fields; moderate amount of pollen; insect pollinated. August-September.

Central City

Altitude 8,516 Feet

1. *Agropyron smithii*—Colorado Blue Stem (*). Grass Family. Rather common in a few places forming small patches in the yards; moderate amount of pollen. July.
2. *Artemisia frigida*—Mountain Sage (***). Composite Family.

Fig. 8. A. Inflorescence of the common lawn grass, Blue Grass, or June Grass (Poa pratensis) during the pollination period.

Fig. 8. B. Inflorescence of Notholcus mollis, recently introduced into this country, but which is rapidly spreading.

Very common on all of the slopes; moderate amount of pollen. July-September.

3. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Rather common in all of the old gardens, barnyards and waste places; plants rather dwarfed; moderate amount of pollen. July-August.
4. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Few plants in the waste places; plants dwarfed; large amount of pollen. August.
5. *Phleum pratense*—Timothy (*). Grass Family. Few plants; moderate amount of pollen. July-August.
6. *Poa* (several species)—June Grasses (*). Grass Family. Rather common in all available places; small amount of pollen. June-July.
7. *Populus tremuloides*—Quaking Aspen (*). Willow Family. Rather common on the slopes and hills in large patches; large amount of pollen. April-May.

Colorado Springs

Altitude 5,878 Feet

1. *Agropyron smithii*—Colorado Blue Stem (*). Grass Family. Rather common along the roads, and ditches, also grown as a hay crop in many places near the city; moderate amount of pollen. July.
2. *Amaranthus retroflexus*—Beet Root, Pigweed (*). Amaranth Family. Rather common along the roads, and in the vacant lots; small amount of pollen. July-September.
3. *Ambrosia psilostachya*—Western Ragweed (***). Ragweed Family. Rather common along the roads; moderate amount of pollen. July-September.
4. *Ambrosia trifida*—Giant Ragweed (****). Ragweed Family. Rather common along the ditches and in the moist waste places; large amount of pollen. July-September.
5. *Artemisia aromatica*—Mugwort. Composite Family. Rather common on the hillsides and plains near Colorado Springs; small amount of pollen. July.
6. *Artemisia camporum*—Sage. Composite Family. Much less common than Artemisia aromatica, but found in the same type of habitat; small amount of pollen. August-September.
7. *Artemisia frigida*—Mountain Sage (***). Composite Family. Very, very common on all of the slopes and hills; moderate amount of pollen. July-September.
8. *Bouteloua procumbens*—Grama Grass (*). Grass Family. Very common as it forms the dominant pastureland grass of the region; moderate amount of pollen. August-September.
9. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Rather common in all of the waste places, such as

vacant lots, reverting fields, neglected yards, etc.; moderate amount of pollen. June-September.

10. *Dactylis glomerata*—Orchard Grass (*). Grass Family. Rather common along the ditches; moderate amount of pollen. June.

11. *Franseria acanthicarpa*—False Ragweed (*). Ragweed Family. Few plants along the roads and in the vacant lots; moderate amount of pollen. August-September.

12. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Very common along the ditches, streams and roadsides; large amount of pollen. August-September.

13. *Kochia scoparia*—Burning Bush, Summer Cypress (*****). Chenopod Family. Very common in all of the vacant lots, along the roads and in all waste places; large amount of pollen. July-September.

14. *Medicago sativa*—Alfalfa. Pea Family. Rather common along the ditches and in the vacant lots where it has escaped from cultivation; small amount of pollen; insect pollinated. June-September.

15. *Melilotus alba*—White Clover. Pea Family. Rather common along the roads and ditches; small amount of pollen; insect pollinated. July-September.

16. *Phleum pratense*—Timothy (*). Grass Family. Rather common along the roads and ditches; small amount of pollen. July-August.

17. *Poa* (several species)—June Grasses (*). Grass Family. Very common especially Poa pratensis, the lawn grass; small amount of pollen. April-August.

18. *Populus angustifolia*—Narrow-leaf Cottonwood (*). Willow Family. Rather common along the streams in the canyons near the city; large amount of pollen. Early spring.

19. *Populus sargentii*—Western Cottonwood (*). Willow Family. Rather common as a shade tree; large amount of pollen. Early spring.

20. *Salsola pestifer*—Russian Thistle (*****). Chenopod Family. Very common in all of the vacant lots, waste places and along the roads; moderate amount of pollen. July-September.

21. *Taraxacum taraxacum*—Dandelion. Chicory Family. Very common in the lawns and waste places; moderate amount of pollen; insect pollinated. April-September.

22. *Xanthium pennsylvanicum*—Cocklebur, Clotbur (*). Ragweed Family. Rather common along the roads and in the waste fields; moderate amount of pollen. July-August.

23. *Ximenesia exauriculata*—Composite Family. Rather common along the roads and in reverting fields; moderate amount of pollen; insect pollinated. August-September.

Conifer

Altitude 8,153 Feet

1. *Artemisia frigida*—Mountain Sage (***). Composite Family. Very common in all parts; moderate amount of pollen. July-September.
2. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Very common in all of the waste fields and along the roads; plants dwarfed; moderate amount of pollen. July-August.
3. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Rather common in the waste fields and along the roads; large amount of pollen. August.
4. *Phleum pratense*—Timothy (*). Grass Family. Rather common in the meadows near Conifer; moderate amount of pollen. July-August.
5. *Poa* (several species)—June Grasses (*). Grass Family. Rather common in all available places; small amount of pollen. June-July.
6. *Taraxacum taraxacum*—Dandelion. Chicory Family. Rather common in moist places; moderate amount of pollen; insect pollinated. May-September.

Deckers

Altitude 6,250 Feet

1. *Artemisia frigida*—Mountain Sage (***). Composite Family. Very common on all of the slopes and hills; moderate amount of pollen. July-September.
2. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Rather common in all of the waste places; moderate amount of pollen. July-August.
3. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Rather common along the roads, ditches and in waste places; large amount of pollen. August.
4. *Poa* (several species)—June Grasses (*). Grass Family. Rather common in all available places; small amount of pollen. June-July.

Denver

Altitude 5,184 Feet

1. *Acnida tamariscina*—Western Water-Hemp (*). Amaranth Family. Rather common along the roads and ditches in north and east Denver; much more common in 1925 than 1924; large amount of pollen. July-August.
2. *Agropyron smithii*—Colorado Blue Stem (*). Grass Family. Rather common in the vacant lots in Denver; moderate amount of pollen. June.

3. *Amaranthus retroflexus*—Pigweed, Beet Root (*). Amaranth Family. Rather common in the vacant lots and along the roads; much more common in 1925 than in 1924; small amount of pollen. July-September.
4. *Ambrosia elatior*—Short Ragweed (***). Ragweed Family. Not very common, found to some extent along the roads and ditches; much less common in 1925 than in 1924; moderate amount of pollen. August-September.
5. *Ambrosia psilostachya*—Western Ragweed (***). Ragweed Family. Very common especially in northwest Denver along the roads and ditches; much more common in 1925 than in 1924; moderate amount of pollen. July-September.
6. *Ambrosia trifida*—Giant Ragweed (****). Ragweed Family. Very, very common along the ditches, roads and near the lakes; large amount of pollen. July-September.
7. *Artemisia filifolia*—Silvery Sage (*). Composite Family. Rather common on the plains to the north of the city; moderate amount of pollen. August-September.
8. *Atriplex canescens*—Bushy Atriplex (*). Chenopod Family. Rather common on the dry bluffs in northwest Denver; large amount of pollen. May-June.
9. *Atriplex rosea*—Rose Orache. Chenopod Family. Very common in north Denver near Sloan's Lake; small amount of pollen. July-August.
10. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Very common in the vacant lots, waste places and along the roads; moderate amount of pollen. June-September.
11. *Eurotia lanata*—Winter Fat (*). Chenopod Family. Very common in the northwest part of Denver on the dry bluffs and plains; small amount of pollen. June-July.
12. *Franseria acanthicarpa*—False Ragweed (*). Ragweed Family. Rather common along the roads especially in northeast Denver; moderate amount of pollen. August-September.
13. *Franseria discolor*—False Ragweed (*). Ragweed Family. Rather common in the early summer in northwest Denver; moderate amount of pollen. June-July.
14. *Holcus halapense*—Johnson Grass (*). Grass Family. Rather common in some places where it has been introduced in lawn-grass seed, for instance near City Park Golf Links; moderate amount of pollen. June.
15. *Iva axillaris*—Poverty Weed (*). Ragweed Family. Rather common in north Denver near Sloan's Lake; much more common in 1925 than in 1924; small amount of pollen. June-July.
16. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Very common in vacant lots, along ditches and roads; large amount of pollen. August-September.
17. *Kochia scoparia*—Burning Bush, Summer Cypress (*****).

Fig. 9. Goldenrod (Solidago canadensis) very common along the irrigation ditches; not a cause of Hay Fever, as the pollen is insect carried.

Chenopod Family. Very, very common in all of the vacant lots, along the roads and ditches; large amount of pollen. July-September.

18. *Medicago sativa*—Alfalfa. Pea Family. Rather common along the ditches and in vacant lots; small amount of pollen; insect pollinated. June-September.

19. *Melilotus alba*—White Clover. Pea Family. Very common along the walks and roads; small amount of pollen; insect pollinated. July-September.

20. *Phleum pratense*—Timothy (*). Grass Family. Few plants along the ditches; moderate amount of pollen. July.

21. *Plantago major*—Common Plantain. Plantain Family. Rather common in the lawns and along the ditches; moderate amount of pollen. June-July.

22. *Poa* (several species)—June Grasses (*). Grass Family. Very common in the lawns and along the ditches where they have escaped from cultivation, especially Poa pratensis, and Poa annua; small amount of pollen. April-September.

23. *Populus angustifolia*—Narrow-leaf Cottonwood (*). Willow Family. Rather common along Cherry Creek; large amount of pollen. April-May.

24. *Populus deltoides*—Carolina Poplar (*). Willow Family. Planted rather commonly in the parks; large amount of pollen. March-April.

25. *Populus sargentii*—Western Cottonwood (*). Willow Family. Rather common in the parks and along the walks; large amount of pollen. March-April .

26. *Rumex crispus*—Curled Dock. Buckwheat Family. Rather common along the ditches in early summer; moderate amount of pollen. June.

27. *Salsola pestifer*—Russian Thistle (*****). Chenopod Family. Very, very common in all of the waste places and vacant lots; moderate amount of pollen. July-September.

28. *Solidago sps.*—Goldenrods. Composite Family. Rather common along the ditches; moderate amount of pollen; insect pollinated. July-October.

29. *Taraxacum taraxacum*—Dandelion. Chicory Family. Rather common in the lawns and parks; moderate amount of pollen; insect pollinated. April-October.

30. *Xanthium pennsylvanicum*—Cocklebur, Clotbur (*). Ragweed Family. Few plants along the roads; moderate amount of pollen. July-August.

31. *Ximenesia exauriculata*—Composite Family. Rather common in the vacant lots and waste places; moderate amount of pollen; insect pollinated. August-September.

Estes Park

Altitude 7,000 Feet

1. *Agropyron smithii*—Colorado Blue Stem (*). Grass Family. Common in some of the vacant lots in the village; moderate amount of pollen. July.
2. *Amaranthus retroflexus*—Pigweed, Beet Root (*). Amaranth Family. Few plants in the vacant lots and along the roads; small amount of pollen. August-September.
3. *Artemisia camporum*—Sage. Composite Family. Rather common in the Estes Park region especially in the canyons; small amount of pollen. August.
4. *Artemisia frigida*—Mountain Sage (***). Composite Family. Very, very common on the slopes and hills in this region; moderate amount of pollen. July-September.
5. *Artemisia rhizomata*—Sage. Composite Family. Rather common in this region especially in the canyons; small amount of pollen. August-September.
6. *Artemisia tridentata*—Sagebrush (*****). Composite Family. Rather common on the slopes east of the village; large amount of pollen. July-August.
7. *Bouteloua procumbens*—Grama Grass (*). Grass Family. Very common as a pastureland grass in this region; moderate amount of pollen. August-September.
8. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Rather common in the vacant lots in the village and neglected fields near the village; moderate amount of pollen. July-August.
9. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Few plants near the village in a large grain field; large amount of pollen. August.
10. *Phleum pratense*—Timothy (*). Grass Family. Very common in the meadows near the village; moderate amount of pollen. July-August.
11. *Plantago major*—Common Plantain. Plantain Family. Rather common in the vacant lots in the village; moderate amount of pollen. July.
12. *Poa* (several species)—June Grasses (*). Grass Family. Rather common along the streams and in the vacant lots in the village; small amount of pollen. June-July.
13. *Populus tremuloides*—Quaking Aspen. Willow Family. Rather common on the mountains near the village; large amount of pollen. Early spring.
14. *Rumex acetosella*—Sheep Sorrel (**). Buckwheat Family. Rather common along the roads and on the slopes; moderate amount of pollen. July-August.
15. *Rumex crispus*—Curled Dock. Buckwheat Family. Few

Fig. 10. A. Sage (Artemisia camporum) inflorescence; produces very little pollen; very common in the canyons in the Estes Park region.

Fig. 10. B. Prairie Sage (Artemisia gnaphaloides) not very common in Central Colorado; produces very little pollen.

Fig. 10. C. Sage (Artemisia camporum) basal leaves early in the summer before the tall spike-like inflorescences are produced.

plants in the vacant lots in the village; moderate amount of pollen. June-July.

16. *Salsola pestifer*—Russian Thistle (*****). Chenopod Family. One plant in the village in 1925; moderate amount of pollen. July.
17. *Taraxacum taraxacum*—Dandelion. Chicory Family. Rather common in the vacant lots and along the banks of the streams; moderate amount of pollen; insect pollinated. May-September.

Evergreen

Altitude 7,000 Feet

1. *Agropyron smithii*—Colorado Blue Stem (*). Grass Family. Rather common in places; moderate amount of pollen. July.
2. *Agrostis palustris*—Red-top. Grass Family. Rather common in the meadows along Bear Creek; small amount of pollen. July-August.
3. *Artemisia aromatica*—Mugwort. Composite Family. Rather common on the southern slopes of the canyon; small amount of pollen. July.
4. *Artemisia frigida*—Mountain Sage (***). Composite Family. Rather common on the slopes of the canyon; moderate amount of pollen. July-September.
5. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Rather common in neglected places; some plants dwarfed; moderate amount of pollen. July-August.
6. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Rather common along the roads; large amount of pollen. August.
7. *Phleum pratense*—Timothy (*). Grass Family. Rather common in the meadows along Bear Creek; moderate amount of pollen. July-August.
8. *Poa* (several species)—June Grasses (*). Grass Family. Rather common along the banks of the creek and in meadow-like places; small amount of pollen. June-July.
9. *Populus angustifolia*—Narrow-leaf Cottonwood (*). Willow Family. Few trees along the stream in Bear Creek Canyon; large amount of pollen. Early spring.
10. *Populus tremuloides*—Quaking Aspen. Willow Family. Rather common near the top of the canyon; large amount of pollen. Early spring.
11. *Rumex acetosella*—Sheep Sorrel (**). Buckwheat Family. Rather common in all available places; moderate amount of pollen. July-August.
12. *Rumex crispus*—Curled Dock. Buckwheat Family. Few plants along the roads; moderate amount of pollen. June-July.

Fig. 11. A. Upper portion of a mature plant of Giant Ragweed (Ambrosia trifida) to show the type of inflorescence and the characteristic tri-parted leaf.

Fig. 11. B. Single spike of Giant Ragweed (Ambrosia trifida) to illustrate the type of inflorescence.

13. *Taraxacum taraxacum*—Dandelion. Chicory Family. Rather common along the roads in the moist places and along the banks of Bear Creek; moderate amount of pollen; insect pollinated. May-September.

Florence

Altitude 5,187 Feet

1. *Agrostis palustris*—Red-top. Grass Family. Rather common along the ditches; small amount of pollen. July-August.
2. *Amaranthus retroflexus*—Pigweed, Beet Root (*). Amaranth Family. Rather common in the vacant lots and along the roads; small amount of pollen. July-August.
3. *Ambrosia psilostachya*—Western Ragweed (***). Ragweed Family. Rather common along the roads and in the vacant lots; moderate amount of pollen. July-August.
4. *Ambrosia trifida*—Giant Ragweed (****). Ragweed Family. Very common along the ditches and roads; large amount of pollen. July-September.
5. *Atriplex canescens*—Bushy Atriplex (*). Chenopod Family. Rather common on the limestone hills surrounding Florence; large amount of pollen. May-June.
6. *Atriplex confertifolia*—Spiny Atriplex, Shad Scale (***). Chenopod Family. Very common on the limestone hills and alkaline flats; moderate amount of pollen. May-June.
7. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Very common in the vacant lots, along the roads and in the waste places; moderate amount of pollen. June-September.
8. *Dactylis glomerata*—Orchard Grass (*). Grass Family. Rather common along the ditches and in the small orchards; moderate amount of pollen. June.
9. *Dondia torreyana*—Sea Blite. Chenopod Family. Rather common in the low alkaline marshy places; moderate amount of pollen. July.
10. *Franseria acanthicarpa*—False Ragweed (*). Ragweed Family. Rather common along the roads; moderate amount of pollen. August-September.
11. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Rather common along the ditches and roads; large amount of pollen. July-August.
12. *Kochia scoparia*—Burning Bush, Summer Cypress (*****). Chenopod Family. Very, very common along the roads, in waste places and vacant lots; large amount of pollen. July-September.
13. *Medicago sativa*—Alfalfa. Pea Family. Rather common along the ditches where it has escaped from cultivation from the many alfalfa fields; small amount of pollen; insect pollinated. June-September.

Fig. 12. A. Portion of a young plant of Kochia scoparia (Burning Bush, Summer Cypress) to show manner of growth.

Fig. 12. B. Small portion of a pollinating branch of Summer Cypress, Burning Bush (Kochia scoparia), to show the flowers.

14. *Melilotus alba*—White Clover. Pea Family. Rather common along the ditches and roads; small amount of pollen; insect pollinated. July-September.
15. *Poa* (several species)—June Grasses (*). Grass Family. Very common, especially Poa pratensis; small amount of pollen. May-August.
16. *Populus angustifolia*—Narrow-leaf Cottonwood (*). Willow Family. Rather common along the Arkansas River; large amount of pollen. March-April.
17. *Populus deltoides*—Carolina Poplar (*). Willow Family. Rather common as a shade tree in the town where it has been planted along the walks; large amount of pollen. March-April.
18. *Populus sargentii*—Western Cottonwood (*). Willow Family. Rather common also as a shade tree; large amount of pollen. March-April.
19. *Rumex crispus*—Curled Dock. Buckwheat Family. Rather common along the ditches; moderate amount of pollen. June.
20. *Salsola pestifer*—Russian Thistle (*****). Chenopod Family. Very, very common in all of the waste places and vacant lots; moderate amount of pollen. July-September.
21. *Sarcobatus vermiculatus* — True Greasewood. Chenopod Family. Rather common on the limestone hills; moderate amount of pollen. June-July.
22. *Taraxacum taraxacum*—Dandelion. Chicory Family. Rather common in the lawns and on the ditch banks; moderate amount of pollen; insect pollinated. April-September.
23. *Xanthium pennsylvanicum*—Cocklebur, Clotbur (*). Ragweed Family. Rather common along the roads; moderate amount of pollen. July-August.
24. *Ximenesia exauriculata*—Composite Family. Rather common in the waste places and along the roads; moderate amount of pollen; insect pollinated. August-September.

Fort Lupton

Altitude 4,980 Feet

1. *Acnida tamariscina*—Western Water-Hemp (*). Amaranth Family. Rather common along the roads and ditches; large amount of pollen. July-August.
2. *Amaranthus retroflexus*—Pigweed, Beet Root (*). Amaranth Family. Rather common in the waste places and along the roads; small amount of pollen. July-September.
3. *Ambrosia elatior*—Short Ragweed (***). Ragweed Family. Few plants along the roads and in the vacant lots; moderate amount of pollen. August-September.
4. *Ambrosia psilostachya*—Western Ragweed (***). Ragweed Family. Very common along the roads, and in the waste places; moderate amount of pollen. July-September.

5. *Ambrosia trifida*—Giant Ragweed (****). Ragweed Family. Very common along the roads and ditches; large amount of pollen. July-August.
6. *Artemisia filifolia*—Silvery Sage (*). Composite Family. Rather common on the plains near Fort Lupton; moderate amount of pollen. August-September.
7. *Bouteloua procumbens*—Grama Grass (*). Grass Family. Rather common on the plains as it forms the dominant type of pastureland grass in this region; moderate amount of pollen. July-August.
8. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Very common in all of the waste fields and vacant lots; moderate amount of pollen. June-September.
9. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Very common along all of the ditches and roads; large amount of pollen. August-September.
10. *Kochia scoparia*—Burning Bush, Summer Cypress (*****). Chenopod Family. Very common in all of the waste places and along the roads; large amount of pollen. July-September.
11. *Medicago sativa*—Alfalfa. Pea Family. Rather common along the ditches where it has escaped from cultivation; small amount of pollen; insect pollinated. June-September.
12. *Melilotus alba*—White Clover. Pea Family. Rather common along the roads and ditches; small amount of pollen; insect pollinated. July-September.
13. *Poa* (several species)—June Grasses (*). Grass Family. Very common, especially Poa pratensis; small amount of pollen. May-August.
14. *Salsola pestifer*—Russian Thistle (*****). Chenopod Family. Very common along the roads, ditches and in the waste places; moderate amount of pollen. July-September.
15. *Solidago sps.*—Goldenrods. Composite Family. Rather common along the ditches; moderate amount of pollen; insect pollinated. August.
16. *Taraxacum taraxacum*—Dandelion. Chicory Family. Very common in all available places; moderate amount of pollen; insect pollinated. April-September.
17. *Xanthium pennsylvanicum*—Cocklebur, Clotbur (*). Ragweed Family. Rather common along the roads; moderate amount of pollen. July-August.
18. *Ximenesia exauriculata*—Composite Family. Very common in the waste fields; moderate amount of pollen; insect pollinated. August-September.

Georgetown

Altitude 8,507 Feet

1. *Agropyron smithii*—Colorado Blue Stem (*). Grass Family. Few plants in some of the yards; moderate amount of pollen. July.

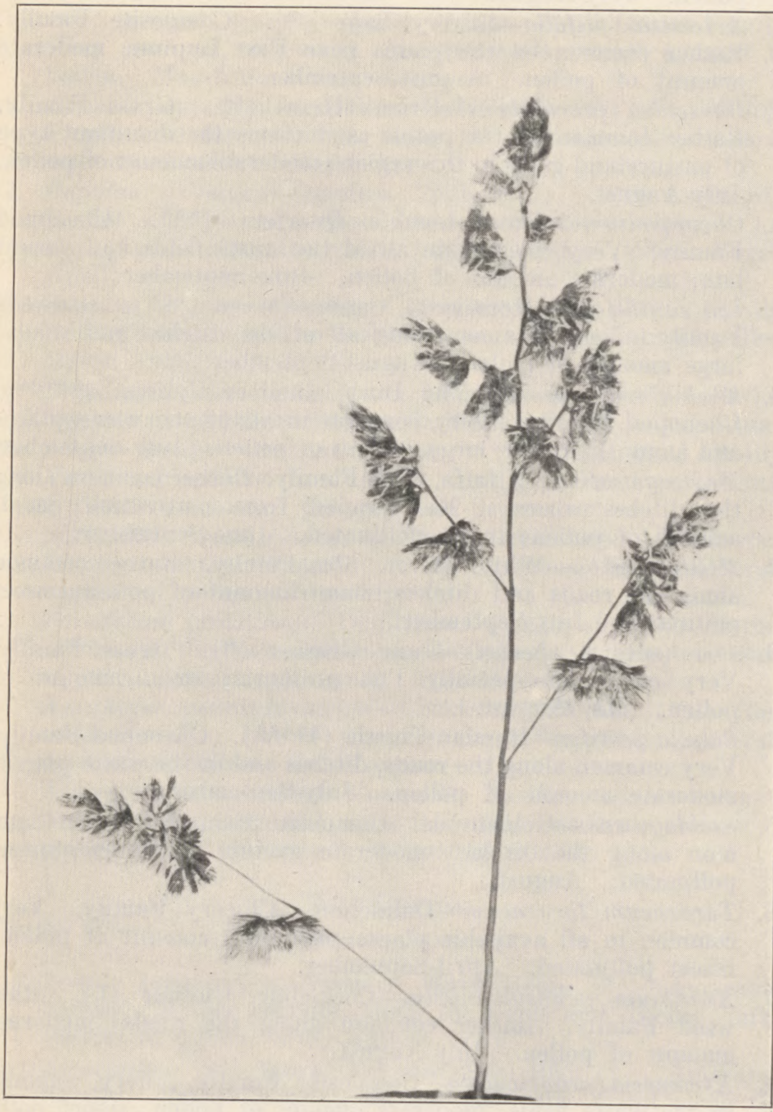


Fig. 13. Orchard Grass (Dactylis glomerata) inflorescence, note the mature stamens discharging pollen.

2. *Artemisia frigida*—Mountain Sage (***). Composite Family. Very common on all of the mountains; moderate amount of pollen. July-September.
3. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Very few plants in the vacant lots and waste places; moderate amount of pollen. July-August.
4. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Few plants on the hillside in back of the Lodge; large amount of pollen. August.
5. *Phleum pratense*—Timothy (*). Grass Family. Few plants along the streams; moderate amount of pollen. July-August.
6. *Poa* (several species)—June Grasses (*). Grass Family. Rather common in all available places; small amount of pollen. June-July.
7. *Populus tremuloides*—Quaking Aspen. Willow Family. Rather common on the mountain slopes; large amount of pollen. Early Spring.
8. *Taraxacum taraxacum*—Dandelion. Chicory Family. Rather common; moderate amount of pollen; insect pollinated. May-September.

Golden

Altitude 5,693 Feet

1. *Agrostis palustris*—Red-top. Grass Family. Few plants along Clear Creek; small amount of pollen. July-August.
2. *Amaranthus retroflexus*—Pigweed, Beet Root (*). Amaranth Family. Rather common along the roads and in the vacant lots; small amount of pollen. July-September.
3. *Ambrosia elatior*—Short Ragweed (***). Ragweed Family. Few plants along the roads; moderate amount of pollen. August-September.
4. *Ambrosia psilostachya*—Western Ragweed (***). Ragweed Family. Rather common in the waste fields and along the roads; moderate amount of pollen. July-September.
5. *Ambrosia trifida*—Giant Ragweed (****). Ragweed Family. Very common along the roads and ditches; large amount of pollen. July-September.
6. *Artemisia camporum*—Sage. Composite Family. Rather common on the slopes in Clear Creek Canyon; small amount of pollen. August.
7. *Artemisia frigida*—Mountain Sage (***). Composite Family. Very common on all of the hills and mountains; moderate amount of pollen. July-September.
8. *Artemisia rhizomata*—Sage. Composite Family. Rather common, especially in Clear Creek Canyon; small amount of pollen. July-August.
9. *Chenopodium album*—Lamb's Quarters (**). Chenopod

Family. Rather common in all of the waste places; moderate amount of pollen. June-September.

10. *Dactylis glomerata*—Orchard Grass (*). Grass Family. Rather common along the ditches; moderate amount of pollen. June.
11. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Rather common along the roads and ditches; large amount of pollen. August-September.
12. *Kochia scoparia*—Burning Bush, Summer Cypress (*****). Chenopod Family. Very common in all of the waste places and along the roads; large amount of pollen. July-September.
13. *Melilotus alba*—White Clover. Pea Family. Rather common along the roads and ditches; small amount of pollen; insect pollinated. July-September.
14. *Poa* (several species)—June Grasses (*). Grass Family. Rather common in all available places; small amount of pollen. May-August.
15. *Salsola pestifer*—Russian Thistle (*****). Chenopod Family. Very common along the roads and in all of the waste places; moderate amount of pollen. July-September.
16. *Taraxacum taraxacum*—Dandelion. Chicory Family. Very common in the lawns and waste places; moderate amount of pollen; insect pollinated. April-September.
17. *Xanthium pennsylvanicum*—Cocklebur, Clotbur (*). Ragweed Family. Rather common along the roads; moderate amount of pollen. July-August.

Grand Lake

Altitude 8,158 Feet

1. *Artemisia tridentata*—Sagebrush (*****). Composite Family. Very, very common, the predominant type of vegetation on the mesas and hills; large amount of pollen. August-September.
2. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Rather common in all of the waste places; moderate amount of pollen. July-August.
3. *Poa* (several species)—June Grasses (*). Grass Family. Rather common in all available places; small amount of pollen. June-August.

Granby

Altitude 8,015 Feet

1. *Artemisia tridentata*—Sagebrush (*****). Composite Family Very, very common, the predominant type of vegetation; large amount of pollen. August-September.
2. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Common in the waste places; moderate amount of pollen. July-August.

Fig. 14. Sage Brush (Artemisia tridentata), very common on the Western slope, some in the Estes Park region; produces large amount of pollen.

3. *Poa* (several species)—June Grasses (*). Grass Family. Rather common in all available places; small amount of pollen. June-July.

Idaho Springs

Altitude 7,556 Feet

1. *Ambrosia psilostachya*—Western Ragweed (***). Ragweed Family. Few plants in a grain field near the road; moderate amount of pollen. July-August.
2. *Artemisia frigida*—Mountain Sage (***). Composite Family. Very common on the slopes and hills; moderate amount of pollen. July-September.
3. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Rather common in all of the waste places; moderate amount of pollen. July-August.
4. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Few plants along the roads; large amount of pollen. August.
5. *Phleum pratense*—Timothy (*). Grass Family. Rather common along the streams; moderate amount of pollen. July.
6. *Poa* (several species)—June Grasses (*). Grass Family. Rather common along the banks of the stream; small amount of pollen. June-July.
7. *Populus angustifolia*—Narrow-leaf Cottonwood (*). Willow Family. Rather common along the banks of Clear Creek; large amount of pollen. Early spring.
8. *Populus tremuloides*—Quaking Aspen. Willow Family. Rather common on all of the slopes; large amount of pollen. Early spring.
9. *Salsola pestifer*—Russian Thistle (*****). Chenopod Family. Few plants along the road; moderate amount of pollen. July-September.
10. *Taraxacum taraxacum*—Dandelion. Chicory Family. Rather common; moderate amount of pollen; insect pollinated.

Lafayette

Altitude 5,094 Feet

1. *Amaranthus retroflexus*—Pigweed, Beet Root (*). Amaranth Family. Rather common in waste places and neglected fields; small amount of pollen. July-September.
2. *Ambrosia elatior*—Short Ragweed (***). Ragweed Family. Rather common along the roads; moderate amount of pollen. August-September.
3. *Ambrosia psilostachya*—Western Ragweed (***). Ragweed Family. Common along the roads and in the waste places; moderate amount of pollen. July-September.
4. *Ambrosia trifida*—Giant Ragweed (****). Ragweed Family. Very common along the roads and ditches; large amount of pollen. July-September.

5. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Rather common in the waste places and vacant lots; moderate amount of pollen. June-September.
6. *Dactylis glomerata*—Orchard Grass (*). Grass Family. Rather common along the ditches; moderate amount of pollen. June.
7. *Eurotia lanata*—Winter Fat (*). Chenopod Family. Few plants on the plains near the town; small amount of pollen. June-July.
8. *Franseria acanthicarpa*—False Ragweed (*). Ragweed Family. Rather common along the roads; moderate amount of pollen. August-September.
9. *Holcus halapense*—Johnson Grass (*). Grass Family. Few plants along the ditches; moderate amount of pollen. June.
10. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Very common along the roads and ditches; large amount of pollen. August-September.
11. *Kochia scoparia*—Burning Bush, Summer Cypress (*****). Chenopod Family. Very common along the roads, in the waste places and vacant lots; large amount of pollen. July-September.
12. *Poa* (several species)—June Grasses (*). Grass Family. Rather common, especially Poa pratensis; small amount of pollen. May-August.
13. *Salsola pestifer*—Russian Thistle (*****). Chenopod Family. Very common in the waste places and along the roads; moderate amount of pollen. July-September.
14. *Taraxacum taraxacum*—Dandelion. Chicory Family. Rather common; moderate amount of pollen; insect pollinated. April-September.
15. *Xanthium pennsylvanicum*—Cocklebur, Clotbur (*). Ragweed Ramily. Rather common along the roads; moderate amount of pollen. July-August.

Littleton

Altitude 5,358 Feet

See list of plants for Denver omitting Artemisia filifolia and substituting Artemisia aromatica.

1. *Artemisia aromatica*—Mugwort. Composite Family. Rather common on the hills and flats; small amount of pollen. July.

Longmont

Altitude 4,941 Feet

1. *Agropyron smithii*—Colorado Blue Stem (*). Grass Family. Rather common in the vacant lots; moderate amount of pollen. June.
2. *Amaranthus retroflexus*—Pigweed, Beet Root(*). Amaranth Family. Few plants along the roads and in the waste places; small amount of pollen. July-September.

CHART OF HAY

Location	Elevation	June Grasses Poas	Colo. Blue Stem Agropyron	Timothy Phleum	Lamb's Quarter Chenopodium	Russian Thistle Salsola	Pigweed Amaranthus
Allenspark		+	−	−	+	−	−
Bailey	7,725	+	−	−	+	+	−
Bendemeer		+	+	−	+	−	−
Berthoud	4,962	+	−	−	+	+++	++
Black Hawk	8,045	+	+	+	+	−	−
Boulder	5,350	++	+	+	++	++	+
Brighton	4,985	++	−	−	++	++	++
Canon City	5,332	++	−	−	++	+++	+
Central City	8,516	+	+	+	+	−	−
Colorado Springs	5,878	++	+	+	++	+++	+
Conifer	8,153	+	−	+	+	−	−
Deckers		+	−	−	+	−	−
Denver	5,184	+++	++	+	+++	+++	+++
Estes Park	7,000	+	+	++	++	−	−
Evergreen		+	+	++	+	−	−
Florence	5,187	+	−	−	++	++	+
Fort Lupton		+	−	−	+	+++	+
Georgetown	8,507	+	+	+	+	−	−
Golden	5,693	+	−	−	++	++	+
Grand Lake	8,158	+	−	−	+	?	?
Granby		+	−	−	+	?	?
Idaho Springs	7,556	+	−	+	+	+	−
Lafayette	5,094	+	−	−	++	++	++
Littleton	5,358	++	−	−	++	++	++
Longmont	4,941	++	+	−	++	++	+
Loveland	4,986	++	+	−	++	++	+
Lyons	5,349	+	−	−	+	+	+
Morrison	5,766	+	−	−	++	++	+
Nederland	8,263	+	−	+	+	−	+
Palmer Lake	7,224	+	+	+	+	+	+
Peaceful Valley		+	−	−	+	−	+
Penrose		+	−	−	+	+++	+
Perry Park		+	−	−	+	+++	+
Pine		+	−	−	+	−	−
Pueblo	4,675	+	−	−	+++	+++	++
Shawnee		+	−	+	+	+	−
Silver Plume	9,189	+	+	+	+	−	−
Tabernash		+	−	−	+	−	?
Troutdale		+	−	−	+	+	+
Ward	9,231	+	+	+	+	−	−

FEVER RESORTS

Summer Cypress Kochia	Cocklebur Xanthium	Ragweeds Ambrosias	Horseweed Iva	Silvery Sage A. filifolia	Mountain Sage A. frigida	Sagebrush A. tridentata	
-	-	-	+	-	++	-	
-	-	+	+	-	++	-	
-	-	-	+	-	++	-	
++	++	++	+	-	-	-	
-	-	-	-	-	++	-	
-	+	++	++	-	+	-	
++	++	++	+	+	-	-	
+	++	++	+	-	-	-	
-	-	-	+	-	+++	-	
+	+	++	++	-	++	-	
-	-	-	+	-	++	-	
-	-	-	+	-	++	-	
+++	+	+++	+++	++	-	-	
-	-	-	+	-	+++	+	
-	-	-	+	-	+	-	
++	+	++	+	-	-	-	
+	+	++	+	++	-	-	
-	-	-	+	-	++	-	
+	+	++	+	-	++	-	
-	?	?	?	-	?	+++	
-	?	?	?	-	?	+++	
-	-	+	+	-	+	-	
++	+	++	+	-	-	-	
+	+	++	+	-	-	-	
+++	+	++	+	-	-	-	Legend
++	+	++	+	-	+	-	+ = Present
+	+	++	+	-	+	-	++ = Common
+	+	++	+	-	-	-	+++ = Very Common
-	-	-	+	-	++	+	- = Absent
+	-	+	+	-	++	-	
-	-	-	+	-	+	-	
+	+	+	+	-	-	-	
+	-	+	+	-	+	-	
-	-	-	+	-	+	-	
+++	++	++	+	-	-	-	
-	+	-	+	-	++	-	
-	-	-	+	-	++	-	
-	-	-	-	-	?	+++	
-	-	-	+	-	+	-	
-	-	-	+	-	++	-	

3. *Ambrosia elatior*—Short Ragweed (***). Ragweed Family. Few plants along the roads; moderate amount of pollen. August-September.
4. *Ambrosia psilostachya*—Western Ragweed (***). Ragweed Family. Rather common in the waste places and vacant lots; moderate amount of pollen. July-September.
5. *Ambrosia trifida*—Giant Ragweed (****). Ragweed Family. Very common along the roads and ditches; large amount of pollen. July-September.
6. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Very common in all of the vacant lots and waste places; moderate amount of pollen. June-September.
7. *Dactylis glomerata*—Orchard Grass (*). Grass Family. Few plants along the ditches; moderate amount of pollen. June.
8. *Franseria acanthicarpa*—False Ragweed. Ragweed Family. Rather common along the roads and in the waste places; moderate amount of pollen. August-September.
9. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Rather common along the roads and in the waste places; large amount of pollen. August-September.
10. *Kochia scoparia*—Burning Bush, Summer Cypress (*****). Chenopod Family. Very common along the roads, in the waste places and vacant lots; large amount of pollen. July-September.
11. *Medicago sativa*—Alfalfa. Pea Family. Rather common along the ditches where it has escaped from cultivation; small amount of pollen; insect pollinated. June-September.
12. *Melilotus alba*—White Clover. Pea Family. Rather common along the ditches and roads; small amount of pollen; insect pollinated. July-September.
13. *Poa* (several species)—June Grasses (*). Grass Family. Rather common, especially Poa pratensis; small amount of pollen. April-August.
14. *Populus sargentii*—Western Cottonwood (*). Willow Family. Rather common along the walks where it has been planted as a shade tree; large amount of pollen. Early spring.
15. *Salsola pestifer*—Russian Thistle (*****). Chenopod Family. Very common along the roads and in the vacant lots; moderate amount of pollen. July-September.
16. *Taraxacum taraxacum*—Dandelion. Chicory Family. Very common in all of the available places; moderate amount of pollen; insect pollinated. April-September.
17. *Xanthium pennsylvanicum*—Cocklebur, Clotbur (*). Ragweed Family. Rather common along the roads; moderate amount of pollen. July-August.

Loveland

Altitude 4,986 Feet

See list of plants for Longmont with the addition of Artemisia frigida.

1. *Artemisia frigida*—Mountain Sage (***). Composite Family. Rather common; moderate amount of pollen. July-September.

Lyons

Altitude 5,349 Feet

Same as Longmont with these exceptions: Omit Agropyron smithii and add Artemisia frigida.

1. *Artemisia frigida*—Mountain Sage (***). Composite Family. Rather common on the slopes; moderate amount of pollen. July-September.

Morrison

Altitude 5,766 Feet

1. *Amaranthus retroflexus*—Pigweed, Beet Root (*). Amaranth Family. Few plants along the roads; small amount of pollen. July-September.
2. *Ambrosia elatior*—Short Ragweed (***). Ragweed Family. Rather common along the roads; moderate amount of pollen. August-September.
3. *Ambrosia psilostachya*—Western Ragweed (***). Ragweed Family. Common along the roads and in the waste places; moderate amount of pollen. July-September.
4. *Ambrosia trifida*—Giant Ragweed (****). Ragweed Family. Common along the ditches and roads; large amount of pollen. July-September.
5. *Artemisia camporum*—Sage. Composite Family. Few plants on the nearby hills; small amount of pollen. July-August.
6. *Artemisia rhizomata*—Sage. Composite Family. Rather common on the slopes of the hills; small amount of pollen. July-August.
7. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Common in the vacant lots, along the roads and in the waste places; moderate amount of pollen. June-September.
8. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Very common along the roads and ditches; large amount of pollen. August-September.
9. *Kochia scoparia*—Burning Bush, Summer Cypress (*****). Chenopod Family. Very common in all of the waste places; large amount of pollen. July-September.
10. *Melilotus alba*—White Clover. Pea Family. Rather common along the roads leading into Morrison, also common in the waste places in the town; small amount of pollen; insect pollinated. July-September.

11. *Poa* (several species) —June Grasses (*). Grass Family. Rather common in all of the available places; small amount of pollen. May-August.
12. *Rumex crispus*—Curled Dock. Buckwheat Family. Few plants along the roads and ditches; moderate amount of pollen. June-July.
13. *Salsola pestifer*—Russian Thistle (*****). Chenopod Family. Very common in all of the waste places; moderate amount of pollen. July-September.
14. *Taraxacum taraxacum*—Dandelion. Chicory Family. Rather common in the yards and along the stream; moderate amount of pollen; insect pollinated. April-September.
15. *Xanthium pennsylvanicum*—Cocklebur, Clotbur (*). Ragweed Family. Rather common along the roads; moderate amount of pollen. July-August.
16. *Ximenesia exauriculata*—Composite Family. Rather common in the neglected yards and along the roads; moderate amount of pollen; insect pollinated. August-September.

NEDERLAND

Altitude 8,263 Feet

1. *Amaranthus retroflexus*—Pigweed, Beet Root (*). Amaranth Family. Rather common in all of the vacant lots and waste places; small amount of pollen. July-September.
2. *Artemisia frigida*—Mountain Sage (***). Composite Family. Very common on the slopes; moderate amount of pollen. July-September.
3. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Very common in the neglected gardens, waste places and along the streets; moderate amount of pollen. July-August.
4. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Few plants in the waste places; large amount of pollen. August.
5. *Phleum pratense*—Timothy (*). Grass Family. Few plants along the streams; moderate amount of pollen. July-August.
6. *Poa* (several species)—June Grasses (*). Grass Family. Rather common in all available places; small amount of pollen. June-July.
7. *Populus tremuloides*—Quaking Aspen. Willow Family. Common on the slopes of the mountains; large amount of pollen. Early spring.
8. *Taraxacum taraxacum*—Dandelion. Chicory Family. Rather common; moderate amount of pollen; insect pollinated. May-August.

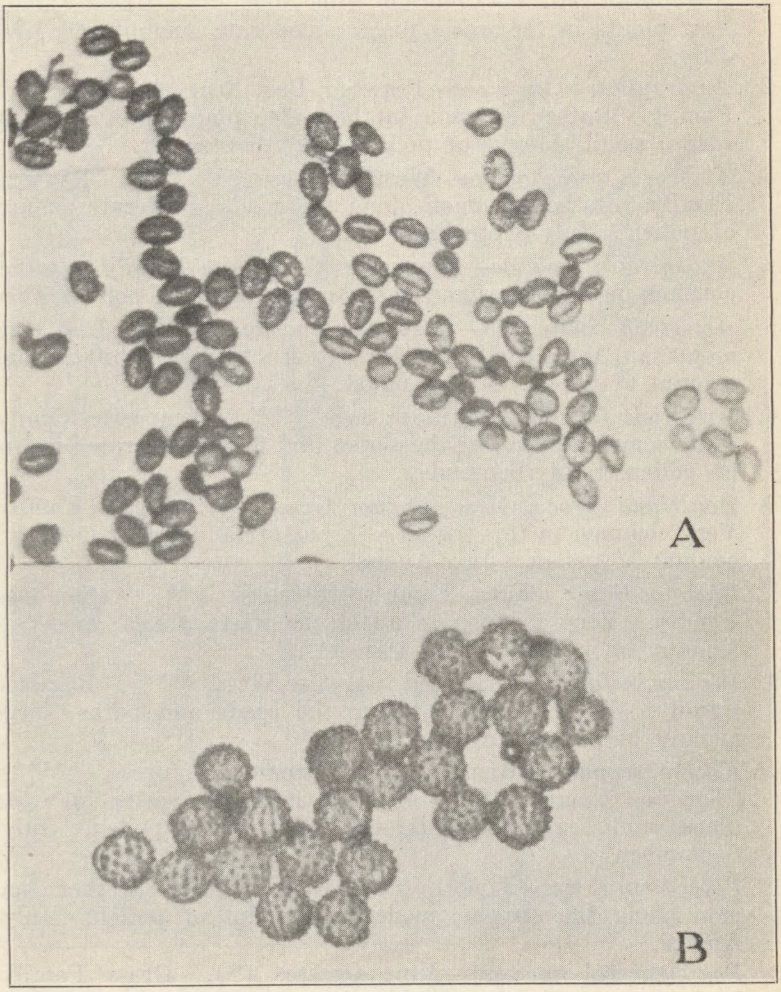


Fig. 15. A. Pollen of Goldenrod (Solidago serotina), insect pollinated, therefore not a cause of Hay Fever (x 250).

Fig. 15. B. Pollen of Giant Ragweed (Ambrosia trifida); very common cause of Hay Fever from the middle of July until frost (x 500).

Palmer Lake

Altitude 7,224 Feet

1. *Agropyron smithii*—Colorado Blue Stem (*). Grass Family. Few plants in the waste places; moderate amount of pollen. July.
2. *Amaranthus retroflexus*—Pigweed, Beet Root (*). Amaranth Family. Rather common in the waste places and along the roads; small amount of pollen. July-September.
3. *Ambrosia psilostachya*—Western Ragweed (***). Ragweed Family. Rather common along the roads; moderate amount of pollen. July-September.
4. *Artemisia aromatica*—Mugwort. Composite Family. Rather common on the slopes and flats; small amount of pollen. July.
5. *Artemisia camporum*—Sage. Composite Family. Less common than Artemisia aromatica but in a similar habitat; small amount of pollen. July-August.
6. *Artemisia frigida*—Mountain Sage (***). Composite Family. Very common on all of the slopes and flats; moderate amount of pollen. July-September.
7. *Bouteloua procumbens*—Grama Grass (*). Grass Family. Very common in this region as a pastureland grass; moderate amount of pollen. July-August.
8. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Very common in all of the waste places; moderate amount of pollen. June-August.
9. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Rather common along the roads and paths; large amount of pollen. August.
10. *Kochia scoparia*—Burning Bush, Summer Cypress (*****). Chenopod Family. Very common along the roads, in waste places and neglected fields; large amount of pollen. July-September.
11. *Phleum pratense*—Timothy (*). Grass Family. Rather common along the stream; moderate amount of pollen. July-August.
12. *Poa* (several species)—June Grasses (*). Grass Family. Rather common in all available places; small amount of pollen. June-July.
13. *Salsola pestifer*—Russian Thistle (*****). Chenopod Family. Very common in all of the waste places; moderate amount of pollen. July-September.
14. *Taraxacum taraxacum*—Dandelion. Chicory Family. Very common; moderate amount of pollen; insect pollinated. May-September.
15. *Ximenesia exauriculata*—Composite Family. Rather common along the roads; moderate amount of pollen; insect pollinated. August-September.

Fig. 16. A. Young plants of Western Ragweed (Ambrosia psilostachya); rather common cause of Hay Fever; note characteristic perennial root system.

Fig. 16. B. Young plant of Short Ragweed (Ambrosia elatior); very common cause of Hay Fever; note characteristic annual root system.

Peaceful Valley

Altitude 8,000 Feet

1. *Amaranthus retroflexus*—Pigweed, Beet Root (*). Amaranth Family. Rather common along the roads in front or near ranch houses; small amount of pollen. July-August.
2. *Artemisia frigida*—Mountain Sage (***). Composite Family. Very common throughout the canyon; moderate amount of pollen. July-September.
3. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Rather common in the barnyards and waste places; moderate amount of pollen. July-August.
4. *Bouteloua procumbens*—Grama Grass (*). Grass Family. Rather common as it forms the pastureland grass of this region; moderate amount of pollen. August-September.
5. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Rather common; large amount of pollen. August.
6. *Poa* (several species)—June Grasses (*). Grass Family. Rather common along the stream; small amount of pollen. June-July.
7. *Populus tremuloides*—Quaking Aspen. Willow Family. Rather common on the slopes of the canyon and along the stream; large amount of pollen. Early spring.
8. *Taraxacum taraxacum*—Dandelion. Chicory Family. Rather common along the banks of the stream (South St. Vrain); moderate amount of pollen; insect pollinated. May-August.

Penrose

Altitude 5,175 Feet

1. *Amaranthus retroflexus*—Pigweed, Beet Root (*). Amaranth Family. Rather common along the roads; small amount of pollen. July-August.
2. *Ambrosia elatior*—Short Ragweed (***). Ragweed Family. Few plants, much dwarfed due to lack of rainfall; moderate amount of pollen. July-August.
3. *Ambrosia psilostachya*—Western Ragweed (***). Ragweed Family. Rather common along the roads and in the orchards; moderate amount of pollen. July-September.
4. *Ambrosia trifida*—Giant Ragweed (****). Ragweed Family. Common along the ditches; large amount of pollen. July-September.
5. *Atriplex canescens*—Bushy Atriplex (*). Chenopod Family. Rather common on the low limestone hills and along the road; large amount of pollen. May-June.
6. *Atriplex confertifolia*—Spiny Atriplex, Shad Scale (***). Chenopod Family. Very common on the limestone hills; moderate amount of pollen. June.

Fig. 17. Winter Fat (Eurotia lanata), portion of the staminate plant to show the manner of growth and character of the inflorescence.

7. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Rather common along the roads and in the waste places; moderate amount of pollen. June-August.
8. *Dactylis glomerata*—Orchard Grass (*). Grass Family. Few plants along the ditches in the orchards; moderate amount of pollen. June.
9. *Dondia torreyana*—Sea Blite. Chenopod Family. Rather common in the more moist alkaline places; moderate amount of pollen. July.
10. *Franseria acanthicarpa*—False Ragweed (*). Ragweed Family. Rather common along the roads; moderate amount of pollen. August-September.
11. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Rather common along the roads and ditches; large amount of pollen. August-September.
12. *Kochia scoparia*—Burning Bush, Summer Cypress (*****). Chenopod Family. Very common along the roads and in all of the waste places; large amount of pollen. July-September.
13. *Medicago sativa*—Alfalfa. Pea Family. Rather common along the ditches and in the orchards; small amount of pollen; insect pollinated. June-September.
14. *Melilotus alba*—White Clover. Pea Family. Rather common along the roads and ditches; small amount of pollen; insect pollinated. July-September.
15. *Poa* (several species)—June Grasses (*). Grass Family. Rather common; small amount of pollen. May-August.
16. *Rumex crispus*—Curled Dock. Buckwheat Family. Few plants; moderate amount of pollen. June.
17. *Salsola pestifer*—Russian Thistle (*****). Chenopod Family. Very common on the alkaline flats; many of the plants very dwarfed due to the lack of moisture; moderate amount of pollen. July-September.
18. *Sarcobatus vermiculatus* — True Greasewood. Chenopod Family. Rather common on the hills; moderate amount of pollen. June-July.
19. *Taraxacum taraxacum*—Dandelion. Chicory Family. Very common; moderate amount of pollen; insect pollinated. April-August.
20. *Xanthium pennsylvanicum*—Cocklebur, Clotbur (*). Ragweed Family. Rather common along the roads; moderate amount of pollen. July-August.
21. *Ximenesia exauriculata*—Composite Family. Rather common in the orchards and neglected fields; moderate amount of pollen; insect pollinated. August-September.

Fig. 18. A. Habitat study of June Grass (Koeleria cristata) during the pollination period.

Fig. 18. B. Habitat study of Squirrel-tail Grass (Hordeum jubatum).

Perry Park

Altitude 7,000 Feet

1. *Amaranthus retroflexus*—Pigweed, Beet Root (*). Amaranth Family. Few plants along the roads; small amount of pollen. July-September.
2. *Ambrosia psilostachya*—Western Ragweed (***). Ragweed Family. Rather common along the roads; moderate amount of pollen. July-September.
3. *Ambrosia trifida*—Giant Ragweed (****). Ragweed Family. Rather common along the road; large amount of pollen. July-September.
4. *Artemisia aromatica*—Mugwort. Composite Family. Rather common on the flats; small amount of pollen. July.
5. *Artemisia frigida*—Mountain Sage (***). Composite Family. Very common on the slopes and flats; moderate amount of pollen. July-September.
6. *Bouteloua procumbens*—Grama Grass (*). Grass Family. Very common as a pastureland grass; moderate amount of pollen. August-September.
7. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Very common in the waste places and along the roads; moderate amount of pollen. June-September.
8. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Rather common along the roads; large amount of pollen. August-September.
9. *Kochia scoparia*—Burning Bush, Summer Cypress (*****). Chenopod Family. Very common along the roads and in the waste places; large amount of pollen. July-September.
10. *Melilotus alba*—White Clover. Pea Family. Rather common along the roadsides; small amount of pollen; insect pollinated. July-September.
11. *Poa* (several species)—June Grasses (*). Grass Family. Rather common; small amount of pollen. June-July.
12. *Salsola pestifer*—Russian Thistle (*****). Chenopod Family. Very, very common along the roads; moderate amount of pollen. July-September.
13. *Ximenesia exauriculata*—Composite Family. Rather common along the roads and in the waste places and neglected fields; moderate amount of pollen; insect pollinated. August-September.

Pine

Altitude 6,753 Feet

1. *Artemisia camporum*—Sage. Composite Family. Rather common; small amount of pollen. July-August.
2. *Artemisia frigida*—Mountain Sage (***). Composite Family. Very common on all the slopes; moderate amount of pollen. July-September.

3. *Artemisia rhizomata*—Sage. Composite Family. Rather common; small amount of pollen. July-September.
4. *Bouteloua procumbens*—Grama Grass (*). Grass Family. Very common as a pastureland grass; moderate amount of pollen. August-September.
5. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Very common in all of the waste places; moderate amount of pollen. July-August.
6. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Few plants along the roads; large amount of pollen. August.
7. *Poa* (several species)—June Grasses (*). Grass Family. Rather common; small amount of pollen. June-July.

PUEBLO

Altitude 4,675 Feet

1. *Amaranthus retroflexus*—Pigweed, Beet Root (*). Amaranth Family. Rather common in the waste places; small amount of pollen. July-September.
2. *Ambrosia elatior*—Short Ragweed (***). Ragweed Family. Common along the walks, ditches and moist places; moderate amount of pollen. August-September.
3. *Ambrosia psilostachya*—Western Ragweed (***). Ragweed Family. Very common in all parts of the city; moderate amount of pollen. July-September.
4. *Ambrosia trifida*—Giant Ragweed (****). Ragweed Family. Very common along the ditches and moist waste places; large amount of pollen. July-September.
5. *Atriplex canescens*—Bushy Atriplex (*). Chenopod Family. Rather common on the alkaline flats; large amount of pollen. May-June.
6. *Atriplex confertifolia*—Spiny Atriplex Shad Scale (***). Chenopod Family. Very common on the alkaline flats; moderate amount of pollen. June-July.
7. *Bouteloua procumbens*—Grama Grass (*). Grass Family. Rather common on the plains surrounding the city; moderate amount of pollen. August.
8. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Very common in all of the waste places; moderate amount of pollen. June-September.
9. *Dactylis glomerata*—Orchard Grass (*). Grass Family. Rather common along the ditches; moderate amount of pollen. June.
10. *Dondia torreyana*—Sea Blite. Chenopod Family. Rather common on the alkaline flats; moderate amount of pollen. July.
11. *Franseria acanthicarpa*—False Ragweed (*). Ragweed Family. Rather common along the streets, in vacant lots and waste places; moderate amount of pollen. August-September.

Fig. 19. A. Upper portion of a plant of Short Ragweed (Ambrosia elatior) to show the type of inflorescence.

Fig. 19. B. Upper portion of a plant of False Ragweed (Franseria discolor) to show type of inflorescence and character of the leaves.

Fig. 20. Rabbit Brush (Chrysothamnus graveolens) rather common on the slopes and flats in the Estes Park region.

12. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Very common along the ditches, roads and in the waste places; large amount of pollen. August-September.
13. *Kochia scoparia*—Burning Bush, Summer Cypress (*****). Chenopod Family. Very common in all of the vacant lots, waste places and along the walks and streets; large amount of pollen. July-September.
14. *Medicago sativa*—Alfalfa. Pea Family. Rather common along the ditches where it has escaped from cultivation; small amount of pollen; insect pollinated. June-September.
15. *Melilotus alba*—White Clover. Pea Family. Rather common along the walks and ditches; small amount of pollen; insect pollinated. July-September.
16. *Plantago lanceolata*—Narrow-leaf Plantain. Plantain Family. Few plants; small amount of pollen. July-August.
17. *Plantago major*—Common Plantain. Plantain Family. Rather common in the lawns; moderate amount of pollen. June-July.
18. *Poa* (several species)—June Grasses (*). Grass Family. Very common, especially Poa annua and Poa pratensis; small amount of pollen. April-September.
19. *Populus deltoides*—Carolina Poplar (*). Willow Family. Very common as a shade tree; large amount of pollen. February-March.
20. *Populus sargentii*—Western Cottonwood (***). Willow Family. Very, very common not only as a shade tree, planted

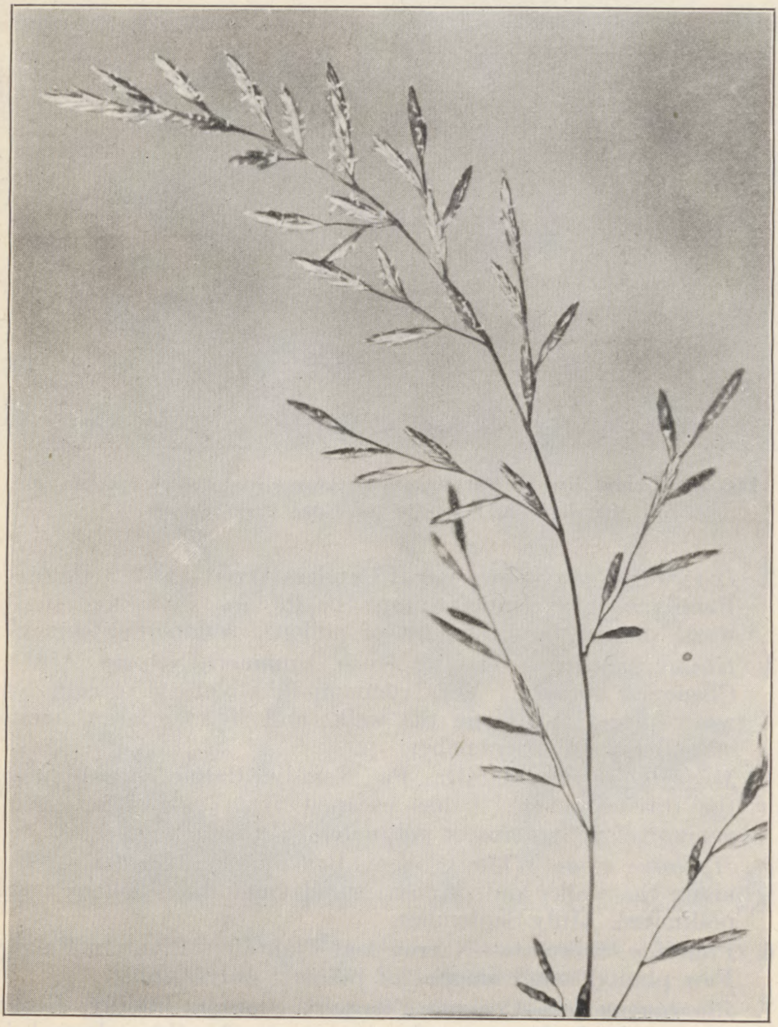


Fig. 21. Fescue Grass (Festuca elatior), rather common around the edges of the lakes in Denver; inflorescence with anthers exerted.

in the city, but along the Fountain and Arkansas Rivers; large amount of pollen. February-March.

21. *Rumex crispus*—Curled Dock. Buckwheat Family. Few plants; moderate amount of pollen. June.
22. *Salsola pestifer*—Russian Thistle (*****). Chenopod Family. Very, very common in all of the vacant lots and waste places; moderate amount of pollen. July-September.
23. *Sarcobatus vermiculatus*—True Greasewood (*). Chenopod Family. Rather common on the plains near the city; moderate amount of pollen. June-July.
24. *Taraxacum taraxacum*—Dandelion. Chicory Family. Very common in all parts of the city; moderate amount of pollen; insect pollinated. April-September.
25. *Xanthium pennsylvanicum*—Cocklebur, Clotbur (*). Ragweed Family. Rather common due to the recent flood; moderate amount of pollen. July-August.
26. *Ximenesia exauriculata*—Composite Family . Rather common along the roads and in neglected places and fields; moderate amount of pollen; insect pollinated. August-September.

Shawnee

Altitude 7,750 Feet

1. *Artemisia camporum*—Sage. Composite Family. Rather common on the slopes; small amount of pollen. August-September.
2. *Artemisia frigida*—Mountain Sage (***). Composite Family. Very, very common on all of the slopes; moderate amount of pollen. July-September.
3. *Artemisia rhizomata*—Sage. Composite Family. Rather common on the slopes in the same type of habitat as Artemisia camporum; small amount of pollen. July-September.
4. *Bouteloua procumbens*—Grama Grass (*). Grass Family. Very common as a pastureland grass; moderate amount of pollen. August-September.
5. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Rather common in all of the waste places and neglected fields, plants rather dwarfed; moderate amount of pollen. July-August.
6. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Rather common along the roads; large amount of pollen. August.
7. *Phleum pratense*—Timothy (*). Grass Family. Rather common along the banks of the Platte River; moderate amount of pollen. July.
8. *Poa* (several species)—June Grasses (*). Grass Family. Rather common along the banks of the Platte River; small amount of pollen. June-July.
9. *Populus tremuloides*—Quaking Aspen. Willow Family. Very

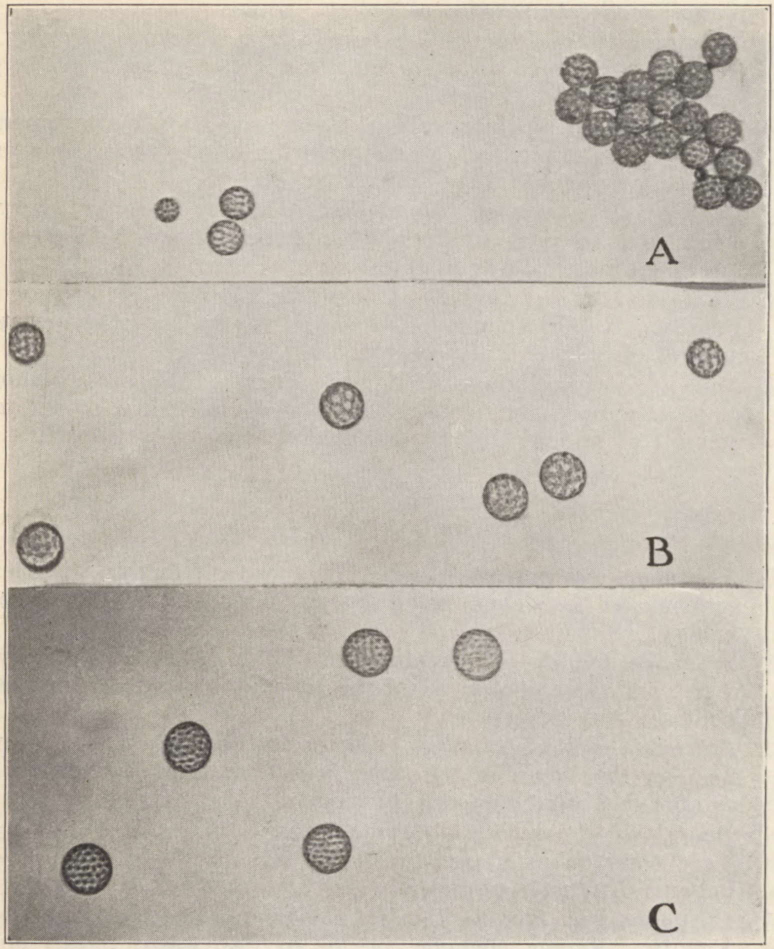


Fig. 22. A. Pollen of Rose Orache (Atriplex rosea); note the conspicuous pores (x 250).

Fig. 22. B. Pollen of Lamb's Quarters (Chenopodium album); minor cause of Hay Fever (x 250).

Fig. 22. C. Pollen of Russian Thistle (Salsola pestifier); a very common cause of Hay Fever (x 250).

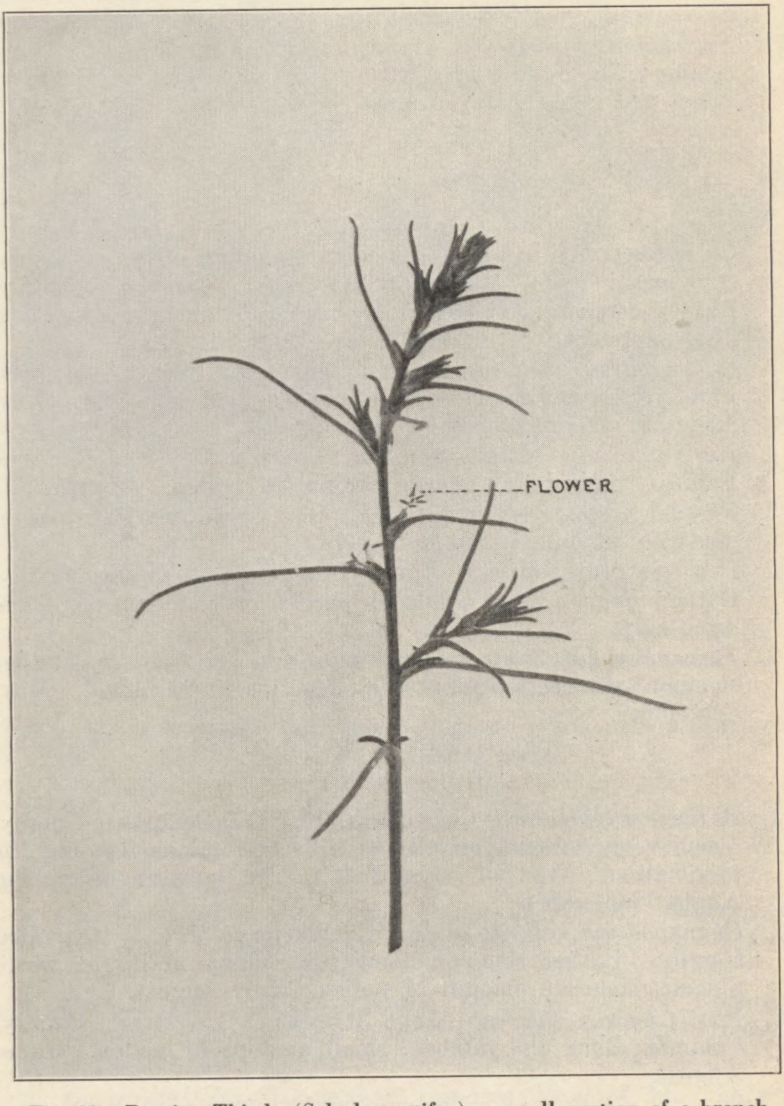


Fig. 23. Russian Thistle (Salsola pestifer), a small portion of a branch to show presence of the axillary flowers.

common on the hills and mountains; large amount of pollen. Early spring.

10. *Salsola pestifer*—Russian Thistle (*****). Chenopod Family. Few plants; moderate amount of pollen. July-August.
11. *Taraxacum taraxacum*—Dandelion. Chicory Family. Very common along the Platte River; moderate amount of pollen; insect pollinated. May-August.

Silver Plume

Altitude 9,189 Feet

1. *Agropyron smithii*—Colorado Blue Stem (*). Grass Family. Rather common in patches, moderate amount of pollen. July.
2. *Artemisia frigida*—Mountain Sage (***). Composite Family. Rather common on the slopes; moderate amount of pollen. July-September.
3. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Rather common in old gardens and neglected places; moderate amount of pollen. July-August.
4. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Few plants; large amount of pollen. August.
5. *Phleum pratense*—Timothy (*). Grass Family. Few plants; moderate amount of pollen. July.
6. *Poa* (several species)—June Grasses (*). Grass Family. Rather common in all available places; small amount of pollen. June-July.
7. *Taraxacum taraxacum*—Dandelion. Chicory Family. Rather common; moderate amount of pollen; insect pollinated. May-September.

Tabernash

Altitude 8,020 Feet

1. *Artemisia tridentata*—Sagebrush (*****). Composite Family. Very, very common on all the hills and mesas forming the predominant type of vegetation; large amount of pollen. August-September.
2. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Rather common along the roads and in the waste places; moderate amount of pollen. July-August.
3. *Poa* (several species)—June Grasses (*). Grass Family. Common along the ditches; small amount of pollen. June-August.

Troutdale

Altitude 7,300 Feet

1. *Amaranthus retroflexus*—Pigweed, Beet Root (*). Amaranth Family. Rather common in the waste places; small amount of pollen. July-September.
2. *Artemisia camporum*—Sage. Composite Family. Rather common on the slopes; small amount of pollen. July-August.

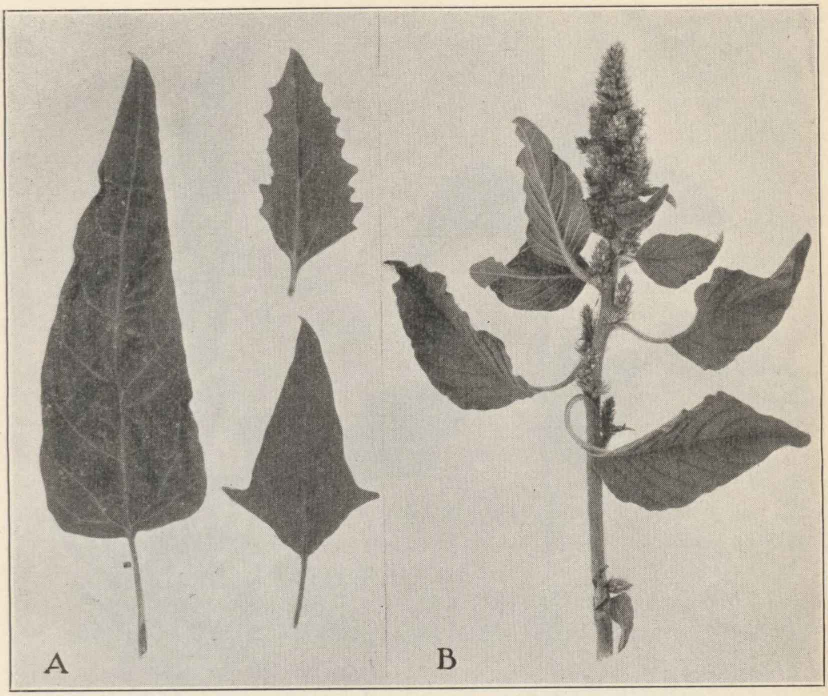


Fig. 24. A. Stem leaves to show the variation between the three species of herbaceous Atriplex common in Central Colorado, A. hortensis at the left, A. rosea upper right, and A. hastata lower right.

Fig. 24. B. Pigweed (Amaranthus retroflexus) inflorescence and upper leaves of a pollinating plant.

3. *Artemisia frigida*—Mountain Sage (***). Composite Family. Very common on the slopes; moderate amount of pollen. July-September.
4. *Artemisia rhizomata*—Sage. Composite Family. Rather common on the slopes in the same type of habitat as Artemisia camporum; small amount of pollen. July-September.
5. *Chenopodium album*—Lamb's Quarters (**). Chenopod Family. Very common in the waste places; moderate amount of pollen. July-August.
6. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Rather common along the road; large amount of pollen. August.
7. *Poa* (several species)—June Grasses (*). Grass Family. Rather common; small amount of pollen. June-July.
8. *Salsola pestifer*—Russian Thistle (*****). Chenopod Family. Few plants along the road; moderate amount of pollen. August.

Fig. 25. A. Upper portion of a young plant of Horseweed, or Careless Weed (Iva xanthifolia) to show the characteristic broad leaves.

Fig. 25. B. Portion of a plant of Poverty Weed (Iva axillaris).

Ward

Altitude 9,331 Feet

1. *Agropyron smithii*—Colorado Blue Stem (*). Grass Family. Rather common; moderate amount of pollen. July.
2. *Artemisia frigida*—Mountain Sage (***). Composite Family. Very common on the slopes; moderate amount of pollen. July-September.
3. *Artemisia gnaphaloides*—Prairie Sage. Composite Family. Rather common in the village proper; small amount of pollen. July-August.
4. *Chenopodium album*—Lamb's Quarters. (**). Chenopod Family. Rather common in the waste places; plants much dwarfed; moderate amount of pollen. July-August.
5. *Iva xanthifolia*—Horseweed, Careless Weed (***). Ragweed Family. Few plants in the waste places; plants much dwarfed; large amount of pollen. August.

6. *Phleum pratense*—Timothy (*). Grass Family. Few plants in the meadows; moderate amount of pollen. July.
7. *Poa* (several species)—June Grasses (*). Grass Family. Rather common in all available places; small amount of pollen. June-July.

Identification of Pollen Grains

For accurate diagnosis of the specific cause of Hay Fever, that is the *offending plant,* in any given case, the following information is essential:

1. Identification of all of the Hay Fever plants of the locality, as is done in this Survey.
2. Determination of the dates of pollination of these Hay Fever plants.
3. Identification of the pollen grains floating in the air by microscopic examination of those grains caught on a microscopic slide moistened with glycerine.
4. Correlation of these data with the dates of the onset of the patient's symptoms.
5. Determination of the patient's Hay Fever reaction by skin or mucous membrane tests with the suspected pollen or pollens.

Frequently diagnosis can be made solely by correlating date of onset of the patient's symptoms with the date of beginning pollination or abundant pollination of the chief Hay Fever plants of the patient's locality. A positive skin test will confirm this tentative diagnosis. Occasionally, a study of the weeds of the immediate environment of the patient is necessary; more rarely, pollen slides must be placed on the window sills of the patient's house, the pollen grains caught and identified by the microscope.

Pollen grain identification is made by:

1. Knowing what plants with wind-borne pollen are pollinating at the moment, and
2. By recognizing under the microscope the size, shape, color, external morphology and staining variations of the pollen grains.

Chart No. II has been prepared by Miss Pope to assist in pollen grain identification.

Chart No. II

Classification of Hay Fever Pollen Grains According to Shape, Size and External Morphology

Kind of Surface	Ellipsoidal	Spherical	Capsule-shaped Cylindrical	Polyhedric
Echinate	Iva xanthifolia, S. (14x20 microns) Solidago sps., S. (21x30 microns) Ximenesia exauriculata, S. (24x33 microns)	Ambrosia elatior, S. (18 microns) Ambrosia psilostachya, S. (22-20 microns) Ambrosia trifida, S. (16-18 microns) Franseria acanthicarpa, S. (16-21 microns) Franseria discolor, S. (16 21 microns) Iva axillaris, S. (20-21 microns) Xanthium pennsylvanicum, S. (20-25 microns)		Taraxacum taraxacum, M. (40 microns)
Smooth	Artemisia aromatica, S. (15x18 microns) Artemisia camporum, S. (12x18 microns) Artemisia filifolia, S. (15x18 microns) Artemisia frigida, S. (12x18 microns) Artemisia gnaphaloides, S. (12x18 microns) Artemisia tridentata, S. (12x21 microns)	Plantago major, S. (15 microns) Plantago lanceolata, S. (15 microns)		Agropyron smithii, M. (30x54 microns) Agrostis palustris, M. Bouteloua procumbens, M. Bromus inermis, M. (30x45 microns) Dactylis glomerata, M. (21x36 microns) Holcus halapense, M. Phleum pratense, M. (30x45 microns) Poa pratensis, M. (30x54 microns)

Punctate		Populus angustifolia, S. Populus deltoides, S. Populus sargentii, S. (24-27 microns) Populus tremuloides, S.	Medicago sativa, M. (20x42 microns) Melilotus alba, M. (15x35 microns)	
Bands	Rumex acetosella, M. Rumex crispus, M. (21x36 microns)			
With very distinct pores		Acnida tamariscina, S. (21-27 microns) Amaranthus retroflexus, S. (19-21 microns)		
With less distinct pores		Atriplex canescens, S. (25-30 microns) Atriplex confertifolia, S. Atriplex rosea, S. Chenopodium album, S. (18-25 microns) Dondia torreyana, S. Eurotia lanata, S. (24 microns) Kochia scoparia, S. (20-28 microns) Salsola pestifer, S. (18-24 microns) Sarcobatus vermiculatus, S.		

Note: S=Small Grains (10-30 microns); M=Medium Grains (30-60 microns).