Weights of Seeds and Numbers per Plant[1]

O. A. Stevens[2]

The present paper is supplementary to one previously published (3) which received more comment than had been expected. In the meantime Salisbury's book (2) appeared in which reference was made to the paucity of data on the subject and many records from the previous paper were quoted. Salisbury made statistical and ecological studies of various species in Great Britain.

Methods of collection have been the same as for the earlier report (3). In most cases a single plant, judged to be of average size and growing where competition was low, was harvested at maturity or when a maximum number of seeds could be obtained. The plants were air dried for two weeks or more, threshed and cleaned to remove immature seeds, empty florets, etc. In some cases *(Epilobium, Pyrola),* visual examination had to replace the usual cleaning.

This method serves well for species the seeds of which are retained until all are mature. For species in which ripening extends over a considerable period and seeds are shed as soon as mature, only a part of the total number can be secured at a single collection. In most cases that number is given, with footnotes to indicate that more would have developed, or if some had already dropped. As noted in the previous report (3) the total yield for these plants might be estimated at twice as many if some had dropped or had not matured or four times as many if both factors prevailed.

In a few cases daily collections were made or *(Lactuca scariola, L. biennis)* heads were counted and total number estimated. In some plants seeds were extensively damaged by insects and this is noted. In most cases the total number listed is that of good seeds only for one plant. In those groups where seed is not separated readily from fruit the weights are usually of the fruit or parts thereof, such as caryopsis with lemma and palea, achenes, nutlets or mericarps.

For perennials which increase in area, a single stalk was usually taken. The propriety of choosing an "average" plant has been discussed by Salisbury (2) who sought to obtain average yields from a large number of individuals. However, conditions vary so widely that averages would be valid only for the conditions under which samples were taken. Production by occasional plants that survive in fields is an important item which is often overlooked. Further discussion is made under a few species.

Material is from North Dakota unless otherwise indicated. A few species have been duplicated, usually without intention. Specimens from the same lot of a few species have been distributed to several

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[2]Formerly Botanist, North Dakota Agric. Exp. Sta. Retired June 30, 1956.

Table 1. Seed weights and production of individual plants.

Species	Wt. 1000 seeds grams	Total number per unit of measure	Unit of measure	Remarks
Sparganiaceae				
Sparganium eurycarpum	46.600	295	1 stem	4 heads
Alismataceae				
Sagittaria cuneata	.235	5,150	1 plant	6 flowers
Gramineae				
Aristida longiseta	3.500	130	1 plant	Awns present
Aristida longiseta	2.000	———	———	Awns removed
Bromus inermis	2.900	220	1 stem	
Bromus latiglumis	2.200	1,220	1 plant	
Bromus tectorum	2.400	700	1 plant	
Cinna latifolia	.080	6,400	3 stems	
Deschampsia caespitosa	.200	50	1 plant	
Elymus villosus	3.300	390	1 plant	
Elymus virginicus, var. *submuticus*	4.950	435	1 plant	14 spikes
Eragrostis spectabilis	.103	86,430	1 plant[4]	Kansas
Eragrostis spectabilis	.073	———	———	Caryopses
Festuca obtusa	1.100	980	1 plant	
Glyceria grandis	.400	2,550	1 stem	
Glyceria striata	.200	1,650	1 plant	
Leersia oryzoides	1.200	4,240	1 plant	
Lolium persicum[3]	8.650	490	1 plant	
Oryzopsis hymenoides	3.150	280	1 plant	
Phalaris arundinacea	1.100	120	1 stem	
Poa annua	.200	2,050	1 plant	
Poa palustris	.130	2,770	1 plant	Plus many infertile
Puccinellia nuttalliana	.170	3,530	1 plant	
Schedonnardus paniculatus	.300	125	1 plant	
Schedonnardus paniculatus	.340	1,380	1 plant[4]	
Scolochloa festucacea	1.100	1,430	1 stem	
Setaria faberii	1.900	4,030	1 plant	Kansas
Setaria verticillata	1.050	3,180	1 plant	
Sphenopholis obtusata	.090	6,330	1 plant	
Stipa comata	9.040	125	1 plant	Incl. awns
Stipa comata	3.600	———	———	Without awns
Stipa spartea	34.400	72	1 plant	Incl. awns
Stipa spartea	16.100	———	———	Without awns
Cyperaceae				
Carex cristatella	.240	2,160	1 plant	
Carex filifolia	2.900	232	1 plant	Tuft 1.5 dm., 92 spikes
Carex gracillima	1.350	550	1 plant	
Carex retrorsa	1.260	10,400	1 plant	
Carex stenophylla	1.400	12	1 stem	Av. from 100 spikes
Eriophorum angustifolium	.300	35	1 stem	
Scirpus acutus	1.460	400	1 stem	Av. of 10 panicles
Scirpus cyperinus	.023	100,000	1 plant	Minn., bristles mostly off
Scirpus fluviatilis	8.500	420	1 stem	
Scirpus paludosus	2.730	179	1 stem	
Scirpus validus	.700	1,785	1 stem	Av. of 10 panicles
Araceae				
Acorus calamus	3.720	435	1 stem	
Arisaema atrorubens	21.400	101	1 plant	
Commelinaceae				
Tradescantia occidentalis	3.000	305	1 plant	
Liliaceae				
Allium stellatum	1.800	303	1 plant	3 umbels
Allium textile	2.350	136	1 plant	3 umbels
Allium textile	2.140	56	1 plant	2 umbels
Allium textile	2.560	168	1 plant	
Allium tricoccum	13.250	24	1 plant	Av. of 15
Asparagus officinalis	19.850	2,650	1 stem	
Fritillaria atropurpurea[5]	2.780	72	1 plant	1 capsule
Polygonatum canaliculatum	17.080	270	1 stem	

Table 1. Seed weights and production of individual plants *(Continued).*

Species	Wt. 1000 seeds grams	Total number per unit of measure	Unit of measure	Remarks
Smilacina stellata	15.300	16	1 stem	Av. of 10 stalks
Smilax herbacea	30.600	277	1 plant	4 umbels
Trillium cernuum	2.200	106	1 plant	
Amaryllidaceae				
Hypoxis hirsuta	.380	300	1 plant	
Urticaceae				
Pilea pumila	.090	660	1 plant	
Polygonaceae				
Eriogonum multiceps[5]	.450	103	1 plant	Plus 90% infertile
Polygonum aviculare	.900	4,600	1 plant[4]	
Polygonum longistylum	2.400	6,000	1 plant[4]	Kansas
Polygonum pensylvanicum	3.250	6,500	1 plant[4]	Kansas
Polygonum prolificum	1.460	652	1 plant[4]	Plus 403 exserted immature
Polygonum prolificum	1.250	———	———	Without calyx
Polygonum punctatum	2.250	5,140	1 plant[4]	Kansas
Rumex alluvialis[6]	1.000	20,000	1 plant	Grown from Kans. seed
Rumex domesticus	.900	63,250	1 plant	
Tovara virginiana	9.900	113	1 stem	Kansas
Chenopodiaceae				
Atriplex glabriuscula	2.380	———	———	Thin yellow
Atriplex glabriuscula	1.000	6,000	1 plant	Black seeds
Axyris amaranthoides	1.540	500	1 plant[4]	84 rounded, 416 flattened
Chenopodium bushianum[7]	1.450	2,170	1 plant	
Chenopodium fremontii[5]	.400	2,800	1 plant[4]	
Chenopodium glaucum	.280	80,000	1 plant	
Chenopodium strictum[7]	.370	114,200	1 plant	Large plant
Chenopodium strictum[7]	.370	50,000	1 plant	Av. plant
Amaranthaceae				
Amaranthus retroflexus	.340	229,175	1 plant[4]	Large plant
Amaranthus retroflexus	———	147	1 plant	Late plant 8 cm. high
Amaranthus retroflexus	.410	313,000	1 sq. yd.	60 plants, 77,000 immature seeds
Aizoaceae				
Mollugo verticillata	.058	15,000	1 plant[4,8]	
Caryophyllaceae				
Arenaria lateriflora	.450	175	———	About 25 stems
Cerastium brachypodum	.058	795	1 plant[4]	
Gypsophila paniculata	.860	13,700	1 plant	Minn.
Lychnis alba	.580	8,440	1 plant	
Lychnis drummondii	.150	6,730	1 plant[8]	
Saponaria vaccaria	7.400	2,570	1 plant	
Silene dichotoma	.860	15,325	1 plant[4]	
Stellaria media	.387	600	1 plant[4]	
Ranunculaceae				
Ranunculus cymbalaria	.073	1,220	———	1 Tuft
Ranunculus macounii	1.740	784	1 plant[4]	
Ranunculus pensylvanicus	.700	11,200	1 plant[4]	
Ranunculus pensylvanicus	.600	2,500	1 plant[4]	
Ranunculus recurvatus	.575	1,600	1 plant	
Ranunculus sceleratus	.260	3,270	1 plant[4,8]	
Thalictrum dasycarpum	2.550	1,600	1 plant	
Berberidaceae				
Caulophyllum thalictroides	121.000	30	1 plant	
Papaveraceae				
Corydalis sempervirens	.460	1,000	1 plant	Minn.
Papaver somniferum	.280	13,800	1 plant	7 fruits
Sanguinaria canadensis	7.260	31	———	1 fruit

Table 1. Seed weights and production of individual plants *(Continued).*

Species	Wt. 1000 seeds grams	Total number per unit of measure	Unit of measure	Remarks
Cruciferae				
Arabis divaricarpa	.140	3,000	1 plant	
Arabis holboellii	.085	4,590	1 plant	
Arabis holboellii	.110	9,455	1 plant	
Brassica hirta	4.600	3,125	1 plant	
Brassica juncea	1.840	4,780	1 plant	
Brassica nigra	1.500	5,600	1 plant	
Camelina microcarpa	.280	12,820	1 plant[4]	
Camelina microcarpa	.280	5,035	1 plant	
Cardaria draba	2.150	2,300	1 stem	Plus many infertile
Cardaria pubescens	1.000	20	1 stem	Av. 10 stems
Descurainia sophia	.110	842,700	1 sq. yard	
Draba nemorosa	.019	1,340	1 plant	
Draba reptans	.037	1,300	1 plant	
Lepidium sativum	2.150	2,300	1 plant	
Lesquerella alpina[5]	.476	210	1 plant[4]	
Lesquerella ludoviciana	.467	300	1 plant[4]	Herb. Stevens 139
Raphanus raphanistrum	7.650	1,875	1 plant	Grown in garden
Raphanus sativus	8.500	160	1 plant	Wild form
Rorippa islandica, var. *hispida*	.047	18,080	1 plant[4]	
Rorippa obtusa	.075	19,730	1 plant	
Sisymbrium loeselii	.080	37,200	1 plant	
Saxifragaceae				
Heuchera richardsonii	.063	3,300	1 plant	
Ribes setosum	1.300	1,830	1 plant	
Rosaceae				
Chamaerhodos nuttallii	.270	780	1 plant[4,8]	
Geum aleppicum	1.750	1,000	1 plant	
Geum triflorum	.600	142	1 plant	
Potentilla pensylvanica	.130	15,200	1 plant	
Potentilla pentandra	.047	32,100	1 plant	
Rosa arkansana	12.100	200	1 stem	
Rosa woodsii	10.640	1,140	1 stem	
Leguminosae				
Amorpha fruticosa	9.250	4,070	1 plant	Fruits
Amorpha fruticosa	5.600	———	———	Seeds
Amorpha nana	4.800	2,310	1 plant	Fruits
Amorpha nana	2.450	———	———	Seeds
Amphicarpa bracteata	35.000	130	1 plant	
Astragalus bisculcatus[5]	4.750	1,870	1 plant	Plus 50% weeviled
Astragalus canadensis	1.600	2,125	1 plant	Plus many infertile or weeviled
Astragalus racemosus	4.000	2,800	1 plant	
Astragalus racemosus	4.300	4,400	1 plant	
Astragalus striatus	1.550	3,000	1 plant	
Astragalus tenellus	3.410	117	1 plant	
Desmodium canadense	5.150	2,160	1 plant	
Hedysarum boreale[5]	5.050	———	1 plant	Segments, mostly infertile
Hedysarum boreale	2.240	125	1 plant	Seeds
Lathyrus venosus	37.500	80	1 stem	
Lupinus pusillus[5]	17.600	50	1 plant[4]	
Petalostemum multiflorum	1.200	1,750	1 plant	Kans., plus many infertile
Petalostemum purpureum	1.500	368	1 plant	Plus many infertile
Psoralea argophylla	19.000	53	1 stem	
Thermopsis rhombifolia[5]	15.200	40	1 stem	
Vicia americana	16.400	62	1 stem	
Geraniaceae				
Geranium bicknellii	1.840	87	1 plant[4]	
Geranium carolinianum	1.950	470	1 plant[4]	
Linaceae				
Linum sulcatum	.200	110	1 plant[4]	
Oxalidaceae				
Oxalis violacea	.450	23	1 plant	Av. of 5 plants

Table 1. Seed weights and production of individual plants *(Continued).*

Species	Wt. 1000 seeds grams	Total number per unit of measure	Unit of measure	Remarks
Polygalaceae				
Polygala alba	.700	515	1 plant	Many yet undeveloped
Euphorbiaceae				
Croton monanthogynous	5.760	26	1 plant[4]	Kansas
Euphorbia dictyosperma	1.350	215	1 plant[4]	
Euphorbia dentata	4.650	835	1 plant[4]	Kansas
Euphorbia maculata (nutans)	.330	156	1 plant[4]	Plus 285 immature, Kansas
Euphorbia marginata	14.500	660	1 plant[4]	Kansas
Euphorbia missurica	.600	900	1 plant[4]	Kansas
Malvaceae				
Abutilon theophrasti	8.750	4,300	1 plant[4]	Below average
Hibiscus trionum	3.500	58,600	1 plant	Large plant collected daily
Malva parviflora	3.500	2,130	1 plant	Carpels
Sida spinosa	3.190	510	1 plant[4]	Kans., carpels
Sphaeralcea coccinea	2.100	1,860	1 plant	Carpels, large plant
Violaceae				
Viola nuttallii[5]	2.900	117	1 plant	
Viola pensylvanica	2.430	43	1 plant[4]	
Loasaceae				
Mentzelia decapetala	1.150	4,460	1 plant[4]	Below average
Cactaceae				
Opuntia fragilis	20.850	485	1 plant	One large clump
Opuntia humifusa	29.400	———	———	
Lythraceae				
Ammannia coccinea	.020	335,000	1 plant	
Onagraceae				
Epilobium glandulosum	.084	72,600	1 plant[4,8]	
Gaura parviflora	8.100	520	1 plant[4,8]	Kans., fruits
Umbelliferae				
Cryptotaenia canadensis	2.450	270	1 plant	
Cymopterus acaulis	3.020	116	1 plant	
Heracleum maximum	8.000	2,280	1 plant	Aphid damage
Lomatium foeniculaceum	5.100	149	1 plant	
Lomatium macrocarpum[5]	4.400	1,000	1 plant	
Musineon divaricatum[5]	2.350	625	1 plant	
Pastinaca sativa	4.450	6,240	1 plant	
Zizia aurea	2.100	1,120	1 plant	
Pyrolaceae				
Pyrola elliptica	.001	23,000	1 stalk	Av. of 2 stalks, 18 capsules
Primulaceae				
Androsace occidentalis	0.210	700	1 plant	
Lysimachia quadriflora	4.400	55	1 plant	
Gentianaceae				
Gentiana andrewsii	.060	2,400	1 plant	
Asclepiadaceae				
Asclepias incarnata	4.400	1,200	1 plant	
Asclepias ovalifolia	4.150	200	1 plant	
Asclepias speciosa	5.890	630	1 stem	Av. wt. and No.
Asclepias syriaca[9]	5.850	760	1 stem	Av. wt. and No.
Convolvulaceae				
Cuscuta glomerata	1.200	1,960	1 host stem	
Cuscuta gronovii	2.300	22,900	1 clump	On *Chrysanthemum uliginosum*
Evolvulus nuttallianus[5]	4.950	363	1 plant	S. Dakota

Table 1. Seed weights and production of individual plants *(Continued).*

Species	Wt. 1000 seeds grams	Total number per unit of measure	Unit of measure	Remarks
Polemoniaceae				
Collomia linearis	1.260	183	1 plant	
Phlox hoodii[5]	1.000	50	1 plant	
Hydrophyllaceae				
Hydrophyllum virginianum	8.100	60	1 plant	
Phacelia heterophylla[5]	.850	740	1 plant[4]	
Boraginaceae				
Amsinkia idahoensis[5]	1.200	350	1 plant[4]	Herb. Stevens 629
Amsinkia menziesii	1.700	———	———	
Cryptantha bradburiana[5]	1.450	1,870	1 plant	
Cynoglossum boreale	15.400	50	1 plant	
Hackelia americana	1.400	770	1 plant	
Heliotropium curassavicum	2.550	3,035	1 plant[4]	
Lithospermum incisum	4.700	100	1 plant	
Mertensia lanceolata[5]	.960	52	1 plant	
Labiatae				
Hedeoma drummondii[5]	.190	1,340	1 plant[4]	
Lycopus uniflorus	.250	1,360	1 plant	
Physostegia parviflora	1.900	200	1 stem	
Salvia reflexa	1.450	3,560	1 plant[4,8]	
Scrophulariaceae				
Castilleja coccinea	.048	2,710	1 plant	Yellow form
Castilleja coccinea	.035	1,290	1 plant	Yellow form
Castilleja sessiliflora	.100	3,900	1 plant	
Castilleja sessiliflora	.170	1,500	1 plant	
Orthocarpus luteus	.120	1,170	1 plant	
Pedicularis canadensis	.445	1,530	1 stem	
Penstemon angustifolius[5]	1.000	3,730	1 plant	
Penstemon eriantherus[5]	1.620	2,340	1 plant	
Penstemon nitidus[10]	1.500	513	1 plant	
Penstemon nitidus[10]	.900	180	1 plant	
Veronica peregrina	.035	2,650	1 plant[4,8]	
Martyniaceae				
Proboscidia lousianica	30.600	870	1 plant	Colo.
Orobanchaceae				
Orobanche ludoviciana	.0025	240,000	1 plant	
Phrymaceae				
Phryma leptostachya	5.000	70	1 plant	Fruits with calyx
Plantaginaceae				
Plantago eriopoda	.440	500	1 plant	
Plantago eriopoda	.470	1,570	1 plant	
Plantago indica	1.500	100	1 plant	
Rubiaceae				
Galium aparine	7.600	105	1 plant	
Campanulaceae				
Lobelia siphilitica	.024	8,100	1 plant	
Compositae				
Agoseris cuspidata	2.090	105	1 plant	2 heads
Agoseris glauca	1.820	137	1 plant	4 heads
Aster brachyactis	.170	47,000	1 plant	
Aster hesperius	.260	10,000	1 stem	
Aster umbellatus	.575	4,000	1 plant	Pappus present
Aster umbellatus	.500	———	———	Pappus removed
Carduus crispus	1.600	700	1 plant[4]	
Centaurea repens	4.600	128	1 plant	Plus 80% infertile
Cichorium intybus	.800	4,600	1 plant	Wis.

Table 1. Seed weights and production of individual plants *(Concluded).*

Species	Wt. 1000 seeds grams	Total number per unit of measure	Unit of measure	Remarks
Cirsium altissimum	5.500	55,120	1 plant[4]	
Circium undulatum, var. *megacephalum*	5.300	136	1 plant	5 heads, plus 50% weeviled
Dyssodia papposa	.550	420	1 plant	Kans.
Erigeron canadensis	.052	32,000	1 plant	Incl. 84% immature
Eupatorium maculatum	.390	2,700	1 stem	
Gaillardia pulchella	2.250	1,730	1 plant	
Helenium autumnale	.330	125	1 plant	Plus 90% weeviled
Helianthus maximiliani	1.700	9,120	1 plant	4 or 5 stems
Lactuca biennis	.900	3,600	1 plant	Est. total
Liatris aspera	1.100	145	1 plant	Plus 70% infertile or weeviled
Liatris punctata	4.660	58	1 plant	Plus 90% infertile or weeviled
Liatris pycnostachya	1.100	330	1 plant	Plus 60% infertile or immature
Petasites sagittatus	.036	550	1 stem	
Ratibida pinnata	.720	4,300	1 plant	Minn.
Senecio integerrimus	.760	760	1 plant	
Silphium perfoliatum	6.850	295	1 stem	
Solidago canadensis, var. *gilvocanescens*	.100	16,500	1 stem	
Solidago mollis	.175	4,850	1 stem	
Taraxacum erythrospermum	.410	20,000	1 plant	Large plant
Taraxacum erythrospermum	.370	———	———	Pappus removed
Taraxacum officinale	.640	12,000	1 plant	
Taraxacum officinale	.620	———	———	Pappus removed
Tragopogon major	6.000	150	1 plant	Outer flowers
Tragopogon major	4.000	330	1 plant	Inner flowers

[3]Hitchcock, A. S., "Manual of the Grasses of the United States", 2nd edition, USDA Misc. Publ. 200, 1950.
[4]Additional seeds not matured.
[5]Harrington, H. D., "Manual of the Plants of Colorado", 1954.
[6]Gates, F. C. and MacGregor, R. L., Trans. Kansas Acad. Sci. 53:186, 1949.
[7]Wahl, H. B., Bartonia 27:1–46, 1954; Stevens, O. A., North Dakota Agr. Exp. Sta. Bimonthly Bul. 17:108–110, 1955.
[8]Additional seeds shattered.
[9]Stevens, O. A., North Dakota Agr. Exp. Sta. Bul. 333, 1945.
[10]Rydberg, P. A., "Flora of the Rocky Mountains and Adjacent Plains", 1922.

large herbaria and collector's numbers of these are cited. Nomenclature follows M. L. Fernald, "Gray's Manual of Botany", 8th. edition, (1950) in most cases. Western species are according to H. D. Harrington, "Manual of the Plants of Colorado" (1954).

Comparison of seed numbers per plant

In the previous paper (3) seed weights were compared with those reported by other workers because of the utility of these in seed analysis. Salisbury (2) also emphasized seed weight. In Table 2 numbers of seeds per plant are shown for species listed by Korsmo (1), Salisbury and Stevens. There seem to be only six that have been reported in all three listings. Where ranges were given by Salisbury the averages are shown and the totals are rounded off.

The numbers found by the three workers probably agree in the main as well as could be expected. Korsmo's figures run low as a rule, apparently because plants under considerable competition were used.[11] In a few cases *(Linaria, Matricaria, Stellaria, Solanum)* they are high. Salisbury mentions 16 stems for his *Linaria.*

[11]Korsmo, E. Private communication in which it was stated that his figures were averages for weeds growing among crop plants. 1931.

Table 2. Numbers of seeds per plant found by three workers.

Species	Authority		
	Korsmo	Salisbury	Stevens
Achillea millefolium	3,300	———	210[12]
Alisma plantago and *A. triviale*	———	36,500	21,200
Arctium minus	1,900	———	31,600
Atriplex patula	3,000	———	16,400
Avena fatua	450	———	250[4]
Berteroa incana	7,300	———	2,530
Brassica kaber	1,200	———	2,700
Brassica hirta	1,800	———	3,125[13]
Capsella bursa-pastoris	21,000	3,700	38,500[4,8]
Chenopodium album	3,100	———	72,450
Chenopodium glaucum	2,800	———	80,000[13]
Chenopodium rubrum	3,000	250,000	176,300
Chrysanthemum leucanthemum	2,000	2,700	510[12]
Cichorium intybus	6,500	———	4,600[13]
Descurainia sophia	6,000	———	75,650
Echinochloa crusgalli	600	———	7,160[4,8]
Erigeron canadensis	———	25,000	32,000[13]
Erysimum cheiranthoides	3,750	———	30,500
Galium aparine	360	———	105[13]
Hyoscyamus niger	8,000	6,300	———
Juncus bufonius	———	34,000	5,300
Linaria vulgaris	8,700	31,500	2,280
Malva rotundifolia (borealis)	500	———	47,500
Matricaria matricarioides	———	6,400	850
Mentha arvensis	200	———	5,500[12]
Plantago major	21,500	———	36,150
Polygonum aviculare	160	———	6,380[13]
Polygonum convolvulus	170	———	11,900
Polygonum hydropiper	385	———	3,300
Polygonum lapathifolium	825	———	19,300
Polygonum persicaria	500	———	1,550[4]
Ranunculus sceleratus	———	26,500	3,270[4,8,13]
Raphanus raphanistrum	160	———	1,875[13]
Rorippa palustris and *R. islandica*	———	13,000	18,000[13]
Rumex acetosella	1,000	———	250[12]
Rumex crispus	3,700	———	29,500
Rumex domesticus	9,000	———	63,250[13]
Rumex maritimus	———	64,000	98,250
Salsola kali	300	———	24,700
Setaria glauca	850	———	6,420[4]
Silene dichotoma	1,100	———	15,325[4,13]
Solanum nigrum	40,000	8,000	———
Sonchus arvensis	6,400	13,300	9,750[12]
Stachys palustris	240	———	64[12]
Stellaria media	15,000	———	600[4,13]
Taraxacum officinale	3,000	2,400	12,000[13]
Thlaspi arvense	900	2,000	7,040
Verbascum thapsus	———	136,000	223,000

[4]Additional seeds not matured.
[8]Additional seeds shattered.
[12]One stem.
[13]Reported in present paper; all other in earlier report (3).

NOTES ON INDIVIDUAL SPECIES

Actaea rubra. A 20-year old plant in a flower bed bore 19 racemes with 20 to 40 fruits each.

Amaranthus retroflexus. The small plants grew sparsely in bare garden soil. Late summer was so dry that further growth was prevented. In the square yard of 60 plants only two produced lower branches. The comparisons of this with the large plant is a fair example of what happens under moderate competition compared with unrestricted growth under favorable conditions.

Atriplex glabriuscula. A flourishing colony of this was found in 1954 near a railroad in Fargo, N. Dakota. Another was seen in 1955

about one-half mile from the first but seed production was poor. From the first colony, herbarium material was collected (No. 1507) in early bloom August 27 and fruit September 30. The clusters showed scattered larger fruits the bracts of which averaged 4 mm wide as compared to 2.4 mm for the others. There was some intergradation (maturity?) but the size distribution in the smaller ones followed a normal curve while that of the larger ones was quite irregular. Salisbury (2) reported one to two per cent of the larger seeds in *A. patula*. The present writer (3) had either overlooked or discarded them.

Centaurea repens. Collected in August from stems of previous year but seemed not to have shed.

Polygala alba. This is a species that produces flowers over a considerable period and sheds quickly.

Rumex alluvialis. This was grown from seeds supplied by Rev. S. V. Fraser of Concordia, Kansas. It is probably the same as plants identified by Dr. John W. Moore as *R. odontocarpus* Sandor. This is well established in North Dakota, also in adjacent South Dakota and Minnesota. Both it and *R. domesticus* have been overlooked because of their resemblance to *R. crispus*.

Schedonnardus paniculatus. In one case "average" tufts were found to be separable into many (individuals?). One result is from one of these separations and the other probably from an entire tuft.

Stellaria media. The high number given by Korsmo is surprising. The plants most commonly are much crowded in lawns. The present record was from a garden and it was hard to find a specimen that seemed normally fertile.

Taraxacum erythrospermum. The large plant listed in the Table 1 grew in a garden and ripened 162 heads, averaging 120 fruits each from May 26 to June 6.

Taraxacus officinale. The number of fruits varies greatly according to size of plant. Ten plants in an unused city area produced 7 to 79 (av. 24) heads. The number of fruits per head varied from 100 to 300. The one listed in the Table 1 matured 65 heads, and averaged 124 fruits each, from May 28 to June 2. Yields of 3,700 to 20,800 were given by von Hofsten (4).

Thlaspi arvense. Salisbury (2) calculated an average of 468 seeds per plant from two square yards that the present writer harvested. This would be about one-half as many per plant as Korsmo (1) reported, one-fourth what Salisbury calculated and one-fifteenth what Stevens had reported (3). The square yard samples were taken in fallow ground where there was an even and nearly pure stand but without excessive crowding. Evidently the plants were considerably suppressed. Under extreme crowding a single fruit or none at all is produced. In 1953, plants were harvested in 352 feet of wheat drill rows (equivalent to 176 sq. ft.). There were 189 plants averaging 5.5 fruits each. The largest number of fruits per plant was 22 (about 200 seeds).

Tragopogon major. The figures given were from five heads, a low number. A large plant in the garden produced 154 heads from June 15 to August 18. The inner fruits were thought perhaps infertile but both kinds germinated promptly and completely when tested in a chamber a few days after maturing. The number of flowers per head decreased on later branches. Several heads that flowered July 6–12 averaged 117 fruits plus 8 undeveloped; July 17–23, 76 plus 2; and Aug. 15–18, 53 plus 17.

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