1994

Reproductive Strategies in Asclepias syriaca and Apocynum cannabinum

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REPRODUCTIVE STRATEGIES IN ASCLEPIAS SYRIACA AND APOCYNUM CANNABINUM

A Thesis

Presented to

The Faculty of the Department of Biology

The College of William and Mary in Virginia

In Partial Fulfillment

Of the Requirements for the Degree of

Master of Arts

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by

Mariellen J. Soltys

1994

APPROVAL SHEET

This thesis is submitted in partial fulfillment of

the requirements for the degree of

Master of Arts

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ACKNOWLEDGMENTS

Deepest appreciation is extended to the chairman of my committee, Dr. Garnett R. Brooks, Jr., and to the other committee members, Dr. Norman J. Fashing and Dr. Stewart A. Ware, for their advice and guidance in this study. The author wishes to thank Crystal Matthews for her assistance. Special thanks are due to my parents, Anthony and Patricia Soltys, for their financial and field assistance, and to Steve Calabro for his encouragement.

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ABSTRACT

This study documents the reproductive biology of *Asclepias syriaca* and *Apocynum cannabinum*, two common "weed" species. I examined the reproductive output of *Apocynum cannabinum* in relation to that of *Asclepias syriaca* in an attempt to determine if *Apocynum* is similar to *Asclepias* in producing relatively few seed pods with respect to flower number. For both species, I also examined the relationship between the ratio of reproductive tissue weight compared to vegetative weight to determine if this was a factor controlling pod number, and I also examined the effect of adding weight to the apical region on pod and seed production to determine if added weight could affect the number of mature pods produced.

Asclepias and *Apocynum* did not have the same reproductive/vegetative tissue ratio. No significant differences were found in pod number and seed production between plants which had weights added and the control plants. However, the study revealed that, like *Asclepias*, *Apocynum* produces a greater number of flowers than pods. In addition, for both plants, a greater number of pods were initiated than reached maturity.

This study indicated that *Apocynum*, like *Asclepias*, may be useful in the study of the regulation of pod production. Additional studies of *Apocynum* may aid in the understanding of its mechanisms for regulating pod production.

REPRODUCTIVE STRATEGIES IN ASCLEPIAS SYRIACA AND APOCYNUM CANNABINUM

INTRODUCTION

Species of plants commonly referred to as weeds generally utilize r-selected strategies (Mac Arthur and Wilson, 1967). These species emphasize reproductive productivity and generate seeds which are usually wind dispersed. Numerous weed species utilize the habitat created as a result of clearing. Natural phenomena such as fire and flooding in addition to man-made clearings such as pastures, cultivated fields, railroad rights-of-way, and roadsides provide ideal habitat for the r-selected strategists (Mac Arthur and Wilson, 1967). Asclepiadaceae and Apocynaceae are two related families which contain weed species that commonly occupy cleared habitat. Species of these families have brief yet prolific life cycles resulting in maximum reproductive output. Much is known of the reproductive biology of Asclepiadaceae, but little attention has been directed toward reproductive biology in the related Apocynaceae. This study was designed to examine the differences and similarities in the reproductive strategies in two representative species of each family, *Asclepias syriaca* (Common Milkweed) and *Apocynum cannabinum* (Hemp Dogbane).

Asclepias syriaca

Asclepias syriaca is a common weed in pastures and cultivated fields, as well as along railroad tracks and roadsides of the North Central and North East United States and Canada (Evetts and Burnside, 1972; Rasmussen and Einhellig, 1975).

Members of the genus *Asclepias* produce alkaloid compounds which deter herbivorous insects, are distasteful to livestock (Whiting, 1943), and include cardiac glycosides which are poisonous to most vertebrates (Ehrlich and Raven, 1967; Parsons, 1965; Reichstein et. al., 1968; Duffy, 1970); however, milkweed is occasionally eaten by deer. It is also consumed by a small number of insect species, most of which are aposomatic, toxic and have a history of coevolution with *Asclepias* (Jones, 1937; Chemsak, 1963; Ehrlich and Raven, 1965; Slater and Knop, 1969; Feir and Suen, 1971).

Asclepias has been described as an excellent genus for the study of evolutionary ecology (Wilbur, 1976). It is a widespread, perennial genus with 108 species in 9 subgenera in North America and the Antilles (Woodson, 1954). All species that have been studied are isoploid (Moore, 1946) and have a low level of self fertility (Wilbur, 1976). Pollination is effected by large insects, primarily hymenopterans and lepidopterans, which transfer pollinia (Macior, 1965; Willson and Rathcke, 1974). Seeds in this genus are relatively large (Stevens, 1932) and each possesses a tuft of comose hair to assist in wind facilitated seed dispersal (Wilbur, 1976).

Apocynum cannabinum

Apocynum cannabinum, or Hemp Dogbane, is a native species to North America and is thought to be present in all 50 states. Like *Asclepias*, *Apocynum* usually grows in patches which spread vegetatively by lateral roots (Schultz and Burnside, 1979a). *Apocynum cannabinum* was first described as a noxious weed species in the 1940's (Frazier, 1944). Like members of the genus *Asclepias*, *Apocynum* is toxic.

Fifteen to thirty grams of ingested green leaves from hemp dogbane will kill a horse or a cow; however, few cases of livestock poisoning from the weed have been reported (Muenscher, 1951). This species has become a more serious problem with farmers within the past decade due to changes in crop practices. Preemergence herbicides which remove the annual weeds which once competed with the perennial Hemp Dogbane have allowed the species to flourish. In addition, increased irrigation, fertilization, and tillage have allow for a greater rate of vegetative reproduction (Evetts and Burnside, 1973). Because of the plant's negative effect on crop yields, a large portion of research devoted to this plant focuses on the effect of herbicides (Schultz and Burnside, 1979a). The reproductive biology of *Apocynum* has not been extensively studied.

Taxonomic Similarities

Most members of the family Apocynaceae produce a milky latex and have opposite decussate leaves. The flowers are actinomorphic, with the corolla contorted in a bud, usually salverform or funnelform. The pistil consists of two superior ovaries which are unilocular with marginal placentation. The ovaries are terminated by a single style and stigma. The stamens are borne on the corolla, alternate with the corolla lobes, and they produce granular pollen (Lawrence, 1967).

The Asclepiadaceae family shares many characteristics with the Apocynaceae, but it differs from them in the ovaries which are terminated by separate styles and an enlarged single, usually five-lobed stigma. Also the five stamens are usually adenate to the stigma with the pollen agglutinated into pollinia which are united in pairs. Each pollinium bears a translator (or connective) arm with two adjoining

arms meeting in a gland-like body. In the genus *Asclepias*, the corolla tube is crowned by a corona that arises from the corolla, and a corona-horn represents sterile staminate appendages arising from the filament or anther. The fruit of the Asclepiadaceae is a follicle (Lawrence, 1967).

Inflorescence Size

In many plant species, a major attribute of floral display is the aggregation of individual flowers into inflorescences. Inflorescences which contain different numbers of flowers are likely to be differentially successful as both pollen donors and receivers. As a result, inflorescence size may influence the fitness of the plant on which it is borne (Willson and Price, 1980). Many researchers have noted that in most species of the milkweeds the number of fruit maturing per inflorescence is much smaller than the number of flowers produced per inflorescence. In addition, the number of pods initiated is significantly greater than the number of pods maturing (Woodson, 1941; Stevens, 1945; Moore, 1946, 1947; Sparrow and Pearson, 1948; Stebbins, 1951).

The question of low pod production has generated numerous hypotheses. *Asclepias* is often cited as an example of a plant possessing a "lock and key" pollination mechanism (Grant, 1949; Stebbins, 1970) in which pollen grains are transported in units known as pollinia via hairs on an insect body. This complexity has resulted in the suggestion that insufficient pollination could explain the low level of pod maturation. However, hand pollination experiments have demonstrated an abortion rate similar to that found in nature (Wyatt, 1976; Kephart, 1981). Fruit herbivory might also explain low pod production; however, Franson and Willson

(1983) have not noted significant differences in pod production as a result of weevil predation. Genetic incompatibility has also been proposed to explain low pod production, but Willson and Price (1980) have demonstrated that in both self compatible (*A. incarnata*) and in largely self incompatible species (*A. verticillata* and *A. syriaca*), there were similar pod survivorship curves. This suggests that pod abortion as a result of genetic incompatibility might be less important than other factors.

Larger inflorescences tend to receive more pollen than smaller inflorescences and generally have a higher average rate of insect visitation. Therefore, the large number of flowers produced by *Asclepias* is usually explained as contributing to male fitness (Willson and Rathcke, 1974; Willson and Price, 1980). Willson and Price (1980) have noted that in most circumstances larger inflorescences are more successful in initiating pods than in smaller ones. As a result, selection may favor larger inflorescence size so that the excess flowers produced might allow the plants to abort selectively and thus increase the average quality of the remaining offspring (Bookman, 1984, 1983; Lloyd, 1980; Stephenson, 1981).

Studies conducted by Willson and Price (1980) have also suggested that female reproductive output may be resource limited. Upon the addition of excess mineral fertilizer, they noted an increased number of pods per stem, an increased number of seeds per pod, and an increase in seed weight. They also noted a decrease in pod production as a result of leaf loss. These results seem to support the resource limitation hypothesis. During their study, Willson and Price (1980) also note that the increased pod production found in their experiment was often so great

that the stems could not support the weight. This suggests that there may be structural limitations to pod production.

The reproductive biology of *Apocynum* has not been extensively studied. A literature review revealed no data on typical flower number. Only one reference to pod and seed number in *Apocynum cannabinum* occurs in the literature. A study conducted in Nebraska in 1977 indicates that pod number for 3 populations of plants ranged from 2 pods per plant to 150 pods per plant. The average number of seeds per pods for 12 nursery-raised plants was 81. No data was collected on seed number for a population located in a soybean field, or for plants growing in a fescue-dominated field (Schultz and Burnside, 1979b).

My study further documents the reproductive biology of *Apocynum cannabinum*. It examines the life cycle of *Apocynum cannabinum* in relation to *Asclepias syriaca* in an attempt to determine if *Apocynum* is similar to *Asclepias* in producing only a few pods with respect to flower number. The relationship between the ratio of reproductive tissue weight compared to vegetative weight was examined to determine if this was a factor controlling pod number.

This study also investigates the results of the addition of excess weights to *Asclepias syriaca* and *Apocynum cannabinum* to determine if added weight would affect the number of mature pods produced. Because of these plants' primary reliance on wind for seed dispersal, it is possible that plants which are encumbered by numerous pods would bend, reducing the potential for wind dispersal, and thus decrease plant fitness. The addition of simulated pods examines whether additional apical weight impacts pod and seed production in either *Asclepias* or *Apocynum*.

MATERIALS AND METHODS

Population Data Collections

Populations of *Asclepias syriaca* and *Apocynum cannabinum* occurring in James City and York County were sampled during this study. Data were collected on these plants to determine the vegetative/reproductive weight ratios for each species, as well as to provide general information on the reproductive biology of *Apocynum*. A description of data obtained for *Asclepias* and *Apocynum* follows.

The above-ground portion of ten plants of the species *Asclepias syriaca* were collected at weekly intervals from June 30, 1989 until September 10, 1989. The above-ground portion of ten *Apocynum cannabinum* were also collected weekly from June 30 to September 25. The following data were collected:

1) Height of plant in cm.
2) Number of flowers.
3) Number of pods.
4) Number of seeds per pod.
5) Wet weight of stem in grams.
6) Wet weight of leaves in grams.
7) Wet weight of flowers in grams.
8) Wet and dry weights of pods in grams.

Below-ground portions of the plants were not measured to allow for regeneration of the plant populations following experimentation. Data collected are included in Tables 1 - 18, and in the Appendix. Analyses of data collected were

conducted using Statplan IV software. These analyses are also included in the Appendix.

Experimental Data Collection

The Experimental Sites for *Asclepias* and *Apocynum* were selected in locations where plant populations were healthy, and relatively protected from disturbance. The experimental portion of this study was conducted during the summers of 1989 and 1990 for *Apocynum*, and during the summer of 1990 for *Asclepias*. Experimental data for *Asclepias* was not obtained during 1989 due to the destruction of the site by mowing. A description of the 1989 and 1990 study follows.

To determine the effect of excess weight on pod production, plants of the species *Apocynum cannabinum* were randomly assigned to one of four treatments during the summer of 1989. Ten plants had no weights added and served as a control. Ten had one weight (1 gram) added to the apical inflorescence. Ten had two, 1 gram weights added, and ten had four, 1 gram weights added. One gram weights were chosen for this experiment since my preliminary studies had suggested that one gram is half of the average weight of a mature pair of pods. This weight would represent one pod, or an immature pair. Two, one gram weights added represent the weight of one mature pair of pods, while four one gram weights would represent two mature pairs of pods. Data collected are included in the Appendix and summarized in Table 19.

Plants of the species *Asclepias syriaca* were also randomly assigned to one of four treatments during the summer of 1989. Ten plants had no weights added and served as a control. Ten had one weight (10 grams) added to the apical

inflorescence. Ten were assigned two, 10 gram weights, and ten were assigned four, 10 gram weights. Ten gram weights were chosen for this portion of this study based on my preliminary results that suggested the average pod weight for this species would be approximately 10 grams. This portion of the study was not completed during the 1989 growing season due to the destruction of the experimental plot by mowing.

During the second season of experimentation, treatments were assigned to *Apocynum* and *Asclepias* similar to the previous year. The total sample size of each plot was increased to 80 with 20 representatives of each treatment. Data collected during the second season were recorded from June 3, 1990 until September 15, 1990. Data collected are included in the Appendix and summarized in Tables 20 and 21. Data collected during the experimental portion of this study also were analyzed using Statplan IV software.

RESULTS

Collection Data

Asclepias Reproductive/Vegetative Ratio

July

During July 1989 (Table 1), Plant height ranged from 60.0 cm. to 194.0 cm., with a mean of 122.6 cm.. Stem weight ranged from 12.2 grams to 218.1 grams, with a mean of 96.8 grams. Total leaf weight per plant for *Asclepias* ranged from 8.5 grams to 166.1 grams, with a mean of 78.5 grams. The sum of stem and leaf weights resulted in a mean vegetative weight value of 175.4 grams, with values ranging from 42.2 grams to 384.2 grams.

Flower weight ranged from 0.0 grams (for the 28 plants that were not flowering at the time of collection) to 14.7 grams, with an average value of 2.4 grams. The average pod number was 1.3, ranging from 0 (for the 28 plants not producing pods at the time of collection) to 8. Values for individual pod weight ranged from 0.9 grams to 23.9 grams with a mean of 13.0 grams. The total pod weight per plant ranged from 0.0 grams (for the 28 plants without pods at the time of collection) to 131.8 grams, with a mean of 15.6 grams. Reproductive weight value (total flower weight per plant plus total pod weight per plant) ranged from 0.0 to 131.8, with a mean of 18.0 grams. The reproductive/vegetative tissue ratio for plants producing flowers or pods ranged from 0.0 to 0.8, with a mean of 0.1 during July.

TABLE 1

ASCLEPIAS COLLECTION DATA (JULY, 1989)

	Minimum	Number of Zero Values	Lowest Non-Zero Value	Maximum	Mean	Median	Standard Deviation	Sample Size
Plant Ht. (in cm.)	60.0	0	60.0	194.0	122.6	119.0	32.6	50
Stem Wt. (in cm.)	12.0	0	12.2	218.1	96.8	86.8	49.5	50
Leaf Wt. (in cm.)	8.5	0	8.5	166.1	78.5	77.8	40.0	50
Vegetative Wt. (in cm.)	42.2	0	42.2	384.2	175.4	165.4	75.4	50
Total Flower Wt. (in cm.)	0.0	28	0.29	14.7	2.4	0.0	3.9	50
Pod Number	0.0	28	1.0	8.0	1.3	0.0	2.1	48
Weight/Pod (in g.)	0.9	0	0.9	23.9	13.0	13.1	7.8	20
Total Pod Wt. (in g.)	0.0	28	1.55	131.8	15.6	0.0	28.4	50
Reproductive Wt. (in g.)	0.0	10	1.34	131.8	18.0	4.2	27.4	50
Ratio (with zero values)	0.0	10	0.01	0.08	0.097	0.03	0.1	50
Ratio (without zero values)	0.01	0	0.01	0.08	0.121	0.05	0.1	40

TABLE 2

ASCLEPIAS COLLECTION POD DATA (JULY 1989)

	Minimum	Maximum	Mean	Median	Standard Deviation	Sample Size
Pod Length in cm.	2.0	15.5	9.6	9.5	3.9	60
Wet Weight in cm.	0.14	34.3	13.4	15.2	7.6	58
Dry Weight in cm.	0.08	5.97	2.2	2.1	1.6	58
Seed Number	10	265	180.9	184	70.4	59

Pod length values for July 1989 (Table 2) ranged from 2.0 cm. to 15.5 cm., with a mean of 9.6 cm.. Wet Weight values for pods ranged from 0.14 grams to 34.3 grams, with a mean of 13.4 grams. Dry weight values ranged from 0.08 grams to 5.97 grams, with a mean of 2.2 grams. Seed number for individual pods ranged from 10 to 265, with a mean of 181.

August

During August 1989 (Table 3), plant height ranged from 69.0 cm. to 180.0 cm., with a mean of 148.3 cm.. Stem weight ranged from 26.0 grams to 212.8 grams, with a mean of 121.6 grams. Total leaf weight per plant for *Asclepias* ranged from 0.0 grams (for 9 plants which had lost leaves due to predation or senescence) to 91.2 grams, with a mean value of 22.6 grams. This resulted in a vegetative weight ranging from 47.9 grams to 304.0 grams, with a mean of 145.4 grams.

Because flowering was completed in July, values for flower weight for *Asclepias* were all 0.0 grams. The pod number per plant values ranged from 0 to 9, with a mean of 2.8. Weight per individual pod values ranged from 7.0 grams to 20.6

TABLE 3

ASCLEPIAS COLLECTION DATA (AUGUST, 1989)

	Minimum	Number of Zero Values	Lowest Non-Zero Value	Maximum	Mean	Median	Standard Deviation	Sample Size
Plant Ht. (in cm.)	69.0	0	69.0	180.0	148.3	162.0	30.1	29
Stem Wt. (in cm.)	26.0	0	26.0	212.8	121.6	121.8	42.4	30
Leaf Wt. (in cm.)	0.0	9	2.5	91.2	22.6	8.7	28.5	30
Vegetative Wt. (in cm.)	47.9	0	47.9	304.0	145.4	128.2	50.9	30
Total Flower Wt. (in cm.)	0.0	30	--	0.0	0.0	0.0	0.0	30
Pod Number	0.0	6	1.0	9.0	2.8	1.0	2.7	30
Weight/Pod (in g.)	7.0	0	7.0	20.6	16.1	16.5	3.5	24
Total Pod Wt. (in g.)	0.0	6	16.5	127.8	42.0	20.6	39.8	30
Reproductive Wt. (in g.)	0.0	6	16.5	127.8	42.0	20.6	39.8	30
Ratio (with zero values)	0.0	6	0.08	0.7	0.274	0.2	0.2	30
Ratio (without zero values)	0.08	0	0.08	0.7	0.342	0.4	0.2	24

grams, with a mean of 16.1 grams. Total pod weight per plant ranged from 0.0 grams (for 6 plants which had not produced pods at the time of collection) to 127.8 grams, with a mean of 42.0 grams. This resulted in a reproductive weight value ranging from 0.0 grams (for the 6 plants which had not produced pods or flowers) to 127.8 grams, with a mean of 42.0 grams. The vegetative/reproductive ratio values for plants producing pods increased between July (mean = 0.1) and August which had values ranging from 0.08 to 0.7 and a mean of 0.3.

Pod length values for the 24 plants which produced pods (Table 4) also increased between July (mean = 9.6) and August, 1989, ranging from 7.0 cm. to 15.5 cm., with a mean of 13.0 cm.. Wet weight for pods ranged from 1.3 grams to 29.2 grams, with a mean of 15.6 grams Dry weight for pods ranged from 0.7 grams to 9.9 grams, with a mean of 4.1 grams. Seed number values also increased, ranging from 112 to 326, with a mean of 233 (July mean = 181).

TABLE 4

***ASCLEPIAS* COLLECTION POD DATA (AUGUST, 1989)**

	Minimum	Maximum	Mean	Median	Standard Deviation	Sample Size
Pod Length in cm.	7.0	15.5	13.0	13.0	1.4	83
Wet Weight in cm.	1.3	29.2	15.6	15.9	4.8	81
Dry Weight in cm.	0.7	9.9	4.1	4.1	1.2	81
Seed Number	112	326	232.8	239	47.2	83

September

During September 1989 (Table 5), plant height values decreased slightly from those observed in August (mean = 148.3). Plant height during September ranged from 63.0 to 178.0, with a mean of 115.9. Stem and leaf weight values also decreased significantly by September, Stem weight ranged from 20.6 grams to 187.6 grams, with a mean of 73.3 grams. Leaf weight for *Asclepias* ranged from 0.0 grams for plants which had lost leaves due to predation or senescence, to 26.8 grams, with a mean of 7.2 grams. This resulted in a vegetative weight value ranging from 31.8 grams to 187.6 grams, with a mean of 80.5 grams.

Because flowering was completed in June, values for total flower weight per plant for *Asclepias* were all 0.0 grams. The average pod number per plant ranged from 0 (for 2 plants that had not produced pods at the time of collection) to 3, with a mean of 1.7. Individual pod weight values ranged from 6.9 to 22.3, with a mean of 13.5. Total pod weight per plant ranged from 0.0 grams, for 2 plants which did not produce pods, to 49.4 grams, with a mean of 22.4 grams. This resulted in a reproductive weight value ranging from 0.0 grams to 49.5 grams, with a mean of 22.4 grams. The reproductive/vegetative tissue ratio value for plants producing pods ranged from 0.12 to 0.5. Although both reproductive and vegetative ratio values were lower for plants collected in September than for plants collected in August (mean = 0.3), the mean ratio value was still 0.3 in September.

TABLE 5

ASCLEPIAS COLLECTION DATA (SEPTEMBER, 1989)

	Minimum	Number of Zero Values	Lowest Non-Zero Value	Maximum	Mean	Median	Standard Deviation	Sample Size
Plant Ht. (in cm.)	63.0	0	63.0	178.0	115.9	92.0	42.0	23
Stem Wt. (in cm.)	20.6	0	20.6	187.6	73.3	48.67	50.6	24
Leaf Wt. (in cm.)	0.0	11	0.2	26.8	7.2	0.17	8.5	24
Vegetative Wt. (in cm.)	31.8	0	31.8	187.6	80.5	62.68	46.7	24
Total Flower Wt. (in cm.)	0.0	24	--	0.0	0.0	0.0	0.0	24
Pod Number	0.0	2	1.0	3.0	1.7	2.0	0.92	24
Weight/Pod (in g.)	6.9	0	6.9	22.3	13.5	14.0	3.6	22
Total Pod Wt. (in g.)	0.0	2	8.3	49.5	22.4	22.3	13.8	24
Reproductive Wt. (in g.)	0.0	2	8.3	49.4	22.4	22.3	13.8	24
Ratio (with zero values)	0.0	2	0.12	0.5	0.274	0.31	0.1	24
Ratio (without zero values)	0.12	0	0.12	0.5	0.324	0.33	0.1	22

TABLE 6

ASCLEPIAS COLLECTION POD DATA (SEPTEMBER, 1989)

	Minimum	Maximum	Mean	Median	Standard Deviation	Sample Size
Pod Length in cm.	9.0	16.5	12.9	13.5	2.0	39
Wet Weight in cm.	4.7	31.6	14.4	14.6	4.4	38
Dry Weight in cm.	1.0	8.9	4.1	4.6	1.5	38
Seed Number	112.0	270.0	216.6	225	39.6	39

Pod length for September 1989 (Table 6) ranged from 9.0 cm. to 16.5 cm., with a mean of 12.9 cm.. Wet weight values ranged from 4.7 grams to 31.6 grams, with a mean of 14.4 grams. Dry weight values ranged from 1.0 grams to 8.9 grams, with a mean of 4.1 grams. Although the mean pod length value during September (mean = 12.9 cm.) was similar to the mean during August (13.0 cm.), the wet weight mean value for September (14.6 grams) was lower than the August mean value (15.6 grams). This was most likely due to the loss of water as the pods mature since dry weight mean values in August and September were both 4.1 grams. Seed number ranged from 112 to 270 with a mean of 217. These values are slightly lower than those observed in August (mean = 233), and may indicate abortion of less-fit seeds.

Summary

Asclepias data collected between July and September 1989 are summarized in Table 7. During the sampling period, plant height ranged from 60 cm. to 194 cm. with a mean of 128 cm.. Stem weight values ranged from 12.2 grams to 218.1 grams, with a mean of 98.6 grams. Leaf weight for the 104 plants collected ranged from

0.0 grams (for 20 plants whose leaves had been lost due to senescence or predation) and 166.1 grams. The mean total leaf weight was 45.9 grams. This resulted in a total vegetative weight ranging from 31.9 grams to 384.2 grams with a mean of 144.5 grams.

The total reproductive weight value consisted of the combined flower weight and pod weight. Flower weight ranged from 0.0 grams (for 82 plants which were not flowering at the time of collection) to 14.7 grams, with a mean of 1.2 grams. Pod number ranged from 0 to 9, with an average of 1.8 pods per plant. The average weight per pod was 14.3 grams, ranging from 0.9 grams to 23.9 grams. Total pod weight per plant ranged from 0.0 grams (for 36 plants which did not have pods at the time of collection) to 131.8 grams, with a mean of 24.8 grams. Total reproductive weight per plant ranged from 0.0 grams (for the 18 plants that did not produce flowers or pods) to 131.8 grams, with a mean of 25.8 grams. The reproductive/vegetative tissue ratio for *Asclepias* plants producing pods ranged from 0.01 to 0.8 with a mean value of 0.2 during the period sampled.

Table 8 examines data collected between July and September, 1989. Pod length ranged from 2.0 cm. to 16.5 cm., with a mean of 11.8 cm.. Wet weight for pods ranged from 0.1 grams to 34.3 grams, with a mean of 14.6 grams. Dry weight values ranged from 0.1 grams to 10.0 grams, with a mean of 3.5 grams. Seed number ranged from 10 to 326, with a mean of 211.

TABLE 7

ASCLEPIAS COLLECTION DATA (JULY - SEPTEMBER, 1989)

	Minimum	Number of Zero Values	Lowest Non-Zero Value	Maximum	Mean	Median	Standard Deviation	Sample Size
Plant Ht. (in cm.)	60.0	0	60.0	194.0	128	125	36.3	102
Stem Wt. (in cm.)	12.2	0	12.2	218.1	98.6	95.0	50.5	104
Leaf Wt. (in cm.)	0.0	20	0.2	166.1	15.9	30.4	45.1	104
Vegetative Wt. (in cm.)	31.9	0	31.9	384.2	144.5	138.6	73.1	104
Total Flower Wt. (in cm.)	0.0	82	0.29	14.7	1.2	0.0	2.9	104
Pod Number	0.0	36	1.0	9.0	1.8	1.0	2.1	104
Weight/Pod (in g.)	0.9	0	0.9	23.9	14.3	14.9	5.3	66
Total Pod Wt. (in g.)	0.0	36	1.55	131.8	24.8	14.8	31.7	104
Reproductive Wt. (in g.)	0.0	18	1.34	131.8	25.8	14.8	30.4	104
Ratio (with zero values)	0.0	18	0.01	0.08	0.197	0.1	0.2	104
Ratio (without zero values)	0.01	0	0.01	0.08	0.234	0.2	0.2	86

TABLE 8

ASCLEPIAS COLLECTION POD DATA (JULY - SEPTEMBER, 1989)

	Minimum	Maximum	Mean	Median	Standard Deviation	Sample Size
Pod Length in cm.	2.0	16.5	11.8	13.0	3.1	182
Wet Weight in cm.	0.1	34.3	14.6	15.2	5.8	177
Dry Weight in cm.	0.1	10.0	3.5	3.7	1.7	177
Seed Number	10	326	211.4	233	58.8	181

A correlation analysis was conducted for the variables examined for *Asclepias*. The purpose of the correlation analysis was to measure the intensity of association between pairs of variables and to test whether the association was greater than what could be expected by chance. The results of the correlation analysis are included in the Appendix (Table A-3). The following significant correlations were noted:

- Plant Height and Stem Weight (r=0.858, p=1.000, n=102)
- Plant Height and Flower Weight (r=-0.231, p=0.980, n=102)
- Plant Height and Pod Number (r=0.411, p=1.000, n=100)
- Plant Height and Total Pod Weight (r=0.485, p=1.000, n=102)
- Stem Weight and Pod Number (r=0.453, p=1.000, n=102)
- Stem Weight and Total Pod Weight (r=0.539, p=1.000, n=104)
- Leaf Weight and Flower Weight (r=0.446, p=1.000, n=104)
- Leaf Weight and Total Pod Weight (r=-0.217, p=0.973, n=104)
- Flower Weight and Pod Number (r=-0.327, p=0.999, n=102)
- Flower Weight and Total Pod Weight (r=-0.308, p=0.999, n=104)
- Pod Number and Total Pod Weight (r=0.925, p=1.000, n=102)

A strong correlation was noted between plant height and stem weight for Asclepias. This would be expected, since as the plant gets taller, it is likely that it

would also weigh more. A negative correlation was noted between plant height and flower weight; however, this is most likely a result of the time of collection. In general, taller plants were collected at the end of the sampling period (August and September). Since most flowering occurred in June, the taller plants collected would have less flowers than the shorter plants collected earlier in the season.

Correlations between plant height and pod weight and number, along with stem weight and pod weight and number were also noted. This may suggest that taller plants with more massive stems would produce more, heavier pods. These taller plants would also have an advantage during seed dispersal since their seeds would most likely travel farther, since they would be dispersed from a greater height.

Correlations were noted between leaf weight and flower weight. This may indicate resource limitation in Asclepias since a greater number of leaves may allow for greater photosynthesis. This may allow for greater reproductive output.

A negative correlation was also noted for leaf weight and total pod weight. This is most likely due to the fact that at the time of collection of the largest and heaviest pods (August and September), leaf sinescense had started. Therefore, larger pods would be associated with fewer leaves.

Negative correlations were also noted for flower weight and pod number and total pod weight. This may suggest that smaller inflorescences produce larger numbers of pods; however, it is more likely a result of the timing of collection. When the larger pods were present (August and September), flowering had already ended. Therefore, plants with larger pods would have fewer (or no) flowers at the time of collection.

Correlations between pod number and weight were also noted. This suggests that as pod number increases, pod weight increases as well.

Twin Pods

During this study, five plants were collected which produced more than one pod per pedicel. These "twin" pods were previously noted by Willson and Price (1977) during their studies of *Asclepias*. Data were collected for 12 "twin" pods. One plant produced two pairs of "twin" pods, and the other four produced only one pair. Data collected on these pods is included in Table 9.

Table 9

Plants Producing "Twin" Pods Data

Plant	Pod Length	Seed Number
24	7.6	184
24	7.6	176
37	8.2	136
37	8.5	119
48	12.5	213
48	12.5	248
76	14.0	263
76	14.0	266
76	11.0	228
76	11.0	200
82	12.5	112
82	13.0	248
Sample Size	12	12
Mean	11.0	119
Median	11.0	200
Standard Deviation	2.4	54.9

The "twin" pods mean pod length (11.0) was slightly less than the overall sample mean (13.0). The seed number per pod was also lower than the overall sample mean; however, the total seed number produced per flower, or twice the mean seed number value (238), was slightly larger than the value for the overall sample mean (233).

Apocynum Reproductive/Vegetative Ratio

June/July

Data collected between June and July 1989 is presented in Table 10. Plant height ranged from 49.0 cm to 111.0 cm, with a mean of 81.5. Values for leaf weight ranged from 6.7 grams to 136.6 grams, with a mean of 29.5 grams Stem weight ranged from 8.4 grams to 197.2 grams with a mean of 45.0 grams This resulted in a vegetative weight value ranging from 10.3 grams to 333.8 grams, with a mean of 66.1 grams.

Flower weight for *Apocynum* during this time period ranged from 0.0 grams (for 23 plants which were not flowering at the time of collection) to 25.0 grams, with a mean of 1.3 grams. Pod number values ranged from 0 to 69, with a mean of 6.4. Average weight per pod was 0.73 grams, ranging from 0.02 grams to 2.39 grams. Total pod weight per plant values range from 0.0 grams (for 13 plants which were not producing pods at the time of data collection) to 51.6 grams with a mean of 4.5 grams. This resulted in reproductive weight values ranging from 0.0 grams to 58.8 grams, with a mean of 5.8 grams. The reproductive/vegetative weight ratio during this collection period ranged from 0.0 to 0.5 with a mean of 0.1.

TABLE 10

APOCYNUM COLLECTION DATA (JUNE/JULY, 1989)

	Minimum	Number of Zero Values	Lowest Non-Zero Value	Maximum	Mean	Median	Standard Deviation	Sample Size
Plant Ht. (in cm.)	49.0	0	49.0	111.0	81.5	79.0	13.3	31
Stem Wt. (in cm.)	8.4	0	8.4	197.2	45.0	28.7	41.5	30
Leaf Wt. (in cm.)	6.7	0	6.7	136.6	29.5	16.1	29.5	31
Vegetative Wt. (in cm.)	10.3	0	10.3	333.8	66.1	46.1	61.4	51
Total Flower Wt. (in cm.)	0.0	23	0.01	25.0	1.3	0.01	3.9	52
Pod Number	0.0	13	1.0	69.0	6.4	4.0	10.3	52
Weight/Pod (in g.)	0.02	0	0.02	2.39	0.73	0.7	0.4	38
Total Pod Wt. (in g.)	0.0	13	0.04	51.6*	4.5	1.9	7.9	52
Reproductive Wt. (in g.)	0.0	6	0.01	58.8*	5.8	2.8	9.4	52
Ratio (with zero values)	0.0	10	0.005	0.5	0.103	0.05	0.1	51
Ratio (without zero values)	0.005	0	0.005	0.6	0.128	0.09	0.1	41

TABLE 11

APOCYNUM COLLECTION POD DATA (JUNE/JULY, 1989)

	Minimum	Maximum	Mean	Median	Standard Deviation	Sample Size
Pod Length in cm.	1.4	21.4	11.8	12.4	3.7	223
Wet Weight in cm.	0.06	1.6	0.7	0.7	0.3	119
Dry Weight in cm.	0.04	0.6	0.3	0.3	0.2	119
Seed Number	8	137	50.2	49.0	27.7	224

Apocynum data collected from the 39 plants which produced pods between June and July, 1989 (Table 11) indicated a range of pod lengths from 1.4 cm. to 21.4 cm., with a mean of 11.8 cm.. Wet weight values ranged from 0.06 grams to 1.63 grams, with a mean of 0.74 grams. Dry weight values ranged from 0.04 grams to 0.6 grams with a mean of 0.27 grams. Total seed number per pod ranged from 0 to 137, with a mean of 50.2.

August

Data collected during August 1989 is presented in Table 12. Plant height increased between July (mean = 81.5) and August which had values ranging from 64.0 to 120.0 with a mean of 99.5. Values for stem weight and leaf weight also increased in August. Stem weight values ranged from 10.5 grams to 120.8 grams with a mean of 55.6 grams. Values for leaf weight ranged from 1.3 grams to 123.4 grams, with a mean of 34.9 grams. Vegetative Weight values increased between July (mean = 66.1) and August which had values ranging from 11.9 grams to 244.2

TABLE 12

APOCYNUM COLLECTION DATA (AUGUST, 1989)

	Minimum	Number of Zero Values	Lowest Non-Zero Value	Maximum	Mean	Median	Standard Deviation	Sample Size
Plant Ht. (in cm.)	64.0	0	64.0	120.0	99.5	102.0	14.6	38
Stem Wt. (in cm.)	10.5	0	10.5	120.8	55.6	50.9	27.4	38
Leaf Wt. (in cm.)	1.3	0	13.0	123.4	34.9	25.4	28.7	38
Vegetative Wt. (in cm.)	11.9	0	11.9	244.2	90.4	79.2	54.1	38
Total Flower Wt. (in cm.)	0.0	30	0.03	7.7	0.7	0.0	1.7	38
Pod Number	0.0	9	1.0	28.0	6.7	4.0	7.0	38
Weight/Pod (in g.)	0.04	0	0.04	2.58	0.75	0.64	0.48	30
Total Pod Wt. (in g.)	0.0	9	0.09	15.5	4.8	3.5	5.0	38
Reproductive Wt. (in g.)	0.0	8	0.03	22.9	5.5	4.6	5.6	38
Ratio (with zero values)	0.0	9	0.008	0.2	0.060	0.05	0.1	38
Ratio (without zero values)	0.008	0	0.008	0.2	0.078	0.06	0.05	29

grams with a mean of 90.4 grams.

Total flower weight per plant values ranged from 0.0 grams (for 30 plants which were not flowering at the time of collection) to 7.7 grams with a mean of 0.7 grams. Pod number per plant ranged from 0 (for the 9 plants which had not produced pods at the time of collection) to 28, with a mean of 6.7. Average weight per pod was 0.75 grams, with a range of 0.045 grams to 2.58 grams. Total pod weight per plant ranged from 0.0 grams to 15.5 grams with a mean of 4.8 grams. Reproductive weight values ranged from 0.0 grams to 22.9 grams, with a mean of 5.5 grams. These values are similar to those observed in June/July. Because the total vegetative weight increased between June and August, the reproductive/ vegetative tissue ratio values for plants producing flowers and pods decreased, ranging from 0.008 to 0.2 with a mean of 0.08.

Apocynum data collected from the 29 plants which produced pods during August 1989 (Table 13) had pod lengths ranging from 3.0 cm. to 19.3 cm. with a mean of 12.3 cm.. The mean value for pod length in August (12.3 cm.) did not

TABLE 13

***APOCYNUM* COLLECTION POD DATA (AUGUST, 1989)**

	Minimum	Maximum	Mean	Median	Standard Deviation	Sample Size
Pod Length in cm.	3.0	19.3	12.3	12.2	3.1	238
Wet Weight in cm.	0.06	1.6	0.7	0.7	0.3	124
Dry Weight in cm.	0.04	0.6	0.3	0.3	0.1	123
Seed Number	0.0	120	50.8	46	24.2	235

increase significantly from July (12.4 cm.). Wet weight values ranged from 0.06 grams to 1.6 grams, with a mean of 0.7 grams. Dry Weight values ranged from 0.04 grams to 0.6 grams with a mean of 0.3 grams. Total seeds produced by pods ranged from 0 (for 5 immature or predated pods which did not contain seeds) to 120, with a mean of 50.8.

September

Data collected in September 1989 is presented in Table 14. Plant height values decreased between August (mean = 99.5 cm.) and September which had values ranging from 58.0 cm. to 103.0 cm. with a mean of 84.7. Stem weight values ranged from 11.0 grams to 76.4 grams with a mean of 17.0 grams. Values for leaf weight ranged from 0.0 grams to 54.3 grams, with a mean of 16.2 grams. This resulted in a decrease in vegetative weight between August (mean = 90.4) and September which had values ranging from 11.0 grams to 130.7 grams with a mean of 56.2 grams.

Flower weight values ranged from 0.0 grams (for the 23 plants which did not have flowers at the time of collection) to 0.2 grams with a mean of 0.009 grams. This is much lower than values obtained in August, since most flowering was completed before September. Pod number values per plant ranged from 0 (for 2 plants which had not produced pods at the time of collection) to 36, with a mean of 12.0. The average weight per pod was 1.04 grams, ranging from 0.23 grams to 3.78 grams. Total pod weight per plant values ranged from 0.0 grams (for 2 plants which had not produced pods at the time of collection) to 30.2 grams, with a mean of 12.3 grams. Reproductive weight values ranged from 0.0 grams (for 2 plants

TABLE 14

APOCYNUM COLLECTION DATA (SEPTEMBER, 1989)

	Minimum	Number of Zero Values	Lowest Non-Zero Value	Maximum	Mean	Median	Standard Deviation	Sample Size
Plant Ht. (in cm.)	58.0	0	58.0	103.0	84.7	84.0	12.8	24
Stem Wt. (in cm.)	11.0	0	11.0	76.4	17.0	39.5	0.4	25
Leaf Wt. (in cm.)	0.0	1	0.4	54.3	16.2	9.3	14.11	25
Vegetative Wt. (in cm.)	11.0	0	11.0	130.7	56.2	55.2	26.5	25
Total Flower Wt. (in cm.)	0.0	23	0.22	0.22	0.009	0.0	0.04	25
Pod Number	0.0	2	2.0	36.0	12.5	12.0	9.7	25
Weight/Pod (in g.)	0.23	0	0.23	3.78	1.04	0.8	0.7	23
Total Pod Wt. (in g.)	0.0	2	0.46	30.2	12.3	10.9	9.3	25
Reproductive Wt. (in g.)	0.0	2	0.46	30.3	12.4	10.9	9.3	25
Ratio (with zero values)	0.0	2	0.01	0.5	0.217	0.2	0.1	25
Ratio (without zero values)	0.01	0	0.01	0.5	0.237	0.2	0.1	22

TABLE 15

APOCYNUM COLLECTION POD DATA (SEPTEMBER, 1989)

	Minimum	Maximum	Mean	Median	Standard Deviation	Sample Size
Pod Length in cm.	3.5	24.8	14.5	12.6	4.3	299
Wet Weight in cm.	0.08	2.3	0.9	0.9	0.4	152
Dry Weight in cm.	0.08	0.9	0.4	0.3	0.2	153
Seed Number	4	138	57.2	51	27.2	300

which did not produce pods or flowers) to 30.3 grams with a mean of 12.4 grams. These values were over twice those noted in August. Reproductive/vegetative ratio values for plants which produced flowers or pods ranged from 0.01 to 0.5 with a mean of 0.2, also twice the ratio found in August (mean = 0.08).

Apocynum data from 23 plants collected during September, 1989 (Table 15) had pod lengths ranging from 3.5 cm. to 24.8 cm., with a mean of 14.5 cm.. Wet weight ranged from 0.08 grams to 2.3 grams, with a mean of 0.9 grams. Dry weight ranged from 0.08 grams to 0.9 grams, with a mean of 0.4 grams. Total seeds ranged from 4 to 138, with a mean of 57.2.

Summary

A summary of data collected between June and September 1989 is presented in Table 16. Plant height ranged from 49.0 cm. to 120.0 cm., with a mean of 88.2 cm. Stem weight values ranged from 8.3 grams to 197.2 grams, with a mean of 48.0 grams. Values for leaf weight ranged from 0.0 grams (for one plant which had lost

its leaves due to predation or senescence) to 136.6 grams, with a mean of 28.3 grams. This resulted in vegetative weight values ranging from 11.0 grams to 333.8 grams, with a mean of 76.5 grams.

Total flower weight per plant ranged from 0.0 grams (for 76 plants which were not flowering at the time of collection) to 25.0 grams, with a mean of 0.8 grams. Pod number ranged from 0 (for 25 plants which were not producing pods at the time of collection) to 69, with a mean of 7.8. Average weight per pod values ranged from 0.02 grams to 3.78 grams, with a mean of 0.81 grams. Total pod weight per plant ranged from 0.0 grams (for 24 plants which had not produced pods at the time of collection) to 51.6 grams with a mean of 6.3 grams. This resulted in a reproductive weight value ranging from 0.0 grams to 58.8 grams, with a mean of 7.1 grams. The vegetative/reproductive ratio value ranged from 0.0 to 0.5 with a mean of 0.1 during the collection period.

Table 17 provides a summary of data collected for plants producing pods between June and September, 1989. During this time period, pod length values ranged from 1.4 cm. to a maximum of 24.8 cm., with a mean of 13.0 cm.. Pod wet weight values ranged from 0.11 grams to 4.5 grams, with a mean of 1.6 grams. Dry weight values ranged from 0.06 grams to 1.7 grams with a mean of 0.61 grams. Seed number per pod ranged from 0 (for plants whose seeds had not matured, or had been predated) to 138 with a mean of 53.2.

A correlation analysis was conducted for the variables examined for *Apocynum*. The purpose of the correlation analysis was to measure the intensity of

TABLE 16

APOCYNUM COLLECTION DATA (JUNE - SEPTEMBER, 1989)

	Minimum	Number of Zero Values	Lowest Non-Zero Value	Maximum	Mean	Median	Standard Deviation	Sample Size
Plant Ht. (in cm.)	49.0	0	49.0	120.0	88.2	88.0	15.8	113
Stem Wt. (in cm.)	8.3	0	8.3	197.2	48.0	41.3	31.2	93
Leaf Wt. (in cm.)	0.0	1	0.4	136.6	28.3	19.4	26.8	94
Vegetative Wt. (in cm.)	11.0	0	11.0	333.8	76.5	57.2	55.8	114
Total Flower Wt. (in cm.)	0.0	76	0.01	25.0	0.8	0.0	2.9	115
Pod Number	0.0	25	1.0	69.0	7.8	5.0	9.4	115
Weight/Pod (in g.)	0.02	0	0.02	3.8	0.81	0.7	0.54	91
Total Pod Wt. (in g.)	0.0	24	0.04	51.6	6.3	3.6	8.0	115
Reproductive Wt. (in g.)	0.0	16	0.01	58.8	7.1	4.5	8.7	115
Ratio (with zero values)	0.0	21	0.01	0.5	0.110	0.07	0.1	114
Ratio (without zero values)	0.005	0	0.005	0.6	0.137	0.1	0.1	92

TABLE 17

APOCYNUM COLLECTION POD DATA (JUNE- SEPTEMBER, 1989)

	Minimum	Maximum	Mean	Median	Standard Deviation	Sample Size
Pod Length in cm.	1.4	24.8	13.0	12.5	4.0	759
Wet Weight in cm.	0.06	2.3	0.8	0.79	0.4	395
Dry Weight in cm.	0.03	0.9	0.3	0.84	0.2	395
Seed Number	8	138	53.9	49.0	26.7	759

association between pairs of variables and to test whether the association was greater than what could be expected by chance. The results of the correlation analysis are included in the Appendix (Table A-6). The following significant correlations were noted:

- Plant Height and Stem Weight (r=0.321, p=0.998, n=91)
- Plant Height and Pod Number (r=0.211, p=0.975, n=113)
- Stem Weight and Leaf Weight (r=0.846, p=1.000, n=92)
- Stem Weight and Flower Weight (r=0.638, p=1.000, n=92)
- Stem Weight and Pod Number (r=0.504, p=1.000, n=92)
- Stem Weight and Total Pod Weight (r=0.278, p=0.993, n=93)
- Leaf Weight and Flower Weight (r=0.813, p=1.000, n=93)
- Leaf Weight and Pod Number (r=0.319, p=0.998, n=93)
- Leaf Weight and Total Pod Weight (r=0.278, p=0.993, n=93)
- Flower Weight and Pod Number (r=0.310, p=0.999, n=115)
- Pod Number and Total Pod Weight (r=0.880, p=1.000, n=115)

A correlation was noted between plant height and stem weight for *Apocynum*. This would be expected, since as the plant gets taller, it is likely that it would also weigh more. This correlation was not as strong as that noted for Asclepias. This may indicate that more factors influence plant height and stem weight in *Apocynum*

than *Asclepias*.

A correlation between plant height and pod number was also noted. This may indicate that taller plants produce a greater number of pods. These pods would have an advantage during seed dispersal, since the plants taller height would allow for a greater dispersal distance.

Correlations were also noted between stem weight and leaf weight, stem weight and flower weight, stem weight and pod number, and stem weight and total pod weight. This may indicate that larger, sturdier stems can produce a greater amount of leaves, as well as larger, more numerous pods. This correlation may indicate a structural control of pod production.

A strong correlation was noted between leaf weight and flower weight. Correlations were also noted between leaf weight and pod number and weight. This may indicate resource limitation in *Apocynum* since the greater amount of leaves may photosynthesize more and allow for greater reproductive output. This correlation is not as strong for leaf weigh and pod number and weight; however, during pod production, some leaf loss occurs. As a result, the leaf weight present at the time of collection would not necessarily be the maximum leaf weight produced by the plant. If leaf weight before pod production were measured, and compared to final pod production, a stronger correlation might be noted.

A correlation between flower weight and pod number was also noted in *Apocynum*. During this collection larger pods were noted during August and September, while the larger flower numbers were noted in June and July. The correlation noted may suggest that plants with a longer flowering period (or those

which were still producing flowers in August and September) may produce more pods than plants which had stopped producing flowers in July.

Correlations between pod number and weight were also noted. This suggests that as pod number increases, pod weight increases as well. This relationship was also noted in *Asclepias*.

Asclepias and *Apocynum* Ratios

A two-way analysis of variance was conducted to determine if *Asclepias* and *Apocynum* had a similar ratio of reproductive to vegetative tissue weights for each of the 9 weeks of collection. Analysis of variance tables are included in the Appendix. The means for *Asclepias* and *Apocynum* reproductive/vegetative tissue weights are included in Table 18. The analysis of variance indicated that for each week sampled, the values for reproductive/vegetative ratio were significantly different at the 5% level.

The data suggests that *Apocynum* plants sampled invested a greater portion of their weight in reproductive tissue than *Asclepias* during the early portion of their growing season (June 25 through July 23). This initial, larger investment is consistent with data indicating that *Apocynum*, like *Asclepias*, produces significantly more flowers than pods. In addition, it may also be indicative of selective pod abortion in *Apocynum*. However, by July, the *Asclepias* plants seem to devote the greater proportion of biomass to reproductive tissue than *Apocynum*. This trend appeared to continue until the end of the reproductive season.

TABLE 18

Asclepias and *Apocynum* Reproductive/Vegetative Tissue Ratio

Week Sampled	Sample Size	*Asclepias* Ratio		*Apocynum* Ratio	
		Mean	Median	Mean	Median
June 25	10	0.02	0.01	0.11	0.02
July 2	10	0.04	0.02	0.14	0.06
July 9	10	0.06	0.04	0.15	0.09
July 23	10	0.13	0.14	0.04	0.05
July 30	10	0.30	0.15	0.07	0.05
August 6	10	0.28	0.38	0.05	0.06
August 20	10	0.10	0.14	0.04	0.03
August 27	10	0.30	0.26	0.21	0.07
September 10	10	0.27	0.24	0.25	0.23

Frequency distributions for *Asclepias* (Figure 1) and *Apocynum* (Figure 2) vegetative/reproductive tissue ratio values were also examined. The shape of the distributions were examined to provide information about the relationship between vegetative and reproductive tissue within the plant populations. A normal distribution would indicate that half of the population had reproductive/vegetative ratio values greater than the mean, and half had ratio values less than the mean. A skewed distribution would indicate that more plants had ratio values that were greater or less than the mean. A truncated distribution would indicated that there may be a maximum reproductive/vegetative tissue ratio which would generally not

FIGURE 1: 1989 *Asclepias* Reproductive/Vegetative Tissue Ratio Frequency Distribution

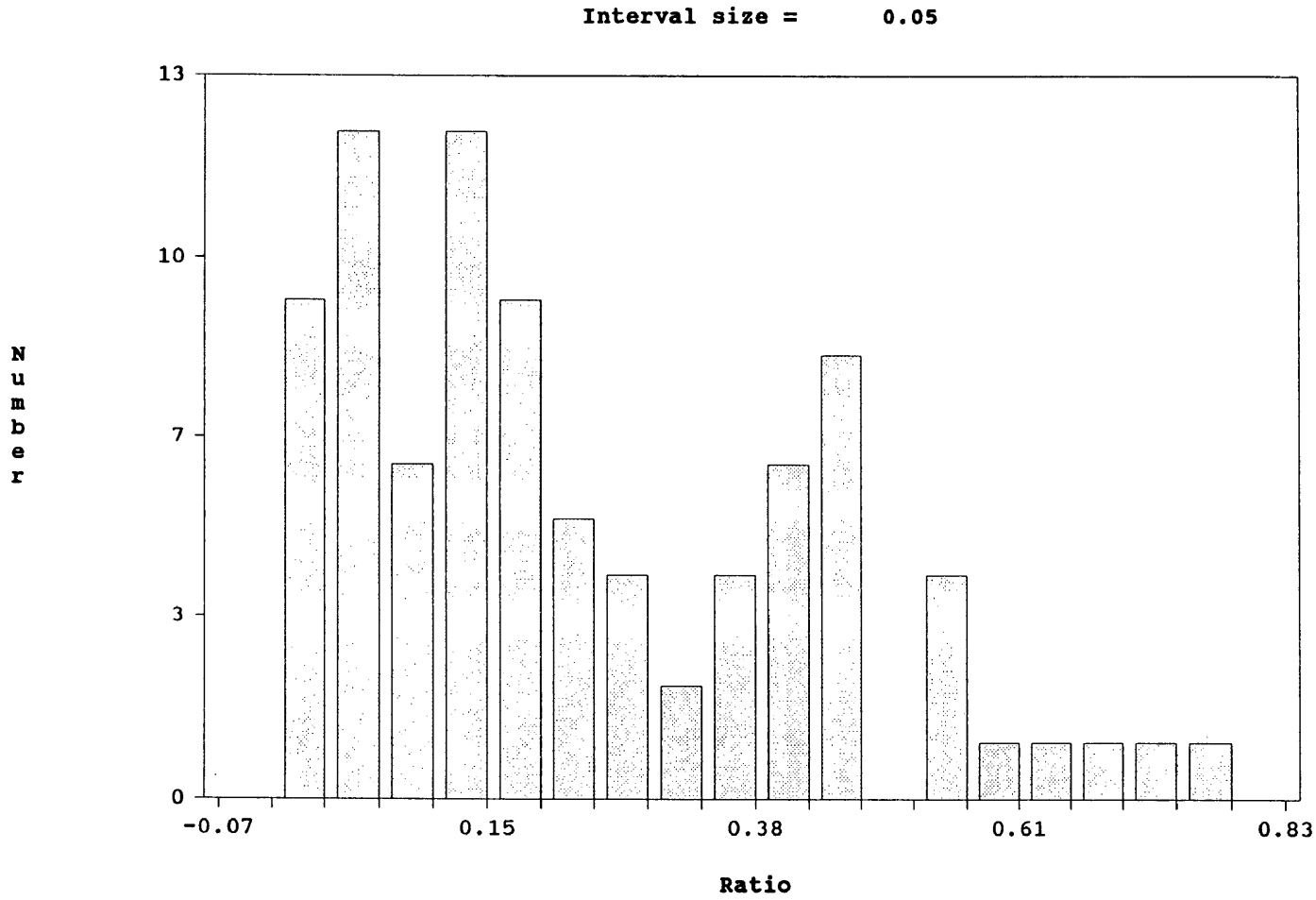
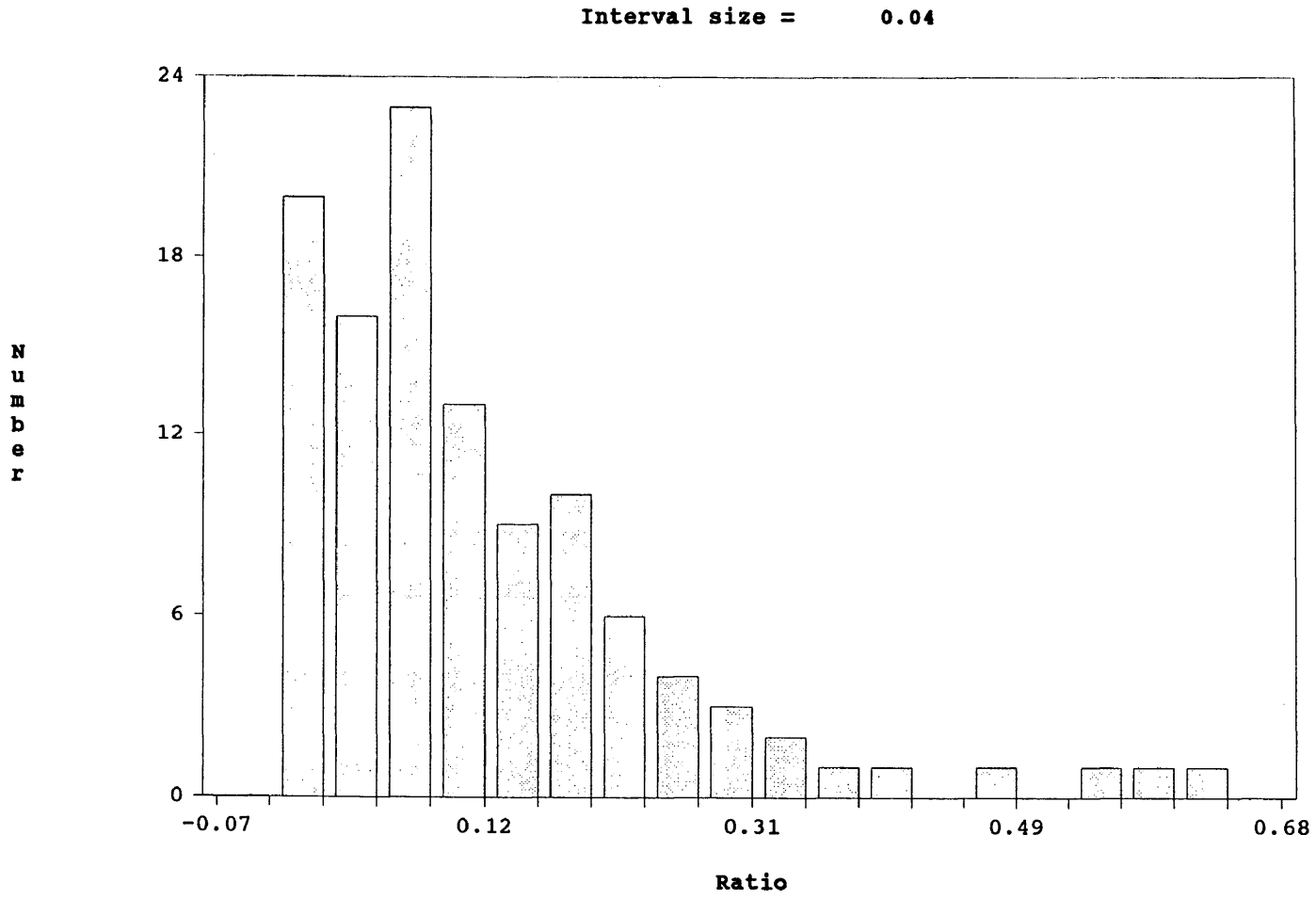


FIGURE 2: 1989 *Apocynum* Reproductive/Vegetative Tissue Ratio Frequency Distribution



be exceeded by the population. This would be represented by a normal distribution, until the ratio values reached the maximum ratio value, and the curve would end abruptly at the maximum ratio value.

The frequency distribution for both *Asclepias* and *Apocynum* ratio values were skewed to the left, indicating that the majority of the values for reproductive/vegetative tissue ratio would be less than the mean. While the curve did not appear to be truncated, the distributions' skew to the left might reflect structural limitations which would result in reduced fitness for plants encumbered by excessive flower and pod production.

Apocynum Experimental Data

1989

A summary of the data collected in 1989 is presented in Table 19. Data collected are also included in the Appendix. Mean plant heights for the examined plants ranged from 61.4 cm. (Treatment 0) to 65.6 cm. (Treatment 4) in July 1989. Average heights in September 1989 ranged from 63.1 for Treatment 4 to 67.8 for Treatment 1. Mean values for flower number range from 202 for Treatment 2 to 260 for Treatment 4. Average values for pods initiated range from 0.8 for Treatment 2 to 1.4 for Treatment 0. Average values for pods produced ranged from 0.1 for Treatment 4 to 1.2 for Treatment 1.

TABLE 19

1989 *Apocynum* Experimental Data

Treatment	July Height n=8		September Height n=8		Flower Number n=8		Pods Initiated n=8		Pods Produced n=8	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
0: Control	61.4	61	66.2	67	236	256	1.4	0	0.6	0
1: 1 "Pod" Added	62.6	60	67.8	64	259	179	1.2	0	1.2	0
2: 2 "Pods" Added	61.6	61	64.1	63	202	82	0.8	0	0.8	0
4: 4 "Pods" Added	65.6	64	63.1	68	260	200	0.9	0	0.1	0

A one-way analysis of variance (Anova) was performed for each of the following variables using Statplan IV software:

- Height of plant at project start (July height)
- Height of plant at project finish (September height)
- Number of flowers produced
- Number of pods initiated
- Number of pods produced

The results of the Anova indicate that the heights of the plants at project start were not significantly different for each of the four treatments at the 5% level. In addition, no significant differences in final height, flower number, pod initiation, or pod production were noted. As a result, I cannot conclude that the addition of weights up to four grams would influence plant growth or pod production.

Asclepias Experimental Data

1990

Asclepias Experimental Data are presented in the Appendix and summarized in Table 20. Plant height mean values ranged from 103.4 for Treatment 2 to 111.5

TABLE 20

1990 *Asclepias* Experimental Data

Treatment	June Height n=80		September Height n=66		Flower Number n=80		Pods Initiated n=8		Pods Produced n=8	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
0: Control	105.5	107	130.8	130	363	267	2.9	2	1.0	0.0
1: 1 Pod Added	111.5	112	133.1	133	372	350	4.0	2	1.6	1.0
2: 2 Pods Added	103.4	100	131.0	135	360	368	2.9	3	1.3	1.0
4: 3 Pods Added	106.1	105	129.9	134	340	335	2.8	2	1.1	1.0

for Treatment 1 at the start of the experiment. By the end of the experiment, mean plant heights ranged from 129.9 for Treatment 4 to 130.8 for Treatment 0. Average flower numbers ranged from 340 for Treatment 4 to 372 for Treatment 1. The average number of pods initiated ranged from 1.8 for Treatment 4 to 4.0 for Treatment 1. The average number of mature pods produced ranged from 1.0 for Treatment 0 to 1.6 for Treatment 1.

A one-way Anova was conducted examining the following variables for each of the four treatments:

- Height of plant at project start (June height)
- Height of plant at project finish (September height)
- Number of flowers produced
- Number of pods initiated
- Number of pods produced

Additional Anovas were conducted for data collected at the end of each month of sampling. No significant differences were noted for the monthly data for plant height, number of inflorescences, flower number, or pod number. Plants producing

pods were also examined; however, no significant differences were noted in pod length, or seed number per pod.

Based on the data collected, I cannot conclude that the addition of up to 40 grams of weight to *Asclepias* plants would influence plant growth or pod production.

Apocynum Experimental Data

1990

Data collected during the experimental portion of this project are included in the Appendix and summarized in Table 21. Mean values for plant height at the start of the project ranged from 82.1 for Treatment 4 to 85.2 for Treatment 0. Plant height means ranged from 82.5 for Treatment 4 to 84.5 for Treatment 2 at the end of the study. Flower number means ranged from 462 for Treatment 4 to 529 for Treatment 2. Values for pods initiated ranged from 1.2 for Treatment 1 to 2.2 for Treatment 2. Values for pods produced ranged from 1.0 for Treatment 1 to 1.8 for Treatment 2.

A one-way Anova was conducted examining the following variables for each of the four treatments:

- Height of plant at project start (June height)
- Height of plant at project finish (September height)
- Number of flowers produced
- Number of pods initiated
- Number of pods produced

Additional Anovas were conducted for data collected at the end of each month of sampling. No significant differences were noted for the monthly data for plant height, number of inflorescences, flower number, or pod number. Plants producing

pods were also examined; however, no significant differences were noted in pod length, or seed number per pod.

Based on the data collected, I cannot conclude that the addition of up to 4 grams of weight to *Apocynum* plants would influence plant growth or pod production.

TABLE 21

1990 *Apocynum* Experimental Data

Treatment	June Height n=80		September Height n=66		Flower Number n=80		Pods Initiated n=8		Pods Produced n=8	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
0: Control	85.2	88	84.1	85	482	456	1.9	0	1.5	0.0
1: 1 Pod Added	83.1	86	83.6	86	468	477	1.2	0	1.0	0.0
2: 2 Pods Added	85.0	84	84.5	85	529	545	2.2	2	1.8	0.0
4: 4 Pods Added	82.1	83	82.5	81	462	478	1.8	0	1.5	0.0

DISCUSSION

My results show that *Asclepias* and *Apocynum* do not have the same reproductive/vegetative tissue ratios. Between July and September, 1989, *Asclepias* had a mean reproductive/vegetative tissue ratio of 0.2, while *Apocynum* had an average value of 0.1. The average weight per pod over the study time period was 14.3 grams for *Asclepias* and 0.81 grams for *Apocynum*.

During June and early July, *Apocynum* had a greater reproductive/vegetative tissue ratio than *Asclepias*. This indicated that during the initial months of the growing season, *Apocynum* devoted a greater proportion of its tissue weight to reproductive tissue than *Asclepias*. During June and July, the average weight per pod for *Asclepias* was 13.0 grams. The average weight for *Apocynum* was 0.73 grams. However, during this time period, *Apocynum* had a greater number of pods (6.4) than *Asclepias* (1.3). By August, however, the ratio of vegetative to reproductive tissue was greater for *Asclepias* than *Apocynum*. Mean pod weight during this time was 16.1 grams for *Asclepias* and 0.75 grams for *Apocynum*. Mean pod number was 2.8 for *Asclepias* and 6.7 for *Apocynum*. A significant loss of *Asclepias* vegetative tissue occurred during this time period when mean total leaf weight values decreased from 78.5 grams in June/July to 22.6 grams in August. Leaf weights for *Apocynum* were 29.5 grams in June/July and 34.9 grams in August.

These values reflect leaf senescence associated with *Asclepias'* pod maturation. This leaf loss was not noted in *Apocynum* until September when mean total leaf weight dropped to 16.2 grams. During this same time period *Asclepias* mean total leaf weight was 7.2 grams.

Based on my literature review, no research has been conducted on the reproductive biology of the genus *Apocynum*. A 1977 study of the distribution and competitive effects of *Apocynum cannabinum* on crops mentioned that pod number per plant values for the population studied were 2 (for 12 plants in a soybean field), 4 (for 12 plants in a fescue field), and 150 (for 12 plants cultivated in a nursery). Two pods were sampled from each of the 12 nursery plants. The average seed number per pod was 81 (Schultz and Burnside, 1979b). However, no information regarding flower number or plant height was provided.

My study has indicated that, like *Asclepias*, *Apocynum* produces a greater number of flowers than pods. In addition, a greater number of pods were initiated than produced. During 1989, the *Apocynum* control plants (Treatment 0), produced an average of 236 flowers, and initiated 1.4 pods. Only 0.6 mature pods were produced per plant. During the 1990 study, the *Apocynum* control plants (Treatment 0) produced an average of 482 flowers and initiated 1.9 pods. Only an average of 1.5 pods were produced. The plants examined in 1989 only achieved an average height of 66.2 cm. while the 1990 population mean reached 84.1 cm.

The data collected during the experimental portion of this study suggests that plant height may be related to flower and pod production, since 1990 populations, which achieved a greater plant height, also produced a larger number of flowers and

pods. Greater plant height may reflect optimal growing conditions. Additional plant height may allow for wider dispersal of seeds during years of optimal growing conditions. Therefore, there would be an advantage to plants achieving a greater height to produce a larger number of pods, with a correspondingly larger number of seeds. During years where sufficient resources do not exist to allow for maximum stem growth, it would possibly be evolutionarily advantageous for the plant to conserve its reproductive resources by not creating as many pods per plant, since seeds would not be dispersed as widely. Since *Apocynum* reproduces vegetatively as well as through seeds, seeds landing in close proximity to the parent plants would most likely be out-competed by adjacent conspecifics. Therefore, by not producing as many seeds during years where conditions for maximum stem growth do not occur, the plant can focus its resources on root growth and vegetative reproduction.

Additional studies examining whether taller plants have a greater reproductive/vegetative tissue ratio than shorter plants may provide useful information on pod production. If the increase in reproductive tissue is greater than, and not proportional to the increase in vegetative tissue, this may indicate selection based on environmental conditions which would allow for stronger stems, allowing for maximum seed dispersal.

Additional studies examining root growth on taller and shorter than average plants during years of above and below average population heights may reveal this trend toward additional root growth and vegetative reproduction during years of less than average plant growth. Greenhouse studies where nutrient availability is controlled could also test this hypothesis if vegetative reproduction or root

production increased as a result of nutrient deprivation.

While no information was provided on plant height, Schultz and Burnside's (1979b.) study suggests that pod production may be related to environmental conditions. Plants collected in a soybean field produced only two pods. These plants were most likely subject to herbicides and competition with existing crops. Plants in a fescue field produced only 4 pods, these plants were also subject to competition with fescue. Plants cultivated in a nursery where there was little competition for resources, produced an average of 150 pods per plant in September. This value is significantly greater than the value of 12.5 pods per plant observed in this study in 1989. The plants in the nursery, free from competition with other species, would most likely grow larger than plants found in an open field. Therefore, they would also most likely produce more pods; however, the difference between 2 to 4 pods per plant and 150 pods per plant suggests a significant increase in pod production which may be greater than what would be expected to accompany an increased plant weight and height. Unfortunately, without plant height and flower production data, no conclusions can be drawn on whether pod abortion may have occurred on the sample collected in the soybean and fescue fields.

Because *Apocynum*'s flowers are significantly smaller than *Asclepias*' flowers, initiated pods are more difficult to identify until a later stage of development. As a result, more frequent monitoring of flowers, enhanced by a hand lens, may eventually reveal a greater number of pods initiated compared to pods produced.

This study has indicated that *Apocynum*, like *Asclepias* may be useful in the study of the regulation of pod production. Additional studies of *Apocynum* may aid

in the understanding of its mechanisms for regulating pod production. The basic question of why so few pods are produced from so many flowers still remains unexplained.

APPENDIX

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Table A-1: 1989 *Asclepias* syriaca Collection Data

Date	Leaf Weight	Stem Weight	Vegetative Weight	Bud Weight	Pod Weight	Pod Number	Reproductive Weight	Height	Ratio
7/01/89	166.07	218.14	384.21	4.03	0.00	0	4.03	171	0.01
7/01/89	48.04	51.98	100.02	0.00	3.50	4	3.50	86	0.03
7/01/89	112.53	114.84	227.37	14.67	0.00	0	14.67	121	0.06
7/01/89	90.84	76.52	167.36	2.09	0.00	0	2.09	113	0.01
7/01/89	109.09	90.94	200.03	2.47	0.00	0	2.47	123	0.01
7/01/89	30.34	22.78	53.12	0.00	0.00	0	0.00	75	0.00
7/01/89	97.98	97.00	194.98	0.29	2.10	1	2.39	126	0.01
7/01/89	163.46	152.67	316.13	1.96	1.67	1	3.63	127	0.01
7/01/89	25.48	20.68	46.16	0.00	0.00	0	0.00	77	0.00
7/01/89	124.67	123.42	248.09	1.00	12.22	2	13.22	132	0.05
7/07/89	90.04	137.96	228.00	3.64	0.00	0	3.64	124	0.02
7/07/89	49.13	30.89	80.02	0.00	0.00	0	0.00	83	0.00
7/07/89	134.58	127.10	261.68	3.06	0.00	0	3.06	127	0.01
7/07/89	85.24	82.29	167.53	3.48	0.00	0	3.48	119	0.02
7/07/89	26.60	15.62	42.22	0.00	0.00	0	0.00	60	0.00
7/07/89	138.05	127.78	265.83	8.94	0.00	0	8.94	121	0.03
7/07/89	55.68	12.20	67.88	1.34	0.00	0	1.34	100	0.02
7/07/89	77.77	73.54	151.31	4.21	0.00	0	4.21	103	0.03

Table A-1: 1989 *Asclepias syriaca* Collection Data (continued)

Date	Leaf Weight	Stem Weight	Vegetative Weight	Bud Weight	Pod Weight	Pod Number	Reproductive Weight	Height	Ratio
7/07/89	91.24	102.39	193.63	9.60	0.00	0	9.60	103	0.05
7/07/89	29.74	54.56	84.30	0.00	1.55	*	1.55	102	0.02
7/12/89	56.44	32.41	88.85	0.00	1.56	*	1.56	83	0.02
7/12/89	88.13	68.20	156.33	0.00	0.00	0	0.00	99	0.00
7/12/89	75.57	63.43	139.00	13.96	0.00	0	13.96	102	0.10
7/12/89	77.56	94.98	172.54	0.65	28.67	4	29.32	109	0.17
7/12/89	78.94	58.75	137.69	5.85	0.00	0	5.85	96	0.04
7/12/89	55.65	37.75	93.40	8.64	0.00	0	8.64	80	0.09
7/12/89	64.39	36.62	101.01	10.27	0.00	0	10.27	83	0.10
7/12/89	112.54	86.81	199.35	4.06	0.00	0	4.06	108	0.02
7/12/89	99.65	65.78	165.43	7.77	0.00	0	7.77	97	0.05
7/12/89	104.14	86.43	190.57	8.03	0.00	0	8.03	100	0.04
7/12/89	68.62	64.68	133.30	0.00	3.11	1	3.11	104	0.02
7/24/89	83.64	55.00	138.64	0.00	0.00	0	0.00	101	0.00
7/24/89	79.09	86.32	165.41	0.00	63.56	4	63.56	110	0.38
7/24/89	80.76	73.87	154.63	0.00	0.00	0	0.00	124	0.00
7/24/89	136.81	152.41	289.22	0.00	52.77	7	52.77	162	0.18
7/24/89	147.54	146.62	294.16	0.00	0.00	0	0.00	166	0.00

Table A-1: 1989 *Asclepias syriaca* Collection Data (continued)

Date	Leaf Weight	Stem Weight	Vegetative Weight	Bud Weight	Pod Weight	Pod Number	Reproductive Weight	Height	Ratio
7/24/89	137.15	183.27	320.42	0.00	78.65	7	78.65	168	0.25
7/24/89	126.81	178.11	304.92	0.00	43.51	4	43.51	185	0.14
7/24/89	85.01	84.60	169.61	0.00	0.00	0	0.00	131	0.00
7/24/89	77.23	83.98	161.21	0.00	38.07	2	38.07	104	0.24
7/31/89	8.49	166.70	175.19	0.00	131.75	8	131.75	166	0.75
7/31/89	36.36	111.26	147.62	0.00	21.80	1	21.80	155	0.15
7/31/89	39.02	118.93	157.95	0.00	23.93	1	23.93	160	0.15
7/31/89	39.76	138.10	177.86	0.00	0.00	0	0.00	169	0.00
7/31/89	41.76	198.26	240.02	0.00	67.31	3	67.31	194	0.28
7/31/89	37.69	123.43	161.12	0.00	38.16	3	38.16	142	0.24
7/31/89	35.02	124.77	159.79	0.00	22.34	1	22.34	163	0.14
7/31/89	10.40	142.62	153.02	0.00	85.12	5	85.12	162	0.56
7/31/89	32.82	93.37	126.19	0.00	13.14	1	13.14	150	0.10
7/31/89	63.23	151.63	214.86	0.00	46.58	2	46.58	164	0.22
8/10/89	21.87	26.02	47.89	0.00	0.00	0	0.00	69	0.00
8/10/89	0.00	65.76	65.76	0.00	27.63	4	27.63	119	0.42
8/10/89	53.15	40.98	94.13	0.00	0.00	0	0.00	83	0.00
8/10/89	91.19	212.76	303.95	0.00	122.97	6	122.97	144	0.40

Table A-1: 1989 *Asclepias syriaca* Collection Data (continued)

Date	Leaf Weight	Stem Weight	Vegetative Weight	Bud Weight	Pod Weight	Pod Number	Reproductive Weight	Height	Ratio
8/10/89	48.48	89.57	138.05	0.00	53.14	3	53.14	106	0.38
8/10/89	58.15	146.15	204.30	0.00	127.81	8	127.81	*	0.63
8/10/89	81.32	96.46	177.78	0.00	22.12	2	22.12	111	0.12
8/10/89	40.47	79.19	119.66	0.00	53.45	3	53.45	104	0.45
8/10/89	68.88	149.79	218.67	0.00	102.23	5	102.23	137	0.47
8/10/89	80.44	74.99	155.43	0.00	0.00	0	0.00	116	0.00
8/22/89	0.00	87.15	87.15	0.00	18.93	1	18.93	146	0.22
8/22/89	5.67	103.74	109.41	0.00	0.00	0	0.00	146	0.00
8/22/89	16.70	195.44	212.14	0.00	16.54	1	16.54	166	0.08
8/22/89	8.72	132.01	140.73	0.00	17.42	1	17.42	165	0.12
8/22/89	10.37	132.94	143.31	0.00	0.00	0	0.00	164	0.00
8/22/89	6.22	101.04	107.26	0.00	18.67	1	18.67	161	0.17
8/22/89	6.45	121.75	128.20	0.00	18.27	1	18.27	168	0.14
8/22/89	2.51	113.85	116.36	0.00	0.00	0	0.00	153	0.00
8/22/89	0.00	125.79	125.79	0.00	17.02	1	17.02	163	0.14
8/22/89	9.79	120.70	130.49	0.00	19.87	1	19.87	162	0.15
8/22/89	0.00	117.28	117.28	0.00	67.42	5	67.87	168	0.58
8/22/89	4.49	167.78	172.27	0.00	96.86	6	96.86	173	0.56

Table A-1: 1989 *Asclepias syriaca* Collection Data (continued)

Date	Leaf Weight	Stem Weight	Vegetative Weight	Bud Weight	Pod Weight	Pod Number	Reproductive Weight	Height	Ratio
8/22/89	0.00	126.35	126.35	0.00	20.57	1	20.57	166	0.16
8/22/89	21.24	138.52	159.76	0.00	18.11	1	18.11	171	0.11
8/22/89	0.00	118.42	118.42	0.00	47.18	3	47.18	167	0.40
8/22/89	0.00	123.99	123.99	0.00	91.66	9	91.66	180	0.74
8/22/89	0.00	125.31	125.31	0.00	82.72	6	82.72	174	0.66
8/22/89	0.00	169.59	169.59	0.00	93.23	6	93.23	175	0.55
8/22/89	13.34	184.95	198.29	0.00	78.84	6	78.84	177	0.40
8/22/89	27.83	160.68	188.51	0.00	27.03	2	27.03	167	0.14
9/02/89	0.00	41.31	41.31	0.00	14.19	1	14.19	125	0.34
9/02/89	0.00	159.64	159.64	0.00	31.64	2	31.64	178	0.20
9/02/89	0.00	187.60	187.60	0.00	22.30	1	22.30	175	0.12
9/02/89	0.00	104.81	104.81	0.00	46.12	3	46.12	128	0.44
9/02/89	0.00	37.45	37.45	0.00	12.67	1	12.67	148	0.34
9/02/89	14.05	68.73	82.78	0.00	14.55	1	14.55	124	0.18
9/02/89	0.00	33.30	33.30	0.00	14.83	1	14.83	92	0.45
9/02/89	0.00	62.68	62.68	0.00	27.98	2	27.98	125	0.45
9/02/89	7.57	180.01	187.58	0.00	49.45	3	49.45	171	0.26
9/02/89	0.00	96.27	96.27	0.00	17.90	1	17.90	164	0.19

Table A-1: 1989 *Asclepias syriaca* Collection Data (continued)

Date	Leaf Weight	Stem Weight	Vegetative Weight	Bud Weight	Pod Weight	Pod Number	Reproductive Weight	Height	Ratio
9/02/89	0.00	94.91	94.91	0.00	33.38	2	33.38	160	0.35
9/02/89	0.00	126.94	126.94	0.00	41.83	3	41.83	159	0.33
9/02/89	0.00	124.30	124.30	0.00	32.49	2	32.49	170	0.26
9/02/89	0.17	83.55	83.72	0.00	44.78	3	44.78	*	0.53
9/10/89	23.45	24.36	47.81	0.00	0.00	0	0.00	77	0.00
9/10/89	16.32	48.67	64.99	0.00	24.06	3	24.06	79	0.37
9/10/89	8.93	57.01	65.94	0.00	31.09	2	31.09	84	0.47
9/10/89	10.05	45.39	55.44	0.00	24.09	2	24.09	81	0.43
9/10/89	8.81	29.20	38.01	0.00	9.15	1	9.15	71	0.24
9/10/89	15.99	34.06	50.05	0.00	23.07	2	23.07	68	0.46
9/10/89	19.58	37.72	57.30	0.00	0.00	0	0.00	78	0.00
9/10/89	26.79	25.75	52.54	0.00	10.33	1	10.33	72	0.20
9/10/89	10.33	34.55	44.88	0.00	13.86	2	13.86	74	0.31
9/10/89	11.21	20.64	31.85	0.00	8.28	1	8.28	63	0.26

Table A-2: 1989 *Asclepias* Collection Data for Plants Producing Pods

Plant #	Pod Length in cm.	Pod Length in cm.	Wet Weight in g.	Dry Weight in g.	Seed #	Seed #
2	2.0	0.0	0.82	0.08	10	0
2	3.0	0.0	0.75	0.09	56	0
2	2.8	0.0	0.97	0.09	63	0
2	2.3	0.0	0.96	0.08	18	0
7	3.4	0.0	2.10	0.21	179	0
8	3.0	0.0	1.67	0.15	158	0
10	3.8	0.0	2.52	0.75	181	0
10	2.4	0.0	9.70	0.25	201	0
24	7.2	0.0	6.30	0.55	217	0
24	7.6	7.6	16.32	1.31	184	176
24	6.5	0.0	5.65	0.58	86	0
31	4.0	0.0	3.11	0.33	124	0
33	9.5	0.0	15.54	2.57	262	0
33	9.5	0.0	15.26	2.14	240	0
33	9.5	0.0	15.78	2.45	235	0
33	9.5	0.0	16.98	2.75	261	0
35	8.0	0.0	7.53	0.84	113	0
35	9.5	0.0	11.71	1.01	174	0
35	10.0	0.0	15.16	1.79	183	0
35	2.3	0.0	0.14	0.10	57	0
35	9.0	0.0	9.18	1.20	116	0
35	8.5	3.0	9.05	1.01	115	0
37	9.0	0.0	9.13	1.41	115	0
37	8.5	0.0	10.25	1.19	122	0
37	10.0	0.0	13.61	1.89	152	0
37	8.5	0.0	10.68	1.29	132	0
37	8.5	0.0	12.88	1.76	152	0
37	8.2	8.5	22.10	2.65	136	119
38	8.5	0.0	12.35	1.27	146	0
38	7.2	0.0	8.67	0.72	113	0

Table A-2: 1989 *Asclepias* Collection Data for Plants Producing Pods

Plant #	Pod Length in cm.	Pod Length in cm.	Wet Weight in g.	Dry Weight in g.	Seed #	Seed #
38	8.3	0.0	8.16	1.11	81	0
38	9.3	0.0	14.33	1.56	149	0
40	10.6	0.0	17.02	2.61	212	0
40	11.0	0.0	21.05	2.89	220	0
41	13.0	0.0	16.90	3.22	262	0
41	13.5	0.0	15.99	3.30	256	0
41	14.0	0.0	17.96	3.73	264	0
41	11.5	0.0	15.85	2.72	264	0
41	13.0	0.0	16.98	3.29	265	0
41	12.0	0.0	14.53	2.53	238	0
41	13.0	0.0	16.38	2.77	240	0
41	13.0	0.0	17.16	2.84	262	0
42	14.5	0.0	21.80	5.13	239	0
43	15.5	0.0	23.93	5.30	259	0
45	15.0	0.0	20.41	5.14	261	0
45	15.0	0.0	23.12	4.58	236	0
45	13.5	0.0	23.78	3.79	226	0
46	4.5	0.0	0.49	0.26	0	0
46	14.0	0.0	19.06	4.29	223	0
46	14.0	0.0	18.61	4.08	131	0
47	14.0	0.0	22.34	5.18	257	0
48	13.5	0.0	18.45	3.75	244	0
48	13.5	0.0	16.57	3.11	219	0
48	12.0	0.0	15.77	2.61	265	0
48	12.5	12.5	34.33	5.97	213	248
49	13.0	0.0	13.14	2.95	114	0
50	15.0	0.0	22.67	4.16	235	0
50	14.0	0.0	23.91	3.68	243	0
52	13.0	0.0	9.15	3.86	274	0
52	12.0	0.0	9.24	3.61	287	0

Table A-2: 1989 *Asclepias* Collection Data for Plants Producing Pods

Plant #	Pod Length in cm.	Pod Length in cm.	Wet Weight in g.	Dry Weight in g.	Seed #	Seed #
52	7.5	0.0	1.29	0.73	123	0
52	11.5	0.0	7.95	2.29	265	0
54	13.0	0.0	16.91	3.52	312	0
54	14.0	0.0	21.92	5.31	313	0
54	13.0	0.0	17.13	3.93	202	0
54	13.0	0.0	20.29	4.18	253	0
54	14.0	0.0	21.92	4.70	284	0
54	13.5	0.0	24.80	4.80	259	0
55	11.5	0.0	15.35	2.87	250	0
55	12.0	0.0	20.24	4.22	251	0
55	11.0	0.0	17.55	3.71	235	0
56	11.5	0.0	14.24	3.20	235	0
56	12.5	0.0	17.76	4.15	315	0
56	11.5	0.0	12.96	3.08	237	0
56	11.5	0.0	12.82	2.86	238	0
56	12.5	0.0	15.00	3.30	236	0
56	12.5	0.0	19.62	3.68	262	0
56	13.5	0.0	20.43	3.86	247	0
56	11.5	0.0	14.98	2.83	248	0
57	13.0	0.0	20.53	4.09	241	0
57	7.0	0.0	1.59	0.90	112	0
58	12.0	0.0	16.82	3.80	299	0
58	12.0	0.0	16.42	3.84	238	0
58	13.0	0.0	20.21	4.02	258	0
59	12.5	0.0	21.42	4.11	271	0
59	13.0	0.0	24.25	4.58	312	0
59	13.0	0.0	21.56	4.18	326	0
59	12.5	0.0	19.05	3.87	281	0
59	12.0	0.0	15.95	3.15	259	0
61	14.5	0.0	18.93	5.01	230	0

Table A-2: 1989 *Asclepias* Collection Data for Plants Producing Pods

Plant #	Pod Length in cm.	Pod Length in cm.	Wet Weight in g.	Dry Weight in g.	Seed #	Seed #
63	13.0	0.0	16.54	4.93	281	0
64	14.0	0.0	17.42	5.21	139	0
66	14.5	0.0	18.67	5.41	132	0
67	15.0	0.0	18.27	5.31	244	0
69	13.0	0.0	17.02	4.99	222	0
70	14.5	0.0	19.87	5.47	240	0
71	13.0	0.0	12.79	3.80	249	0
71	12.5	0.0	13.23	3.72	250	0
71	14.0	0.0	14.27	4.36	258	0
71	13.0	0.0	13.28	4.05	246	0
71	13.0	0.0	13.85	4.19	250	0
72	15.5	0.0	18.04	5.43	261	0
72	14.5	0.0	17.40	5.01	170	0
72	14.0	0.0	17.04	4.86	281	0
72	14.5	0.0	16.38	4.70	237	0
72	12.5	0.0	13.33	3.53	225	0
72	13.0	0.0	14.67	3.91	248	0
73	15.0	0.0	20.57	5.50	262	0
74	15.0	0.0	18.11	5.83	192	0
75	14.5	0.0	16.22	5.03	247	0
75	14.0	0.0	15.08	4.51	198	0
75	14.5	0.0	15.88	4.70	232	0
76	14.0	14.0	29.21	9.95	263	266
76	13.0	0.0	11.79	3.41	174	0
76	12.5	0.0	1.70	3.38	240	0
76	12.0	0.0	9.71	2.99	228	0
76	11.0	11.0	19.53	5.85	228	200
76	11.5	0.0	8.19	1.89	211	0
76	12.0	0.0	11.53	3.03	225	0
77	14.0	0.0	16.18	4.38	233	0

Table A-2: 1989 *Asclepias* Collection Data for Plants Producing Pods

Plant #	Pod Length in cm.	Pod Length in cm.	Wet Weight in g.	Dry Weight in g.	Seed #	Seed #
77	12.5	0.0	9.81	2.57	138	0
77	14.0	0.0	16.25	4.46	239	0
77	12.5	0.0	13.21	3.41	226	0
77	14.0	0.0	16.71	4.09	233	0
77	12.0	0.0	10.56	2.55	131	0
78	14.0	0.0	17.31	5.21	251	0
78	15.5	0.0	18.31	5.23	240	0
78	13.0	0.0	15.22	4.61	237	0
78	14.0	0.0	14.88	4.35	238	0
78	12.0	0.0	13.02	3.74	215	0
78	14.0	0.0	14.49	4.36	242	0
79	13.5	0.0	14.32	4.64	193	0
79	13.0	0.0	15.13	5.00	247	0
79	13.0	0.0	10.80	3.31	133	0
79	11.5	0.0	8.69	2.54	117	0
79	13.5	0.0	16.22	5.00	231	0
79	14.0	0.0	13.68	4.20	141	0
80	14.0	0.0	12.79	3.71	172	0
80	13.5	0.0	14.24	4.31	213	0
81	16.5	0.0	14.19	3.59	188	0
82	12.5	13.0	31.64	8.91	112	248
83	15.0	0.0	22.30	6.20	255	0
84	14.5	0.0	16.18	4.76	240	0
84	14.0	0.0	14.75	3.99	219	0
84	13.5	0.0	15.19	4.13	227	0
85	13.0	0.0	12.67	5.27	241	0
86	14.0	0.0	14.55	4.89	247	0
87	15.0	0.0	14.83	4.59	223	0
88	15.0	0.0	12.44	3.47	180	0
88	15.0	0.0	15.54	4.34	182	0

Table A-2: 1989 *Asclepias* Collection Data for Plants Producing Pods

Plant #	Pod Length in cm.	Pod Length in cm.	Wet Weight in g.	Dry Weight in g.	Seed #	Seed #
89	14.5	0.0	16.97	5.30	270	0
89	14.5	0.0	16.23	5.03	259	0
89	14.5	0.0	16.25	5.15	237	0
90	15.0	0.0	17.90	5.16	221	0
91	14.5	0.0	16.83	4.99	263	0
91	14.0	0.0	16.55	4.67	234	0
92	13.0	0.0	15.79	4.87	238	0
92	12.5	0.0	11.83	4.67	219	0
92	13.5	0.0	14.21	4.62	215	0
93	15.0	0.0	17.87	0.97	177	0
93	9.0	0.0	14.62	5.44	267	0
94	13.5	0.0	14.43	4.60	243	0
94	14.5	0.0	14.64	4.69	233	0
94	14.5	0.0	15.71	4.98	234	0
96	9.5	0.0	4.72	2.35	176	0
96	9.0	0.0	6.20	1.17	154	0
96	10.0	0.0	13.14	3.26	225	0
97	12.0	0.0	17.08	4.74	252	0
97	11.5	0.0	14.01	3.78	237	0
98	11.0	0.0	12.68	3.08	208	0
98	11.0	0.0	11.41	2.72	221	0
99	10.0	0.0	9.15	1.68	118	0
100	11.0	0.0	9.62	3.21	234	0
100	11.0	0.0	13.45	3.59	225	0
102	11.0	0.0	10.33	2.65	121	0
103	11.5	1.4	13.86	3.73	211	0
104	9.5	0.0	8.28	1.93	192	0

TABLE A-3: *Asclepias* Collection Data Correlation Matrix

Variable	Plant Ht.	Stem Wt.	Leaf Wt.	Flower Wt.	Pod #	Pod Wt.
Plant Ht.						
correlation coefficient		0.858	-0.126	-0.231	0.411	0.485
probability		*1.000	0.791	*0.980	*1.000	*1.000
sample size		102	102	102	100	102
Stem Wt.						
correlation coefficient			0.167	-0.082	0.453	0.539
probability			0.910	0.592	*1.000	*1.000
sample size			104	104	102	104
Leaf Wt.						
correlation coefficient				0.446	-0.217	-0.217
probability				*1.000	*0.973	*0.973
sample size				104	104	104
Flower Wt.						
correlation coefficient					-0.327	-0.308
probability					*0.999	*0.999
sample size					102	104
Pod Number						
correlation coefficient						0.925
probability						*1.000
sample size						102
Pod Wt.						
correlation coefficient						
probability						
sample size						

* Indicates Significant Correlation at the 5% Level

Table A-4: *Apocynum cannabinum* Collection Data

Date	Leaf Weight	Stem Weight	Vegetative Weight	Bud Weight	Pod Weight	Pod Number	Reproductive Weight	Height	Ratio
06/30/89	*	*	46.29	0.00	0.00	0	0.00	79	0.00
06/30/89	*	*	193.66	9.99	8.15	21	18.14	102	0.09
06/30/89	*	*	137.84	2.21	0.22	7	2.43	95	0.02
06/30/89	*	*	64.25	0.87	0.04	2	0.91	95	0.01
06/30/89	*	*	43.97	0.00	21.51	9	21.51	84	0.49
06/30/89	*	*	15.21	0.32	0.00	0	0.32	49	0.02
06/30/89	*	*	60.90	0.88	2.76	6	3.64	97	0.06
06/30/89	*	*	53.83	0.59	0.42	7	1.01	91	0.02
06/30/89	*	*	107.39	25.02	2.80	22	27.82	103	0.26
06/30/89	*	*	40.26	0.02	5.37	5	5.39	87	0.13
06/30/89	*	*	37.94	0.03	3.74	4	3.77	69	0.10
07/05/89	*	*	57.53	0.12	0.77	2	0.89	79	0.02
07/05/89	*	*	54.09	0.34	7.90	12	8.24	94	0.15
07/05/89	*	*	11.46	0.00	1.76	1	1.76	67	0.15
07/05/89	*	*	14.38	0.01	0.00	0	0.01	65	0.00
07/05/89	*	*	26.05	0.31	4.28	6	2.85	77	0.11
07/05/89	*	*	24.26	0.01	0.00	0	0.01	74	0.00
07/05/89	*	*	37.95	0.09	3.55	5	3.64	66	0.10

Table A-4: *Apocynum cannabinum* Collection Data

Date	Leaf Weight	Stem Weight	Vegetative Weight	Bud Weight	Pod Weight	Pod Number	Reproductive Weight	Height	Ratio
07/05/89	*	*	32.48	0.01	1.86	2	1.87	64	0.06
07/05/89	*	*	10.27	0.03	6.25	9	6.28	73	0.61
07/05/89	*	*	65.52	0.22	10.94	14	11.16	79	0.17
07/13/89	38.54	37.08	75.62	0.00	6.76	8	6.76	62	0.09
07/13/89	17.94	32.03	49.97	0.00	10.73	12	10.73	83	0.21
07/13/89	19.38	8.35	27.73	0.00	14.15	14	16.03	80	0.58
07/13/89	12.20	10.52	22.72	0.00	4.02	3	4.02	61	0.18
07/13/89	10.93	14.17	25.10	0.00	0.00	0	0.00	63	0.00
07/13/89	13.15	20.96	34.11	0.00	0.00	0	0.00	*	0.00
07/13/89	7.38	*	*	0.00	0.00	0	0.00	84	*
07/13/89	7.94	17.80	25.74	0.00	0.00	0	0.00	84	0.00
07/13/89	13.18	21.51	34.69	0.00	3.48	5	3.48	76	0.10
07/13/89	12.15	27.26	39.41	0.00	4.82	8	4.82	87	0.12
07/13/89	17.41	28.74	46.15	0.00	8.51	11	8.51	78	0.18
07/20/89	136.55	197.22	333.77	7.17	51.63	69	58.80	111	0.18
07/20/89	23.54	26.86	50.40	0.27	3.52	8	3.79	73	0.07
07/20/89	53.69	103.05	156.74	1.87	0.00	0	3.22	98	0.02
07/20/89	13.01	27.99	41.00	0.00	1.30	2	1.30	72	0.03

Table A-4: *Apocynum cannabinum* Collection Data

Date	Leaf Weight	Stem Weight	Vegetative Weight	Bud Weight	Pod Weight	Pod Number	Reproductive Weight	Height	Ratio
7/20/89	111.63	103.59	215.22	8.86	1.94	2	10.80	72	0.05
7/20/89	33.42	57.91	91.33	1.16	1.29	2	2.45	94	0.03
7/20/89	41.33	58.47	99.80	0.40	0.00	0	0.40	68	0.00
7/20/89	52.93	65.73	118.66	1.86	0.00	0	1.86	92	0.02
7/20/89	66.17	136.61	202.78	1.55	7.58	8	9.13	100	0.05
7/20/89	37.35	67.51	104.86	2.54	4.44	6	6.98	95	0.07
7/28/89	13.27	17.02	30.29	0.00	1.52	2	1.52	69	0.05
7/28/89	30.28	34.78	65.06	0.00	6.59	9	6.59	93	0.10
7/28/89	6.68	22.31	28.99	0.00	7.71	9	7.71	74	0.27
7/28/89	24.54	35.97	60.51	0.00	6.12	10	6.12	90	0.10
7/28/89	12.54	16.15	28.69	0.00	1.43	2	1.43	72	0.05
7/28/89	29.64	43.72	73.36	0.01	0.00	0	0.01	81	0.00
7/28/89	15.51	27.40	42.91	0.00	0.00	0	0.00	91	0.00
7/28/89	16.03	38.97	55.00	0.00	4.47	8	4.47	79	0.08
7/28/89	16.15	33.12	49.27	0.01	2.18	4	2.19	82	0.04
7/28/89	9.98	16.63	26.61	0.00	0.00	0	0.00	102	0.00
8/7/89	56.13	88.88	145.01	0.00	0.00	0	0.00	64	0.00
8/7/89	27.96	25.72	53.68	0.00	0.00	0	0.00	102	0.00

Table A-4: *Apocynum cannabinum* Collection Data

Date	Leaf Weight	Stem Weight	Vegetative Weight	Bud Weight	Pod Weight	Pod Number	Reproductive Weight	Height	Ratio
8/07/89	59.61	67.41	127.02	0.00	0.00	0	0.00	117	0.00
8/07/89	70.20	108.93	179.13	0.00	12.28	13	12.28	107	0.07
8/07/89	48.99	75.88	124.87	0.00	8.70	9	8.70	102	0.07
8/07/89	66.81	86.69	153.50	0.00	0.00	0	0.00	120	0.00
8/07/89	25.41	42.78	68.19	0.00	7.15	7	7.15	114	0.10
8/07/89	32.37	55.54	87.91	0.00	15.50	14	15.5	103	0.18
8/07/89	39.23	74.93	114.16	0.00	4.86	6	4.86	120	0.04
8/07/89	32.65	79.66	112.31	0.00	7.61	10	7.61	107	0.07
8/17/89	54.18	46.84	101.02	2.36	3.03	7	5.39	75	0.05
8/17/89	16.44	50.57	67.01	0.00	0.00	0	0.00	100	0.00
8/17/89	54.19	66.53	120.72	1.02	7.14	5	8.16	89	0.07
8/17/89	18.73	37.04	55.77	0.03	0.95	2	0.98	96	0.02
8/17/89	28.45	51.82	80.27	0.00	0.00	0	0.00	79	0.00
8/17/89	82.29	78.44	160.73	2.57	4.81	8	7.38	85	0.05
8/17/89	30.56	35.88	66.44	1.92	0.09	2	2.01	78	0.03
8/17/89	83.52	82.80	166.32	5.06	4.49	8	9.55	71	0.06
8/17/89	97.87	103.81	201.68	4.23	5.96	4	10.19	88	0.05
8/17/89	123.39	120.83	244.22	7.72	15.22	28	22.94	87	0.09

Table A-4: *Apocynum cannabinum* Collection Data

Date	Leaf Weight	Stem Weight	Vegetative Weight	Bud Weight	Pod Weight	Pod Number	Reproductive Weight	Height	Ratio
8/27/89	27.91	48.07	75.98	0.00	6.31	8	6.31	105	0.08
8/27/89	16.73	50.92	67.65	0.00	4.63	6	4.63	89	0.07
8/27/89	40.12	87.50	127.62	0.00	9.65	15	9.65	107	0.08
8/27/89	7.48	25.96	33.44	0.00	0.28	1	0.28	110	0.01
8/27/89	4.92	27.49	32.41	0.00	1.27	4	1.27	105	0.04
8/27/89	24.62	56.61	81.23	0.00	11.77	21	11.77	105	0.14
8/27/89	15.34	63.89	79.23	0.00	7.77	9	7.77	119	0.10
8/27/89	21.44	67.07	88.51	0.00	12.94	19	12.94	117	0.15
8/27/89	9.87	16.44	26.31	0.00	1.92	2	1.92	101	0.07
8/27/89	17.84	30.97	48.81	0.00	0.00	0	0.00	120	0.00
8/27/89	1.41	10.48	11.89	0.00	0.55	3	0.55	81	0.05
8/27/89	20.25	47.50	67.75	0.00	14.67	18	14.67	112	0.22
8/27/89	11.74	30.16	41.90	0.00	1.03	2	1.03	108	0.02
8/27/89	22.69	56.70	79.39	0.00	12.76	17	12.76	92	0.16
8/27/89	1.27	19.42	20.69	0.00	0.29	2	0.29	105	0.01
8/27/89	3.18	19.74	22.92	0.00	0.00	0	0.00	94	0.00
8/27/89	25.20	47.74	72.94	0.00	3.45	4	3.45	108	0.05
8/27/89	3.49	23.56	27.05	0.00	1.58	2	1.58	99	0.06

Table A-4: *Apocynum cannabinum* Collection Data

Date	Leaf Weight	Stem Weight	Vegetative Weight	Bud Weight	Pod Weight	Pod Number	Reproductive Weight	Height	Ratio
9/02/89	14.00	27.48	41.48	0.00	0.46	2	0.46	96	0.01
9/0289	0.40	12.61	13.01	0.00	2.03	2	2.03	80	0.16
9/02/89	9.26	26.42	35.68	0.00	6.32	10	6.32	96	0.18
9/02/89	7.49	66.40	73.89	0.00	13.74	19	13.74	101	0.19
9/02/89	4.42	44.10	48.52	0.00	17.69	24	17.69	84	0.36
9/02/89	1.60	34.62	36.22	0.00	7.14	10	7.14	84	0.20
9/02/89	0.00	11.03	11.03	0.00	2.58	4	2.58	67	0.23
9/02/89	24.83	62.96	87.79	0.00	10.49	19	10.49	94	0.12
9/02/89	3.76	50.69	54.45	0.00	29.26	36	29.26	90	0.54
9/02/89	13.91	50.81	64.72	0.00	8.65	12	8.65	84	0.13
9/02/89	6.55	23.58	30.13	0.00	0.00	0	0.00	103	0.00
9/02/89	2.76	18.94	21.70	0.00	3.81	5	3.81	68	0.18
9/02/89	6.28	39.49	45.77	0.00	15.41	21	15.41	80	0.34
9/11/89	14.27	16.58	30.85	0.06	6.93	6	6.93	*	0.22
9/11/89	33.08	41.53	74.61	0.22	8.13	4	8.35	77	0.11
9/25/89	54.26	76.44	130.70	0.00	27.92	26	27.92	99	0.21
9/25/89	34.53	49.25	83.78	0.00	28.08	30	28.08	81	0.34
9/25/89	24.77	41.31	66.08	0.00	14.39	8	14.39	98	0.22

Table A-4: *Apocynum cannabinum* Collection Data

Date	Leaf Weight	Stem Weight	Vegetative Weight	Bud Weight	Pod Weight	Pod Number	Reproductive Weight	Height	Ratio
9/25/89	8.44	53.93	62.37	0.00	14.29	12	14.29	101	0.23
9/25/89	24.47	30.78	55.25	0.00	15.19	14	15.19	62	0.27
9/25/89	22.11	35.12	57.23	0.00	17.08	13	17.08	88	0.30
9/25/89	30.30	33.31	63.61	0.00	0.00	0	0.00	81	0.00
9/25/89	8.10	61.96	70.06	0.00	17.53	20	17.53	90	0.25
9/25/89	17.85	24.00	41.85	0.00	10.88	8	10.88	58	0.26
9/25/89	36.42	42.57	78.99	0.00	11.54	8	11.54	71	0.15

Table A-5: 1989 *Apocynum* Collection Data for Plants Producing Pods

Plant #	Pod Length in cm.	Pod Length in cm.	Wet Weight in g.	Dry Weight in g.	Seed #	Seed #
13	9.9	6.9	0.64	0.19	23	0
13	12.2	14.2	2.15	0.58	50	59
13	11.5	13.0	1.93	0.56	32	46
13	12.0	12.0	1.24	0.55	44	53
16	7.0	4.5	0.62	0.22	57	*
16	15.0	15.0	1.91	0.61	58	66
16	13.5	13.0	1.75	0.56	39	63
18	12.3	12.7	1.54	0.43	40	47
18	11.8	12.2	1.64	0.43	42	47
19	12.4	12.9	1.86	0.55	55	58
20	10.1	10.5	0.97	0.33	29	37
20	0.0	5.5	0.56	0.10	*	20
20	12.1	12.6	1.63	0.52	35	38
20	12.5	13.9	1.66	0.60	45	101
20	11.5	11.4	1.43	0.52	48	55
21	0.0	11.9	0.67	0.19	*	21
21	12.5	13.5	2.03	0.59	45	71
21	10.5	10.7	1.63	1.46	47	60
21	13.5	1.4	1.01	0.62	35	35
21	12.3	13.0	1.86	0.50	44	46
22	10.8	11.0	1.65	0.53	33	51
22	12.0	12.2	1.87	0.61	35	41
22	13.3	13.8	2.02	0.68	41	43
23	12.7	12.7	2.10	0.61	54	68
23	12.0	10.5	1.85	0.57	48	54
23	11.3	11.4	1.77	0.56	40	44
23	14.1	13.5	2.24	0.71	44	62
23	15.0	15.2	2.63	0.79	56	58
24	9.3	3.6	0.61	0.20	46	0
24	8.0	8.3	1.00	0.25	23	41

Table A-5: 1989 *Apocynum* Collection Data for Plants Producing Pods

Plant #	Pod Length in cm.	Pod Length in cm.	Wet Weight in g.	Dry Weight in g.	Seed #	Seed #
24	0.0	12.5	1.02	0.07	*	8
24	0.0	13.0	1.78	0.31	*	50
24	1.5	14.5	2.35	0.76	41	58
24	2.5	12.5	1.59	0.41	0	53
24	10.6	10.7	2.26	0.57	18	56
24	12.7	12.8	3.54	0.72	39	56
25	12.4	12.6	2.03	0.57	55	60
25	0.0	13.5	1.99	0.56	*	55
30	9.4	9.9	1.27	0.37	46	50
30	13.0	13.3	2.09	0.66	52	60
31	7.5	8.5	0.80	0.48	21	28
31	12.7	13.0	1.99	0.63	51	56
31	10.0	10.5	1.64	0.41	44	58
31	0.0	5.5	0.33	0.11	*	27
32	12.0	12.7	1.73	0.54	47	54
32	0.0	10.5	0.74	0.25	*	36
32	12.4	13.0	1.97	0.61	39	57
32	0.0	5.0	0.27	0.12	*	12
32	6.8	7.0	0.66	0.22	10	14
32	0.0	12.7	1.05	0.35	*	68
32	13.4	13.6	2.09	0.66	61	62
33	9.8	10.0	0.86	0.22	17	19
33	10.0	10.5	1.79	0.27	32	61
33	15.7	16.0	1.16	0.36	49	61
33	11.0	11.2	0.84	0.21	22	34
33	16.0	16.7	2.05	0.72	84	98
33	16.8	17.5	2.00	0.68	67	91
33	18.3	19.3	2.51	0.84	104	117
33	0.0	7.9	0.37	0.10	*	25
33	10.1	10.5	0.72	0.20	30	31

Table A-5: 1989 *Apocynum* Collection Data for Plants Producing Pods

Plant #	Pod Length in cm.	Pod Length in cm.	Wet Weight in g.	Dry Weight in g.	Seed #	Seed #
33	11.0	11.5	0.73	0.21	33	36
33	5.2	5.3	0.37	0.11	17	20
33	13.1	16.5	2.08	0.70	100	114
33	9.2	9.4	2.26	0.55	88	93
33	7.3	7.8	0.50	0.14	24	32
33	19.0	19.0	2.43	0.77	69	77
33	0.0	10.3	0.61	0.21	*	83
33	14.9	15.0	1.92	0.58	83	92
33	3.8	8.0	0.52	0.15	9	46
33	7.7	7.7	0.54	0.16	24	33
33	0.0	11.5	0.68	0.22	*	127
33	9.5	15.5	1.28	0.43	10	105
33	18.5	19.0	2.00	0.53	52	83
33	21.3	21.4	2.91	0.95	79	137
33	13.0	13.8	1.73	0.42	39	47
33	15.8	16.4	2.61	0.43	62	63
33	4.8	4.8	0.25	0.08	16	20
33	13.5	13.5	1.32	0.81	90	105
33	13.0	13.0	1.29	0.32	29	48
33	13.0	15.5	0.94	0.29	36	43
33	9.0	15.5	1.33	0.50	13	94
33	16.0	17.0	1.90	0.35	10	87
33	16.6	16.7	2.59	0.68	77	103
33	18.1	18.3	2.39	0.92	108	128
33	18.6	20.3	2.93	1.04	105	130
34	10.5	12.0	1.15	0.20	32	40
34	3.0	4.0	0.20	0.06	8	14
34	3.0	12.0	0.87	0.29	8	94
34	11.0	11.5	1.30	0.37	54	55
37	15.0	16.5	1.92	0.61	88	93

Table A-5: 1989 *Apocynum* Collection Data for Plants Producing Pods

Plant #	Pod Length in cm.	Pod Length in cm.	Wet Weight in g.	Dry Weight in g.	Seed #	Seed #
38	13.0	13.7	1.29	0.36	49	50
41	14.5	15.0	1.50	0.36	62	69
41	13.5	15.2	1.65	0.45	70	87
41	17.2	17.7	2.19	0.60	96	104
41	15.4	15.7	2.24	0.67	84	90
42	9.6	10.1	0.76	0.23	24	28
42	12.5	13.0	1.29	0.41	35	52
42	8.0	8.5	2.39	0.64	96	123
43	11.0	11.2	1.52	0.49	34	38
44	9.6	10.3	1.27	0.41	32	43
44	12.8	13.0	2.43	0.83	60	65
44	4.5	12.9	1.21	0.54	33	43
44	10.0	10.2	1.59	0.44	30	54
45	0.0	11.5	0.98	0.37	*	51
45	10.3	21.3	0.89	0.34	0	28
45	11.6	12.1	1.84	0.51	55	56
45	11.0	11.3	1.50	0.35	36	44
45	15.7	16.0	2.46	0.77	58	58
46	10.5	10.7	1.58	0.52	37	38
46	12.0	12.2	2.09	0.73	45	47
46	5.0	11.2	1.06	0.39	0	38
46	8.0	8.2	1.19	0.40	26	30
47	9.7	10.3	1.43	0.45	28	44
50	0.0	8.0	0.14	0.11	*	13
50	10.0	10.2	1.31	0.43	26	29
50	7.6	11.7	1.30	0.37	10	53
50	10.9	11.0	1.58	0.50	32	34
51	0.0	10.2	0.73	0.25	*	38
51	12.0	12.5	1.40	0.59	24	48
56	0.0	12.8	0.91	0.30	*	74

Table A-5: 1989 *Apocynum* Collection Data for Plants Producing Pods

Plant #	Pod Length in cm.	Pod Length in cm.	Wet Weight in g.	Dry Weight in g.	Seed #	Seed #
56	16.5	16.6	2.32	0.65	97	105
56	16.1	16.3	2.32	0.76	99	101
56	11.3	12.3	1.12	0.40	26	37
56	17.4	17.4	2.42	0.33	49	52
56	13.5	13.5	1.49	0.83	93	97
56	12.7	13.4	1.70	0.65	37	55
57	0.0	12.4	1.12	0.35	*	73
57	12.0	12.5	1.38	0.39	51	53
57	13.2	13.5	1.61	0.47	50	54
57	16.0	16.7	2.68	0.82	89	90
57	13.1	13.5	1.91	0.60	66	87
59	17.9	18.2	2.59	0.79	109	118
59	14.6	16.2	2.46	0.72	80	98
59	16.5	17.2	2.07	0.64	93	93
60	16.4	17.3	2.48	0.74	87	95
60	12.0	12.0	1.51	0.46	46	46
60	16.4	17.0	1.84	0.51	64	76
60	17.2	18.2	3.01	0.90	96	96
60	17.5	18.0	3.08	0.96	94	77
60	11.5	13.0	1.64	0.46	46	52
60	14.0	15.4	1.94	0.54	74	94
61	14.0	14.2	1.44	0.53	37	56
61	14.9	15.7	2.24	0.75	73	65
61	10.5	10.5	1.18	0.43	25	28
62	14.7	14.8	1.57	0.48	77	85
62	16.6	17.2	2.34	0.80	72	80
62	15.9	16.3	2.40	0.83	71	76
62	6.8	7.0	0.32	0.12	10	11
62	11.5	12.1	0.98	0.33	39	51
63	15.0	15.4	1.59	0.35	33	43

Table A-5: 1989 *Apocynum* Collection Data for Plants Producing Pods

Plant #	Pod Length in cm.	Pod Length in cm.	Wet Weight in g.	Dry Weight in g.	Seed #	Seed #
63	12.6	12.7	1.32	0.36	22	34
65	18.4	18.5	2.93	1.04	90	91
65	17.2	17.3	2.69	1.02	76	100
65	0.0	15.0	1.52	0.60	*	89
66	9.6	10.1	0.95	0.17	25	32
68	14.5	15.0	1.85	0.42	74	82
68	0.0	16.0	1.08	0.38	*	97
68	11.2	11.5	0.92	0.24	32	37
68	9.6	9.9	0.92	0.17	30	35
70	7.9	8.5	0.78	0.08	9	12
70	12.0	13.2	1.21	0.13	29	31
70	14.8	14.3	1.30	0.26	31	37
70	12.2	12.5	1.20	0.29	42	60
71	17.2	18.0	3.26	1.19	98	119
71	16.2	16.5	2.69	0.67	83	120
72	0.0	13.2	0.82	1.14	*	43
72	12.9	13.1	0.21	0.27	0	0
72	12.2	12.4	1.69	0.60	50	50
72	3.0	16.0	1.14	*	*	*
72	0.0	10.0	0.97	0.31	*	104
72	6.5	7.6	0.41	0.19	33	34
72	12.0	12.1	1.26	0.37	35	37
72	12.4	12.9	1.21	0.32	30	73
72	12.6	13.3	0.99	0.56	28	46
72	16.0	16.3	1.64	0.52	59	60
72	11.7	12.5	1.36	0.10	14	16
72	5.8	6.3	0.37	0.29	30	34
73	11.3	11.5	1.77	0.70	40	48
73	10.0	10.5	1.35	0.55	29	41
73	11.7	12.0	1.71	0.69	50	67

Table A-5: 1989 *Apocynum* Collection Data for Plants Producing Pods

Plant #	Pod Length in cm.	Pod Length in cm.	Wet Weight in g.	Dry Weight in g.	Seed #	Seed #
73	10.5	12.2	1.48	0.61	39	54
74	12.2	12.6	1.73	0.63	48	50
74	15.2	15.5	2.70	1.02	62	75
74	7.5	7.5	0.20	0.15	0	49
75	11.8	12.0	1.61	0.65	45	48
75	12.3	12.8	1.83	0.77	53	58
75	0.0	4.0	0.11	0.08	*	*
75	6.8	8.5	1.03	0.44	37	52
75	10.0	10.5	1.49	0.63	46	50
75	11.0	11.5	1.31	0.49	52	68
75	9.5	9.7	1.10	0.55	49	54
76	0.0	5.5	0.28	0.12	*	27
77	4.7	8.1	0.62	0.22	8	36
77	8.5	9.0	0.65	0.24	0	34
78	0.0	11.0	0.41	0.34	*	52
78	15.0	15.0	0.82	0.65	50	65
78	11.2	14.2	1.19	0.63	29	59
78	11.4	11.6	1.40	0.55	39	43
78	0.0	10.5	0.64	0.29	*	54
78	11.8	12.6	1.35	0.63	44	54
78	9.0	9.5	0.86	0.48	34	59
78	4.5	10.7	0.85	0.41	9	63
78	13.5	13.6	1.74	0.80	53	55
78	13.0	13.0	1.70	0.78	56	65
78	7.8	8.2	0.81	0.38	28	40
79	14.0	14.2	2.20	0.86	41	44
79	14.2	15.0	2.51	0.96	60	60
79	10.6	10.8	1.41	0.51	34	48
79	11.1	11.1	1.55	0.62	39	42
80	11.2	11.2	1.38	0.68	42	45

Table A-5: 1989 *Apocynum* Collection Data for Plants Producing Pods

Plant #	Pod Length in cm.	Pod Length in cm.	Wet Weight in g.	Dry Weight in g.	Seed #	Seed #
80	10.7	10.7	1.49	0.63	44	49
80	12.5	12.6	1.88	0.82	51	55
80	19.0	19.3	0.85	0.36	23	25
80	13.1	13.5	1.69	0.72	43	44
80	12.2	13.0	1.20	0.78	47	48
80	6.0	11.5	0.57	0.39	0	58
80	11.0	11.2	1.55	0.66	42	48
80	8.7	9.0	1.10	0.47	41	48
80	9.0	9.0	1.23	0.51	40	43
81	11.5	12.8	1.92	0.76	31	57
83	4.2	10.2	0.53	0.29	11	25
84	11.0	11.1	1.65	0.62	35	45
84	12.9	13.3	2.03	0.76	47	48
84	11.5	11.8	1.89	0.71	49	53
84	11.7	12.0	0.63	0.51	29	59
84	9.0	10.0	1.46	0.53	51	52
84	12.4	12.6	1.71	0.63	42	49
84	8.9	9.1	1.40	0.51	46	55
84	9.7	10.0	1.73	0.66	37	58
84	12.6	13.1	2.17	0.88	40	43
85	7.9	8.5	1.03	0.37	34	41
86	9.5	11.0	0.49	0.40	31	45
86	10.7	12.0	1.47	0.54	18	28
86	12.0	12.5	1.77	0.65	27	35
86	16.5	16.5	2.67	0.98	46	54
86	9.7	10.0	1.28	0.46	36	41
86	10.9	11.5	1.82	0.70	38	44
86	9.7	10.0	1.30	0.48	31	35
86	10.3	12.0	1.72	0.64	43	55
87	8.2	8.5	0.29	0.24	16	18

Table A-5: 1989 *Apocynum* Collection Data for Plants Producing Pods

Plant #	Pod Length in cm.	Pod Length in cm.	Wet Weight in g.	Dry Weight in g.	Seed #	Seed #
89	15.1	15.5	2.13	1.00	40	58
89	11.5	12.7	1.32	0.64	21	53
90	10.5	11.5	1.58	0.57	47	38
91	4.9	9.5	0.46	0.27	15	43
92	15.2	15.7	2.03	0.71	43	44
93	11.2	11.3	1.36	0.59	63	64
93	11.4	11.9	1.45	0.60	45	48
93	12.5	12.8	1.76	0.75	44	48
93	4.5	9.5	0.18	0.15	42	49
93	12.4	12.5	1.57	0.68	10	21
94	15.0	15.4	2.47	0.93	61	63
94	11.5	12.2	1.75	0.64	45	50
94	10.0	10.4	1.23	0.46	34	35
94	13.2	13.4	2.16	0.79	49	50
94	0.0	8.0	0.16	0.15	*	46
94	3.5	13.0	0.93	0.40	9	46
94	11.2	11.3	1.07	0.54	40	44
94	16.2	16.5	1.08	0.84	51	52
94	9.0	9.3	1.22	0.46	19	37
94	12.0	12.0	1.67	0.60	31	42
95	8.0	8.3	0.98	0.42	40	45
95	10.5	11.0	1.65	0.66	44	47
95	10.8	11.2	1.41	0.56	32	33
95	10.9	11.0	1.33	0.55	21	26
95	14.6	14.9	2.25	0.90	51	52
95	13.5	14.9	1.95	0.78	30	50
95	8.7	9.0	0.90	0.39	61	42
95	14.7	14.9	2.48	1.02	55	65
95	12.5	13.0	0.55	0.53	51	51
95	12.0	12.1	1.66	0.67	38	56

Table A-5: 1989 *Apocynum* Collection Data for Plants Producing Pods

Plant #	Pod Length in cm.	Pod Length in cm.	Wet Weight in g.	Dry Weight in g.	Seed #	Seed #
95	12.5	12.6	1.75	0.74	36	43
95	5.9	7.4	0.78	0.34	22	33
96	12.0	12.2	1.63	0.67	34	41
96	11.6	12.5	1.76	0.72	29	53
96	10.8	11.3	1.77	0.73	52	56
96	12.1	12.8	1.16	0.74	39	41
96	13.5	14.3	0.82	0.73	39	58
97	7.9	8.5	1.10	0.49	41	47
97	11.6	12.0	1.48	0.63	41	52
98	10.2	10.5	1.53	0.63	39	46
98	11.4	11.7	1.61	0.65	53	59
98	7.0	9.5	0.41	0.38	16	25
98	12.5	12.7	1.99	0.83	53	63
98	10.0	10.0	1.47	0.62	50	53
98	10.5	10.8	1.64	0.70	51	59
98	12.1	12.2	1.64	0.69	36	49
99	9.5	10.0	1.64	0.63	48	54
99	13.3	13.4	2.04	0.77	43	48
99	13.5	14.3	1.86	0.76	48	75
99	16.9	17.5	2.77	1.14	56	78
99	*	*	*	0.64	54	60
99	10.8	11.0	1.65	0.59	45	61
99	10.5	10.7	1.45	0.62	51	82
99	9.0	10.3	1.52	0.54	34	38
99	10.3	10.5	1.30	0.92	47	68
99	13.6	13.7	2.30	1.18	74	79
99	16.0	16.1	2.88	0.45	29	40
99	19.2	19.2	1.07	0.62	54	57
99	10.8	11.2	1.54	0.60	35	44
99	10.5	10.8	1.44	0.84	44	53

Table A-5: 1989 *Apocynum* Collection Data for Plants Producing Pods

Plant #	Pod Length in cm.	Pod Length in cm.	Wet Weight in g.	Dry Weight in g.	Seed #	Seed #
99	0.0	11.5	0.40	0.37	*	41
99	13.5	13.5	2.16	0.62	54	57
99	0.0	8.6	0.21	0.20	*	37
99	9.5	10.0	1.31	0.54	28	35
99	11.2	13.0	1.72	0.73	48	60
100	11.5	13.0	0.55	0.50	25	39
100	11.7	12.4	1.58	0.62	31	31
100	13.0	13.7	1.75	0.68	28	36
100	11.6	12.2	2.04	0.74	50	64
100	16.1	16.7	2.68	1.08	64	73
102	8.8	12.2	1.04	0.53	49	61
102	0.0	9.0	0.15	0.19	*	*
102	16.4	17.0	2.62	1.20	56	61
103	8.2	11.5	0.43	0.36	9	40
103	10.5	10.5	1.51	0.39	22	29
103	7.5	8.2	0.86	0.23	12	47
103	4.2	8.3	0.29	0.73	59	60
103	11.3	11.5	1.67	0.80	46	56
103	12.4	12.5	1.71	0.94	60	70
103	14.6	15.1	2.39	0.93	63	69
103	13.5	13.7	2.40	0.56	33	36
103	10.4	10.6	1.31	0.54	4	61
103	11.8	12.6	2.12	0.85	57	67
104	20.8	21.0	3.49	1.41	109	124
104	11.2	13.0	1.13	0.47	23	31
104	13.0	13.6	2.31	0.50	22	23
106	18.4	19.0	2.63	0.76	83	92
106	7.8	10.5	0.75	0.55	25	35
106	22.0	22.5	3.34	1.06	65	66
106	12.5	19.9	1.37	0.29	13	36

Table A-5: 1989 *Apocynum* Collection Data for Plants Producing Pods

Plant #	Pod Length in cm.	Pod Length in cm.	Wet Weight in g.	Dry Weight in g.	Seed #	Seed #
106	13.6	14.5	1.47	1.14	85	93
106	19.0	20.2	3.09	0.53	27	35
106	16.2	16.5	2.21	0.44	45	57
106	11.2	11.4	0.99	1.25	69	105
106	20.2	20.3	2.89	0.86	67	93
106	23.3	23.5	3.55	0.43	15	16
106	15.7	16.1	1.73	1.15	98	102
106	11.7	12.1	1.25	1.40	96	96
106	19.6	20.0	2.65	0.67	44	46
107	14.3	14.5	1.77	0.68	71	73
107	7.5	10.0	0.59	0.23	7	14
107	16.6	17.9	2.02	0.86	50	69
107	22.1	22.2	3.09	1.15	118	124
107	17.2	20.1	2.27	1.02	46	104
107	16.2	16.5	1.59	0.64	50	58
107	16.5	20.6	2.17	0.95	42	90
107	16.0	17.6	1.80	0.72	40	59
107	17.8	19.7	2.71	1.23	99	104
107	19.2	20.0	2.42	1.02	92	125
107	11.2	12.0	1.21	0.54	31	33
107	15.5	18.1	1.68	0.72	33	63
107	14.8	15.1	1.28	0.56	42	45
107	14.5	15.1	1.56	0.69	27	34
107	14.1	18.8	1.92	0.84	28	79
108	24.0	24.8	4.53	1.74	114	138
108	21.6	23.6	3.87	1.46	91	93
108	19.8	22.2	4.11	1.49	99	101
108	18.5	18.8	1.88	1.06	60	83
109	23.0	23.9	2.70	1.20	99	111
109	21.0	22.0	3.57	1.44	105	123

Table A-5: 1989 *Apocynum* Collection Data for Plants Producing Pods

Plant #	Pod Length in cm.	Pod Length in cm.	Wet Weight in g.	Dry Weight in g.	Seed #	Seed #
109	19.0	19.2	2.63	1.10	72	72
109	12.4	13.0	1.12	0.45	26	27
109	15.8	17.0	1.83	0.78	49	59
109	18.6	19.2	2.44	0.97	83	91
110	17.5	19.0	2.64	1.04	67	71
110	20.1	20.3	3.29	1.28	84	97
110	15.8	17.0	1.64	0.61	48	55
110	16.0	18.0	1.92	0.75	40	76
110	9.7	9.9	0.73	0.26	15	17
110	18.8	21.0	2.72	1.12	88	130
110	17.5	20.1	2.25	1.00	40	85
111	0.0	8.4	0.52	0.19	*	17
111	21.0	21.2	4.04	1.62	103	117
111	18.5	18.7	2.55	0.90	99	103
111	18.5	16.2	2.29	0.88	30	73
111	20.1	21.1	2.91	1.13	61	81
111	15.5	18.5	2.37	0.94	41	67
111	16.8	17.0	2.40	0.94	79	83
113	15.0	15.0	0.70	0.41	36	46
113	17.5	17.8	0.99	0.70	85	97
113	19.4	21.2	3.61	1.39	104	105
113	21.0	21.1	3.06	1.18	109	115
113	18.4	19.4	2.57	1.02	80	88
113	15.2	15.6	1.14	0.48	103	107
113	13.0	13.5	1.44	0.55	59	62
113	9.1	13.3	0.86	0.31	8	28
113	15.5	17.1	0.99	0.70	58	88
113	16.0	16.5	2.17	0.58	59	67
114	15.0	16.3	1.97	0.72	21	33
114	20.5	21.5	2.62	1.20	66	77

Table A-5: 1989 *Apocynum* Collection Data for Plants Producing Pods

Plant #	Pod Length in cm.	Pod Length in cm.	Wet Weight in g.	Dry Weight in g.	Seed #	Seed #
114	21.2	21.4	3.75	1.48	109	113
114	18.8	19.1	2.54	0.98	92	93
115	18.5	20.6	2.27	0.99	48	50
115	21.9	22.2	3.99	1.63	111	113
115	17.7	18.8	2.52	0.96	58	65
115	18.5	18.6	2.76	1.10	74	75

TABLE A-6: *Apocynum* Collection Data Correlation Matrix

Variable	Plant Ht.	Stem Wt.	Leaf Wt.	Flower Wt.	Pod #	Pod Wt.
Plant Ht.						
correlation coefficient		0.321	0.078	0.085	0.211	0.115
probability		*0.998	0.540	0.630	*0.975	0.776
sample size		91	92	113	113	113
Stem Wt.						
correlation coefficient			0.846	0.638	0.504	0.432
probability			*1.000	*1.000	*1.000	*1.000
sample size			92	92	92	92
Leaf Wt.						
correlation coefficient				0.813	0.319	0.278
probability				*1.000	*0.998	*0.993
sample size				93	93	93
Flower Wt.						
correlation coefficient					0.310	0.070
probability					*0.999	0.544
sample size					115	115
Pod Number						
correlation coefficient						0.880
probability						*1.000
sample size						115
Pod Wt.						
correlation coefficient						
probability						
sample size						

* Indicates Significant Correlation at the 5% Level

Table A-7: 1989 *Apocynum* Experimental Data

Plant #	Treatment	July Height	September Height	Branch	Flowers	Pods Initiated	Pods Produced
1	1	56	57	8	168	0	0
2	0	62	70	11	259	1	0
3	2	61	64	8	339	2	0
4	0	61	67	8	267	5	2
5	1	45	70	6	123	2	2
6	0	69	78	8	256	3	2
7	2	66	70	6	303	0	3
8	1	68	69	7	391	0	0
9	2	61	64	5	259	0	0
10	0	58	62	6	117	0	0
11	1	64	61	6	179	0	0
12	2	62	62	7	58	0	0
13	4	60	62	6	84	0	0
14	2	78	76	11	471	2	2
15	1	80	80	21	741	6	6
16	4	60	65	7	166	2	0
17	4	64	71	11	200	2	0
18	1	60	64	6	251	0	0

Table A-7: 1989 *Apocynum* Experimental Data

Plant #	Treatment	July Height	September Height	Branch	Flowers	Pods Initiated	Pods Produced
19	0	53	59	3	5	0	0
20	1	69	77	8	179	2	2
21	0	65	67	10	275	0	0
22	4	69	68	12	217	0	0
23	4	78	78	11	431	2	0
24	2	50	53	7	69	2	2
25	4	68	69	10	151	0	0
26	4	53	15	0	290	0	0
27	1	58	63	4	41	0	0
28	4	73	77	11	539	1	1
29	0	52	54	5	122	0	0
30	2	56	59	6	82	0	0
31	0	71	72	10	589	2	0
32	2	59	63	8	33	0	0

Table A-8: Summary of 1990 *Asclepias* Experimental Data

Plant	Treatment	June Height	September Height	Flower Number	Pods Initiated	Pods Produced
1	2	117	140	285	6	2
2	1	124	138	433	3	3
3	0	129	149	505	2	1
4	0	130	155	554	0	0
5	2	97	97	219	2	1
6	0	108	130	244	2	2
7	1	138	147	244	1	1
8	1	120	*	193	1	0
9	2	134	138	344	3	1
10	2	137	*	397	5	*
11	1	106	134	301	12	1
12	1	100	*	321	4	*
13	2	124	154	601	5	4
14	2	125	154	539	4	3
15	4	123	158	656	4	2
16	0	119	149	663	10	3
17	4	117	150	420	8	1
18	0	84	91	177	0	0
19	0	99	150	590	11	4
20	1	127	*	369	2	*
21	2	95	130	374	1	1
22	2	76	116	163	5	0
23	2	113	145	613	3	2
24	4	111	136	396	2	2
25	4	96	114	318	3	2
26	4	106	111	243	3	1
27	0	107	116	267	1	0
28	1	104	97	314	2	1

Table A-8: Summary of 1990 *Asclepias* Experimental Data

Plant	Treatment	June Height	September Height	Flower Number	Pods Initiated	Pods Produced
29	0	93	*	202	2	*
30	2	90	117	277	1	1
31	2	112	111	368	2	1
32	1	131	152	488	3	1
33	4	133	158	433	1	0
34	0	123	137	501	3	3
35	1	104	118	257	1	1
36	4	114	134	516	4	1
37	1	127	155	614	9	3
38	1	122	*	441	2	*
39	0	120	158	544	3	2
40	4	106	*	337	2	*
41	4	105	114	180	0	0
42	4	116	127	466	2	2
43	4	76	*	0	0	*
44	4	102	106	335	4	2
45	2	96	118	284	2	0
46	2	92	116	389	3	1
47	2	96	140	406	2	1
48	1	102	130	343	7	3
49	4	104	135	270	2	2
50	1	62	*	385	9	*
51	2	101	153	521	2	0
52	4	105	145	390	1	0
53	0	83	98	151	1	0
54	4	88	99	212	2	0
55	0	82	*	76	0	*
56	1	112	143	443	9	1

Table A-8: Summary of 1990 *Asclepias* Experimental Data

Plant	Treatment	June Height	September Height	Flower Number	Pods Initiated	Pods Produced
57	4	109	*	420	2	*
58	4	97	*	311	3	*
59	4	93	122	216	6	0
60	0	108	*	220	5	*
61	1	120	151	541	9	5
62	4	119	135	431	4	3
63	1	112	127	350	2	2
64	2	119	137	429	2	0
65	0	120	138	467	5	1
66	0	111	130	487	3	1
67	2	74	*	0	0	0
68	0	102	118	208	0	0
69	2	103	117	283	4	3
70	1	93	98	97	1	1
71	2	68	135	339	3	1
72	1	124	156	579	1	0
73	0	76	95	91	2	0
74	1	101	129	322	2	2
75	2	100	140	371	4	2
76	0	95	114	252	2	1
77	1	101	122	409	0	0
78	0	118	160	704	5	0
79	0	103	136	364	2	0
80	4	102	135	260	4	0

Table A-9: Summary of 1990 *Apocynum* Experimental Data

Plant	Treatment	June Height	September Height	Flower Number	Pods Initiated	Pods Produced
1	0	84	85	227	0	0
2	4	65	65	36	2	2
3	2	84	84	637	4	3
4	2	81	80	350	0	0
5	1	85	*	213	0	0
6	0	96	92	523	6	6
7	1	87	89	353	0	0
8	2	94	103	826	10	9
9	4	78	81	25	2	0
10	0	88	85	136	0	0
11	4	59	*	50	0	0
12	0	87	84	633	2	2
13	4	81	80	963	10	10
14	4	91	94	493	12	12
15	2	88	88	545	2	2
16	0	84	83	451	4	4
17	1	91	90	477	2	2
18	4	88	*	514	0	0
19	2	88	86	667	2	2
20	4	84	86	90	0	0
21	2	83	85	496	2	2
22	2	83	86	486	4	4
23	0	88	90	456	0	0
24	0	75	72	121	0	0
25	4	83	81	242	0	0
26	4	87	86	438	0	0
27	1	71	68	479	2	2
28	0	80	79	326	2	1

Table A-9: Summary of 1990 *Apocynum* Experimental Data

Plant	Treatment	June Height	September Height	Flower Number	Pods Initiated	Pods Produced
29	1	94	96	752	2	2
30	0	91	89	877	6	4
31	2	87	85	741	0	0
32	2	80	78	636	6	6
33	1	90	91	519	2	1
34	0	92	95	853	4	4
35	4	94	92	796	2	0
36	1	81	82	369	0	0
37	4	84	80	871	0	0
38	4	95	90	880	6	4
39	2	93	90	775	0	0
40	1	88	86	492	0	0
41	2	80	78	407	0	0
42	4	89	87	637	0	0
43	0	102	101	917	0	0
44	1	96	94	829	2	2
45	2	89	86	329	0	0
46	4	79	76	478	0	0
47	2	88	84	606	2	0
48	1	51	54	34	2	2
49	0	60	59	77	0	0
50	0	63	61	62	0	0
51	0	95	96	411	0	0
52	1	76	76	555	6	6
53	1	91	91	652	2	0
54	4	69	69	27	0	0
55	2	72	73	136	0	0
56	2	77	74	731	0	0

Table A-9: Summary of 1990 *Apocynum* Experimental Data

Plant	Treatment	June Height	September Height	Flower Number	Pods Initiated	Pods Produced
57	0	90	88	683	0	0
58	4	86	86	419	0	0
59	1	99	96	1026	2	2
60	1	86	82	735	0	0
61	1	91	91	354	0	0
62	2	63	69	40	2	2
63	4	64	67	17	0	0
64	2	94	92	693	4	0
65	0	81	79	517	2	2
66	2	93	88	855	6	6
67	0	89	86	687	8	6
68	1	81	80	417	0	0
69	0	96	95	818	0	0
70	1	91	92	693	2	2
71	0	99	98	827	4	2
72	4	103	104	587	0	0
73	1	83	79	368	0	0
74	0	65	65	39	0	0
75	1	63	*	0	0	0
76	4	82	80	1104	0	0
77	2	79	79	201	0	0
78	1	67	68	44	0	0
79	4	81	81	574	2	2
80	2	105	102	432	0	0

Table A-10: June 3, 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	2	117	4	144	0
2	1	124	5	433	0
3	0	129	6	309	0
4	0	130	6	354	0
5	2	97	2	219	0
6	0	108	4	157	0
7	1	138	7	297	0
8	1	120	4	190	0
9	2	134	4	193	0
10	2	137	6	256	0
11	1	106	2	0	0
12	1	100	3	86	0
13	2	124	6	313	0
14	2	125	6	305	0
15	4	123	7	440	0
16	0	119	6	350	0
17	4	117	5	214	0
18	0	84	3	126	0
19	0	99	2	0	0
20	1	127	5	283	0
21	2	95	3	0	0
22	2	76	2	0	0
23	2	113	6	358	0
24	4	111	5	189	0
25	4	96	5	170	0
26	4	106	4	162	0
27	0	107	4	185	0
28	1	104	4	314	0
29	0	93	3	126	0
30	2	90	4	174	0
31	2	112	5	300	0
32	1	131	6	435	0
33	4	133	5	202	0
34	0	123	5	292	0
35	1	104	4	159	0
36	4	114	4	154	0
37	1	127	6	347	0
38	1	122	5	237	0
39	0	120	5	143	0
40	4	106	4	98	0

Table A-10: June 3, 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	4	105	3	67	0
42	4	116	6	414	0
43	4	76	0	0	0
44	4	102	4	106	0
45	2	96	4	82	0
46	2	92	4	78	0
47	2	96	3	0	0
48	1	102	5	94	0
49	4	104	4	138	0
50	1	62	5	0	0
51	2	101	2	0	0
52	4	105	3	0	0
53	0	83	3	77	0
54	4	88	1	0	0
55	0	82	1	0	0
56	1	112	6	247	0
57	4	109	5	224	0
58	4	97	2	0	0
59	4	93	2	0	0
60	0	108	5	220	0
61	1	120	7	351	0
62	4	119	6	353	0
63	1	112	5	167	0
64	2	119	5	272	0
65	0	120	6	299	0
66	0	111	5	305	0
67	2	74	0	0	0
68	0	102	3	79	0
69	2	103	3	84	0
70	1	93	3	76	0
71	2	68	5	0	0
72	1	124	5	225	0
73	0	76	2	0	0
74	1	101	4	154	0
75	2	100	2	0	0
76	0	95	3	0	0
77	1	101	4	148	0
78	0	118	5	173	0
79	0	103	5	121	0
80	4	102	4	60	0

Table A-11: June 9, 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	2	123	4	72	0
2	1	130	5	0	0
3	0	136	6	196	0
4	0	138	6	106	0
5	2	99	2	0	0
6	0	112	4	0	0
7	1	141	7	174	0
8	1	123	4	0	0
9	2	139	4	0	0
10	2	140	6	0	0
11	1	111	4	0	0
12	1	104	4	0	0
13	2	137	7	93	0
14	2	139	6	91	0
15	4	138	7	105	0
16	0	130	6	116	0
17	4	129	6	0	0
18	0	92	3	0	0
19	0	112	4	0	0
20	1	130	5	0	0
21	2	110	4	0	0
22	2	84	4	0	0
23	2	126	6	0	0
24	4	123	5	0	0
25	4	105	5	0	0
26	4	108	4	0	0
27	0	111	4	0	0
28	1	113	4	0	0
29	0	97	3	0	0
30	2	95	4	0	0
31	2	112	5	0	0
32	1	140	6	0	0
33	4	141	5	0	0
34	0	129	5	131	0
35	1	112	4	0	0
36	4	122	5	0	0
37	1	137	7	0	0
38	1	132	6	0	0
39	0	133	6	0	0
40	4	116	4	0	0

Table A-11: June 9, 1993 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	4	106	3	0	0
42	4	123	6	0	0
43	4	80	0	0	0
44	4	109	5	0	0
45	2	104	4	0	0
46	2	103	4	78	0
47	2	106	4	0	0
48	1	108	5	0	0
49	4	114	5	0	0
50	1	86	3	0	0
51	2	113	3	0	0
52	4	119	5	0	0
53	0	91	3	0	0
54	4	94	2	0	0
55	0	87	1	0	0
56	1	127	6	0	0
57	4	122	5	0	0
58	4	105	4	0	0
59	4	105	3	0	0
60	0	123	5	0	0
61	1	136	7	0	0
62	4	128	6	0	0
63	1	122	5	0	0
64	2	129	5	0	0
65	0	131	6	0	0
66	0	124	6	0	0
67	2	77	0	0	0
68	0	111	3	0	0
69	2	111	3	0	0
70	1	94	3	0	0
71	2	86	2	0	0
72	1	139	5	0	0
73	0	84	2	0	0
74	1	121	4	0	0
75	2	115	4	0	0
76	0	101	4	0	0
77	1	101	4	0	0
78	0	132	7	0	0
79	0	117	6	0	0
80	4	110	5	0	0

Table A-12: June 15, 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	2	132	4	0	0
2	1	135	5	0	0
3	0	142	6	0	0
4	0	144	6	0	0
5	2	99	2	0	0
6	0	121	4	0	0
7	1	146	7	0	0
8	1	123	4	0	0
9	2	141	4	0	0
10	2	147	6	0	0
11	1	147	4	0	0
12	1	115	4	0	0
13	2	104	7	0	0
14	2	146	6	0	0
15	4	149	7	0	0
16	0	130	6	0	0
17	4	129	6	0	0
18	0	92	3	0	0
19	0	112	4	0	0
20	1	130	5	0	0
21	2	110	4	0	0
22	2	84	1	0	0
23	2	126	6	0	0
24	4	123	5	0	0
25	4	105	5	0	0
26	4	108	4	0	0
27	0	111	4	0	0
28	1	113	4	0	0
29	0	97	3	0	0
30	2	95	4	0	0
31	2	112	5	0	0
32	1	140	6	0	0
33	4	141	5	0	0
34	0	129	5	0	0
35	1	112	4	0	0
36	4	122	5	0	0
37	1	137	7	0	0
38	1	132	6	0	0
39	0	133	6	0	0
40	4	116	4	0	0

Table A-12: June 15, 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	4	106	3	0	0
42	4	123	6	0	0
43	4	80	0	0	0
44	4	109	5	0	0
45	2	104	4	0	0
46	2	103	4	0	0
47	2	106	4	0	0
48	1	108	5	0	0
49	4	114	5	0	0
50	1	86	3	0	0
51	2	113	3	0	0
52	4	119	5	0	0
53	0	91	3	0	0
54	4	94	2	0	0
55	0	87	1	0	0
56	1	127	6	0	0
57	4	122	5	0	0
58	4	105	4	0	0
59	4	105	3	0	0
60	0	123	5	0	0
61	1	136	7	0	0
62	4	128	6	0	0
63	1	122	5	0	0
64	2	129	5	0	0
65	0	131	6	0	0
66	0	124	6	0	0
67	2	77	0	0	0
68	0	111	3	0	0
69	2	111	3	0	0
70	1	94	3	0	0
71	2	86	2	0	0
72	1	139	5	0	0
73	0	84	2	0	0
74	1	121	4	0	0
75	2	115	4	0	0
76	0	101	4	0	0
77	1	101	4	0	0
78	0	132	7	0	0
79	0	117	6	0	0
80	4	110	5	0	0

Table A-13: June 22, 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	2	136	4	69	0
2	1	138	4	0	0
3	0	150	5	0	0
4	0	152	6	94	0
5	2	100	2	0	0
6	0	129	3	87	0
7	1	153	6	48	0
8	1	123	3	3	0
9	2	149	4	151	0
10	2	150	6	141	0
11	1	128	3	301	0
12	1	134	4	235	0
13	2	155	6	195	0
14	2	154	6	143	0
15	4	156	7	111	0
16	0	145	6	197	0
17	4	147	6	206	0
18	0	99	2	51	0
19	0	137	6	590	0
20	1	134	4	86	0
21	2	128	4	374	0
22	2	109	2	163	0
23	2	142	6	255	0
24	4	140	5	207	0
25	4	115	4	148	0
26	4	117	3	81	0
27	0	117	3	82	0
28	1	109	4	0	0
29	0	102	2	76	0
30	2	107	4	103	0
31	2	120	4	68	0
32	1	151	5	53	0
33	4	153	5	231	0
34	0	139	5	78	0
35	1	119	3	98	0
36	4	137	5	181	1
37	1	152	7	267	0
38	1	151	6	204	0
39	0	155	6	401	0
40	4	136	4	237	0

Table A-13: June 22, 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	4	114	3	113	0
42	4	131	5	52	0
43	4	84	0	0	0
44	4	114	4	229	0
45	2	120	4	202	0
46	2	119	4	233	0
47	2	133	5	406	0
48	1	129	5	249	0
49	4	135	5	132	0
50	1	127	5	385	0
51	2	144	7	255	0
52	4	145	7	301	0
53	0	100	2	74	0
54	4	115	3	212	0
55	0	97	1	76	0
56	1	144	6	196	0
57	4	129	4	82	0
58	4	132	5	311	0
59	4	126	3	216	0
60	0	139	5	0	5
61	1	152	6	190	0
62	4	136	5	78	0
63	1	128	4	183	0
64	2	139	5	157	0
65	0	140	5	168	0
66	0	132	5	182	0
67	2	79	0	0	0
68	0	119	3	129	0
69	2	117	3	199	0
70	1	101	2	21	0
71	2	118	5	156	0
72	1	156	5	354	0
73	0	91	2	91	0
74	1	129	4	168	0
75	2	140	4	371	0
76	0	114	3	252	0
77	1	123	4	113	0
78	0	158	8	529	0
79	0	141	6	243	0
80	4	134	5	200	0

Table A-14: July 7, 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	2	147	4	0	6
2	1	138	5	0	3
3	0	149	5	0	2
4	0	155	6	0	0
5	2	122	2	0	2
6	0	137	3	0	1
7	1	149	6	0	1
8	1	118	1	0	0
9	2	145	4	0	3
10	2	155	6	0	5
11	1	134	3	0	12
12	1	135	4	0	2
13	2	156	6	0	5
14	2	157	6	0	4
15	4	159	7	0	4
16	0	152	6	0	10
17	4	153	6	0	8
18	0	99	2	0	0
19	0	149	6	0	2
20	1	124	4	0	2
21	2	131	4	0	1
22	2	112	2	0	5
23	2	148	6	0	3
24	4	142	5	0	2
25	4	114	4	0	3
26	4	114	3	0	3
27	0	114	3	0	1
28	1	104	4	0	2
29	0	99	2	0	2
30	2	111	4	0	1
31	2	127	4	0	2
32	1	154	6	0	3
33	4	158	5	0	1
34	0	139	5	0	3
35	1	119	3	0	1
36	4	137	5	181	4
37	1	158	7	0	9
38	1	153	6	0	2
39	0	162	6	0	1
40	4	135	4	2	0

Table A-14: July 7, 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	4	114	3	0	0
42	4	130	5	0	2
43	4	85	0	0	0
44	4	116	4	0	4
45	2	117	4	0	2
46	2	119	4	0	3
47	2	141	5	0	1
48	1	134	5	0	4
49	4	136	5	0	2
50	1	140	5	0	0
51	2	150	7	266	2
52	4	145	5	89	0
53	0	100	2	0	1
54	4	109	3	0	1
55	0	97	1	0	0
56	1	146	6	0	9
57	4	124	4	0	2
58	4	130	5	114	0
59	4	128	3	0	6
60	0	139	5	0	5
61	1	152	6	0	9
62	4	138	5	0	4
63	1	128	4	0	2
64	2	137	5	0	2
65	0	140	5	0	5
66	0	129	5	0	3
67	2	79	0	0	0
68	0	120	3	0	0
69	2	117	3	0	4
70	1	101	2	0	1
71	2	137	5	183	0
72	1	153	5	0	0
73	0	102	2	0	0
74	1	129	4	0	2
75	2	141	4	0	1
76	0	111	3	0	1
77	1	123	4	0	0
78	0	166	8	0	0
79	0	142	6	0	0
80	4	135	5	0	1

Table A-15: July 14, 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	2	147	4	0	4
2	1	137	5	0	3
3	0	148	5	0	1
4	0	156	5	0	0
5	2	122	1	0	0
6	0	137	3	0	2
7	1	149	6	0	1
8	1	120	0	0	0
9	2	135	4	0	1
10	2	156	5	0	2
11	1	130	3	0	1
12	1	117	3	0	4
13	2	158	6	0	4
14	2	157	6	0	3
15	4	156	7	0	2
16	0	153	6	0	4
17	4	153	6	0	2
18	0	153	2	0	0
19	0	99	6	0	11
20	1	153	4	0	1
21	2	131	4	0	1
22	2	114	2	0	0
23	2	140	6	0	2
24	4	142	5	0	2
25	4	114	4	0	2
26	4	117	3	0	1
27	0	117	3	0	0
28	1	112	3	0	1
29	0	95	2	0	1
30	2	112	3	0	1
31	2	118	4	0	1
32	1	154	6	0	3
33	4	158	5	0	0
34	0	139	5	0	3
35	1	118	3	0	1
36	4	136	4	0	1
37	1	159	7	0	3
38	1	153	6	0	2
39	0	160	6	0	3
40	4	136	4	0	2

Table A-15: July 14, 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	4	115	2	0	0
42	4	130	5	0	2
43	4	83	0	0	0
44	4	114	4	0	3
45	2	116	4	0	0
46	2	118	4	0	2
47	2	142	5	0	2
48	1	115	4	0	7
49	4	136	5	0	2
50	1	135	5	0	9
51	2	153	7	0	2
52	4	148	5	0	1
53	0	99	2	0	0
54	4	108	3	0	2
55	0	96	1	0	0
56	1	146	6	0	3
57	4	130	4	0	2
58	4	135	4	0	3
59	4	125	43	0	0
60	0	139	1	0	4
61	1	151	6	0	7
62	4	136	5	0	3
63	1	126	4	0	2
64	2	139	5	0	1
65	0	140	5	0	2
66	0	129	5	0	2
67	2	78	0	0	0
68	0	120	2	0	0
69	2	117	3	0	4
70	1	101	2	0	1
71	2	134	5	0	3
72	1	157	5	0	1
73	0	97	2	0	0
74	1	131	4	0	2
75	2	140	4	0	4
76	0	112	3	0	2
77	1	122	4	0	0
78	0	165	8	0	5
79	0	141	6	0	2
80	4	131	4	0	4

Table 16: July 22, 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	2	146	4	0	3
2	1	137	5	0	3
3	0	148	5	0	1
4	0	156	5	0	0
5	2	122	1	0	2
6	0	138	1	0	1
7	1	152	6	0	0
8	1	119	1	0	1
9	2	140	4	0	2
10	2	158	4	0	1
11	1	134	3	0	2
12	1	114	3	0	4
13	2	157	6	0	4
14	2	157	6	0	3
15	4	159	7	0	2
16	0	151	6	0	3
17	4	152	6	0	2
18	0	98	2	0	0
19	0	153	6	0	6
20	1	134	4	0	1
21	2	131	4	0	1
22	2	113	1	0	0
23	2	145	6	0	2
24	4	141	4	0	2
25	4	116	4	0	2
26	4	106	3	0	1
27	0	119	3	0	0
28	1	112	4	0	1
29	0	102	2	0	1
30	2	110	2	0	1
31	2	109	2	0	1
32	1	152	1	0	2
33	4	157	4	0	0
34	0	138	0	0	3
35	1	119	1	0	1
36	4	140	4	0	1
37	1	155	1	0	3
38	1	154	1	0	2
39	0	161	0	0	3
40	4	136	4	0	2

Table A-16: July 22, 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	4	118	4	0	0
42	4	128	4	0	2
43	4	82	4	0	0
44	4	111	4	0	2
45	2	114	2	0	0
46	2	109	2	0	1
47	2	141	2	0	1
48	1	133	1	0	3
49	4	136	4	0	2
50	1	150	1	0	0
51	2	139	7	0	0
52	4	152	4	0	0
53	0	100	0	0	0
54	4	111	3	0	0
55	0	97	0	0	0
56	1	145	1	0	2
57	4	*	*	*	*
58	4	136	4	0	0
59	4	124	4	0	0
60	0	139	1	0	4
61	1	153	1	0	5
62	4	136	4	0	3
63	1	127	1	0	1
64	2	138	2	0	2
65	0	137	0	0	1
66	0	126	0	0	0
67	2	79	2	0	0
68	0	120	0	0	3
69	2	117	2	0	1
70	1	100	1	0	2
71	2	134	2	0	0
72	1	158	1	0	0
73	0	94	0	0	2
74	1	128	1	0	3
75	2	141	2	0	1
76	0	106	0	0	0
77	1	123	1	0	0
78	0	163	0	0	0
79	0	144	0	0	0
80	4	136	4	0	1

Table A-17: July 29, 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	2	146	4	0	3
2	1	134	5	0	3
3	0	148	5	0	1
4	0	156	5	0	0
5	2	122	1	0	1
6	0	140	3	0	2
7	1	145	6	0	1
8	1	112	0	0	0
9	2	142	4	0	1
10	2	156	4	0	2
11	1	134	3	0	1
12	1	*	*	*	*
13	2	159	7	0	4
14	2	157	6	0	3
15	4	158	7	0	2
16	0	151	6	0	3
17	4	153	6	0	2
18	0	97	2	0	0
19	0	153	6	0	4
20	1	133	4	0	0
21	2	133	4	0	1
22	2	112	1	0	0
23	2	144	6	0	2
24	4	141	5	0	2
25	4	119	4	0	2
26	4	117	3	0	1
27	0	119	3	0	0
28	1	108	4	0	1
29	0	100	2	0	1
30	2	109	3	0	1
31	2	121	2	0	1
32	1	153	6	0	2
33	4	159	4	0	0
34	0	139	5	0	3
35	1	119	3	0	1
36	4	137	4	0	1
37	1	152	7	0	3
38	1	151	6	0	2
39	0	161	6	0	3
40	4	137	4	0	2

Table A-17: July 29, 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	4	115	1	0	0
42	4	128	5	0	2
43	4	81	0	0	0
44	4	116	4	0	2
45	2	118	4	0	0
46	2	118	4	0	1
47	2	140	0	0	1
48	1	131	5	0	3
49	4	136	4	0	2
50	1	147	5	0	1
51	2	159	7	0	0
52	4	155	4	0	0
53	0	101	3	0	0
54	4	109	3	0	0
55	0	96	0	0	0
56	1	145	5	0	2
57	4	*	*	*	*
58	4	135	2	0	0
59	4	123	3	0	0
60	0	139	1	0	4
61	1	153	6	0	5
62	4	135	0	0	3
63	1	128	4	0	2
64	2	139	5	0	1
65	0	137	4	0	2
66	0	130	4	0	1
67	2	77	0	0	0
68	0	120	2	0	0
69	2	117	3	0	3
70	1	100	1	0	1
71	2	137	5	0	2
72	1	155	1	0	0
73	0	96	2	0	0
74	1	129	3	0	2
75	2	139	4	0	2
76	0	114	3	0	1
77	1	122	4	0	0
78	0	167	8	0	0
79	0	144	6	0	0
80	4	139	3	0	1

Table A-18: August 4, 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	2	150	4	0	2
2	1	139	5	0	3
3	0	150	5	0	1
4	0	155	5	0	0
5	2	100	1	0	1
6	0	139	3	0	2
7	1	149	6	0	1
8	1	119	0	0	0
9	2	145	3	0	1
10	2	160	4	0	2
11	1	131	3	0	1
12	1	*	*	*	*
13	2	158	7	0	4
14	2	158	6	0	3
15	4	155	7	0	2
16	0	152	6	0	3
17	4	154	6	0	2
18	0	97	2	0	0
19	0	148	6	0	4
20	1	133	4	0	0
21	2	131	4	0	1
22	2	109	1	0	0
23	2	146	6	0	2
24	4	144	5	0	2
25	4	115	4	0	2
26	4	117	3	0	1
27	0	120	3	0	0
28	1	117	4	0	1
29	0	101	2	0	1
30	2	110	3	0	1
31	2	119	2	0	1
32	1	154	6	0	2
33	4	160	4	0	0
34	0	135	5	0	3
35	1	119	3	0	1
36	4	137	4	0	1
37	1	160	7	0	3
38	1	151	6	0	2
39	0	157	6	0	2
40	4	137	4	0	2

Table A-18: August 4, 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	4	115	1	0	0
42	4	129	5	0	2
43	4	82	0	0	0
44	4	118	4	0	2
45	2	124	4	0	0
46	2	117	4	0	1
47	2	140	5	0	1
48	1	137	5	0	3
49	4	139	4	0	2
50	1	139	5	0	1
51	2	158	7	0	0
52	4	152	4	0	0
53	0	98	3	0	0
54	4	103	3	0	0
55	0	96	0	0	0
56	1	146	5	0	2
57	4	*	*	*	*
58	4	135	2	0	0
59	4	128	3	0	0
60	0	*	*	*	*
61	1	152	6	0	5
62	4	136	5	0	3
63	1	126	4	0	2
64	2	139	5	0	1
65	0	136	4	0	2
66	0	131	4	0	1
67	2	77	0	0	0
68	0	120	2	0	0
69	2	115	3	0	3
70	1	99	1	0	1
71	2	141	5	0	2
72	1	159	1	0	0
73	0	104	2	0	0
74	1	133	3	0	2
75	2	141	4	0	2
76	0	113	3	0	1
77	1	124	4	0	0
78	0	166	8	0	0
79	0	145	6	0	0
80	4	136	3	0	1

Table A-19: August 11, 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	2	142	4	0	2
2	1	139	5	0	3
3	0	148	5	0	1
4	0	155	5	0	0
5	2	100	1	0	1
6	0	137	3	0	2
7	1	152	6	0	1
8	1	121	0	0	0
9	2	141	3	0	1
10	2	153	4	0	2
11	1	131	3	0	1
12	1	*	*	*	*
13	2	159	7	0	4
14	2	157	6	0	3
15	4	159	7	0	2
16	0	153	6	0	3
17	4	152	6	0	2
18	0	99	2	0	0
19	0	147	6	0	4
20	1	132	4	0	0
21	2	132	4	0	1
22	2	109	1	0	0
23	2	145	6	0	2
24	4	145	5	0	2
25	4	117	4	0	2
26	4	111	3	0	1
27	0	117	3	0	0
28	1	111	4	0	1
29	0	106	2	0	1
30	2	108	3	0	1
31	2	107	2	0	1
32	1	154	6	0	1
33	4	157	4	0	0
34	0	137	5	0	3
35	1	118	3	0	1
35	4	138	4	0	1
37	1	159	7	0	3
38	1	*	*	*	*
39	0	160	6	0	2
40	4	*	*	*	*

Table A-19: August 11, 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	4	115	1	0	0
42	4	130	5	0	2
43	4	81	0	0	0
44	4	113	4	0	2
45	2	120	4	0	0
46	2	118	4	0	1
47	2	141	5	0	1
48	1	134	5	0	3
49	4	136	4	0	2
50	1	141	5	0	1
51	2	156	7	0	0
52	4	151	4	0	0
53	0	92	3	0	0
54	4	111	3	0	0
55	0	95	0	0	0
56	1	145	5	0	2
57	4	*	*	*	*
58	4	133	2	0	0
59	4	129	3	0	0
60	0	*	*	*	*
61	1	155	6	0	5
62	4	136	5	0	3
63	1	128	4	0	2
64	2	143	5	0	1
65	0	136	4	0	2
66	0	132	5	0	1
67	2	77	0	0	0
68	0	119	2	0	0
69	2	117	3	0	3
70	1	99	1	0	1
71	2	141	5	0	2
72	1	161	0	0	0
73	0	95	2	0	0
74	1	132	3	0	2
75	2	140	4	0	2
76	0	118	3	0	1
77	1	122	4	0	0
78	0	165	8	0	0
79	0	143	6	0	0
80	4	134	3	0	1

Table A-20: August 18, 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	2	145	4	0	2
2	1	134	5	0	3
3	0	148	5	0	1
4	0	155	5	0	0
5	2	96	1	0	1
6	0	136	3	0	2
7	1	149	6	0	1
8	1	*	*	*	*
9	2	142	3	0	1
10	2	153	4	0	2
11	1	135	3	0	1
12	1	*	*	*	*
13	2	159	7	0	4
14	2	154	6	0	3
15	4	157	7	0	2
16	0	147	6	0	3
17	4	153	6	0	2
18	0	100	2	0	0
19	0	148	6	0	4
20	1	130	4	0	0
21	2	132	4	0	1
22	2	109	1	0	0
23	2	145	6	0	2
24	4	142	5	0	2
25	4	113	4	0	2
26	4	110	3	0	1
27	0	117	3	0	0
28	1	105	4	0	1
29	0	103	2	0	0
30	2	110	3	0	1
31	2	111	2	0	1
32	1	152	6	0	1
33	4	160	4	0	0
34	0	137	5	0	3
35	1	118	3	0	1
36	4	135	4	0	1
37	1	162	7	0	3
38	1	*	*	*	*
39	0	151	6	0	2
40	4	*	*	0	0

Table A-20: August 18, 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	4	114	1	0	0
42	4	126	5	0	2
43	4	79	0	0	0
44	4	113	4	0	2
45	2	119	4	0	0
46	2	120	4	0	1
47	2	140	5	0	1
48	1	131	5	0	3
49	4	134	4	0	2
50	1	142	5	0	1
51	2	155	7	0	0
52	4	153	4	0	0
53	0	98	3	0	0
54	4	104	3	0	0
55	0	95	0	0	0
56	1	145	5	0	2
57	4	*	*	*	*
58	4	132	2	0	0
59	4	128	3	0	0
60	0	*	*	*	*
61	1	152	6	0	5
62	4	135	5	0	3
63	1	125	4	0	2
64	2	139	5	0	0
65	0	134	4	0	1
66	0	129	5	0	1
67	2	77	0	0	0
68	0	*	*	*	*
69	2	117	3	0	3
70	1	99	1	0	1
71	2	137	5	0	2
72	1	155	0	0	0
73	0	96	2	0	0
74	1	127	3	0	2
75	2	141	4	0	2
76	0	115	3	0	1
77	1	122	4	0	0
78	0	162	8	0	0
79	0	142	6	0	0
80	4	134	3	0	1

Table A-21: August 25, 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	2	144	4	0	2
2	1	136	5	0	3
3	0	148	5	0	1
4	0	155	5	0	0
5	2	95	1	0	1
6	0	137	3	0	2
7	1	148	6	0	1
8	1	*	*	*	*
9	2	144	3	0	1
10	2	154	4	0	2
11	1	135	3	0	1
12	1	*	*	*	*
13	2	158	7	0	4
14	2	158	6	0	3
15	4	159	7	0	2
16	0	147	6	0	3
17	4	153	6	0	1
18	0	97	2	0	0
19	0	153	6	0	4
20	1	133	4	0	0
21	2	130	4	0	1
22	2	110	1	0	0
23	2	150	6	0	2
24	4	141	5	0	2
25	4	113	4	0	2
26	4	112	3	0	1
27	0	118	3	0	0
28	1	105	4	0	1
29	0	*	*	*	*
30	2	111	3	0	1
31	2	114	2	0	1
32	1	153	6	0	1
33	4	158	4	0	0
34	0	136	5	0	3
35	1	119	3	0	1
35	4	141	4	0	1
37	1	155	7	0	3
38	1	*	*	*	*
39	0	155	6	0	2
40	4	*	*	*	*

Table A-21: August 25, 1993 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	4	111	1	0	0
42	4	126	5	0	2
43	4	81	0	0	0
44	4	110	4	0	2
45	2	120	4	0	0
46	2	119	4	0	1
47	2	141	5	0	1
48	1	132	5	0	3
49	4	134	4	0	2
50	1	139	5	0	1
51	2	161	7	0	0
52	4	156	4	0	0
53	0	99	3	0	0
54	4	109	3	0	0
55	0	*	*	*	*
56	1	144	5	0	1
57	4	*	*	*	*
58	4	136	2	0	0
59	4	130	3	0	0
60	0	138	*	*	*
61	1	155	6	0	5
62	4	134	5	0	3
63	1	127	4	0	2
64	2	142	5	0	0
65	0	137	4	0	1
66	0	131	5	0	1
67	2	77	0	0	0
68	0	119	2	0	0
69	2	117	3	0	3
70	1	99	1	0	1
71	2	136	5	0	1
72	1	157	0	0	0
73	0	97	2	0	0
74	1	128	3	0	2
75	2	138	4	0	2
76	0	113	3	0	1
77	1	122	4	0	0
78	0	158	8	0	0
79	0	142	6	0	0
80	4	137	3	0	1

Table A-22: August 31, 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	2	141	4	0	2
2	1	138	5	0	3
3	0	149	5	0	1
4	0	155	5	0	0
5	2	100	1	0	1
6	0	136	3	0	2
7	1	147	6	0	1
8	1	*	*	*	*
9	2	140	3	0	1
10	2	*	*	*	*
11	1	135	3	0	1
12	1	*	*	*	*
13	2	157	7	0	4
14	2	153	6	0	3
15	4	158	7	0	2
16	0	147	6	0	3
17	4	152	6	0	1
18	0	98	2	0	0
19	0	152	6	0	4
20	1	135	4	0	0
21	2	132	4	0	1
22	2	111	1	0	0
23	2	146	6	0	2
24	4	137	5	0	2
25	4	116	4	0	2
26	4	110	3	0	1
27	0	117	3	0	0
28	1	109	4	0	1
29	0	*	*	*	*
30	2	105	3	0	1
31	2	128	2	0	1
32	1	153	6	0	1
33	4	158	4	0	0
34	0	136	5	0	3
35	1	118	3	0	1
35	4	142	4	0	1
37	1	150	7	0	3
38	1	*	*	*	*
39	0	161	6	0	2
40	4	*	*	*	*

Table A-22: August 31, 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	4	115	1	0	0
42	4	129	5	0	2
43	4	79	0	0	0
44	4	107	4	0	2
45	2	121	4	0	0
46	2	116	4	0	1
47	2	141	5	0	1
48	1	132	5	0	3
49	4	134	4	0	2
50	1	144	5	0	1
51	2	155	7	0	0
52	4	160	4	0	0
53	0	99	3	0	0
54	4	109	3	0	0
55	0	*	*	*	*
56	1	146	5	0	1
57	4	*	*	*	*
58	4	115	2	0	0
59	4	128	3	0	0
60	0	*	*	*	*
61	1	150	6	0	5
62	4	136	5	0	3
63	1	127	4	0	2
64	2	141	5	0	0
65	0	139	4	0	1
66	0	132	5	0	1
67	2	76	0	0	0
68	0	119	2	0	0
69	2	117	3	0	3
70	1	101	1	0	1
71	2	137	5	0	1
72	1	157	0	0	0
73	0	97	2	0	0
74	1	129	3	0	2
75	2	140	4	0	2
76	0	117	3	0	1
77	1	123	4	0	0
78	0	155	8	0	0
79	0	142	6	0	0
80	4	138	3	0	1

Table A-23: September 9, 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	2	140	4	0	2
2	1	137	5	0	3
3	0	148	5	0	1
4	0	155	5	0	0
5	2	99	1	0	1
6	0	131	3	0	2
7	1	145	6	0	1
8	1	*	*	*	*
9	2	139	3	0	1
10	2	*	*	*	*
11	1	132	3	0	1
12	1	*	*	*	*
13	2	155	7	0	4
14	2	157	6	0	3
15	4	157	7	0	2
16	0	147	6	0	3
17	4	151	6	0	1
18	0	92	2	0	0
19	0	150	6	0	4
20	1	131	4	0	0
21	2	131	4	0	1
22	2	109	1	0	0
23	2	144	6	0	2
24	4	136	5	0	2
25	4	114	4	0	2
26	4	110	3	0	1
27	0	117	3	0	0
28	1	105	4	0	1
29	0	*	*	*	*
30	2	110	3	0	1
31	2	111	2	0	1
32	1	153	6	0	1
33	4	155	4	0	0
34	0	134	5	0	3
35	1	118	3	0	1
35	4	136	4	0	1
37	1	153	7	0	3
38	1	*	*	*	*
39	0	150	6	0	2
40	4	*	*	*	*

Table A-23: September 9, 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	4	114	1	0	0
42	4	128	5	0	2
43	4	80	0	0	0
44	4	108	4	0	2
45	2	116	4	0	0
46	2	117	4	0	1
47	2	141	5	0	1
48	1	132	5	0	3
49	4	133	4	0	2
50	1	*	*	*	*
51	2	156	7	0	0
52	4	151	4	0	0
53	0	98	3	0	0
54	4	108	3	0	0
55	0	*	*	*	*
56	1	143	5	0	1
57	4	*	*	*	*
58	4	*	*	*	*
59	4	127	3	0	0
60	0	*	*	*	*
61	1	150	6	0	5
62	4	135	5	0	3
63	1	145	4	0	2
64	2	140	5	0	0
65	0	136	4	0	1
66	0	129	5	0	1
67	2	76	0	0	0
68	0	117	2	0	0
69	2	116	3	0	3
70	1	98	1	0	1
71	2	135	5	0	1
72	1	156	0	0	0
73	0	95	2	0	0
74	1	131	3	0	2
75	2	140	4	0	2
76	0	*	*	*	*
77	1	123	4	0	0
78	0	166	8	0	0
79	0	140	6	0	0
80	4	134	3	0	0

Table A-24: September 19, 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	2	140	4	0	2
2	1	138	5	0	3
3	0	149	5	0	1
4	0	155	5	0	0
5	2	97	1	0	1
6	0	130	3	0	2
7	1	147	6	0	1
8	1	*	*	*	*
9	2	138	3	0	1
10	2	*	4	*	*
11	1	134	3	0	1
12	1	*	*	*	*
13	2	154	7	0	4
14	2	154	6	0	3
15	4	158	7	0	2
16	0	149	6	0	3
17	4	150	6	0	1
18	0	91	2	0	0
19	0	150	6	0	4
20	1	*	*	*	*
21	2	130	4	0	1
22	2	116	1	0	0
23	2	145	6	0	2
24	4	136	5	0	2
25	4	114	4	0	2
26	4	111	3	0	1
27	0	116	3	0	0
28	1	97	4	0	1
29	0	*	*	*	*
30	2	117	3	0	1
31	2	111	2	0	1
32	1	152	6	0	1
33	4	158	4	0	0
34	0	137	5	0	3
35	1	118	3	0	1
35	4	134	4	0	1
37	1	155	7	0	3
38	1	*	*	*	*
39	0	158	6	0	2
40	4	*	*	*	*

Table A-24: September 19, 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	4	114	1	0	0
42	4	127	5	0	2
43	4	*	*	*	*
44	4	106	4	0	2
45	2	118	4	0	0
46	2	116	4	0	1
47	2	140	5	0	1
48	1	130	5	0	3
49	4	135	4	0	2
50	1	*	*	*	*
51	2	153	7	0	0
52	4	145	4	0	0
53	0	98	3	0	0
54	4	99	3	0	0
55	0	*	*	*	*
56	1	143	5	0	1
57	4	*	*	*	*
58	4	*	*	*	*
59	4	122	3	0	0
60	0	*	*	*	*
61	1	151	6	0	5
62	4	135	5	0	3
63	1	127	4	0	2
64	2	137	5	0	0
65	0	138	4	0	1
66	0	130	5	0	1
67	2	*	*	*	*
68	0	118	2	0	0
69	2	117	3	0	3
70	1	98	1	0	1
71	2	135	5	0	1
72	1	156	0	0	0
73	0	95	2	0	0
74	1	129	3	0	2
75	2	140	4	0	2
76	0	114	3	0	1
77	1	122	4	0	0
78	0	160	8	0	0
79	0	136	6	0	0
80	4	135	3	0	0

Table A-25: June 3, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	0	84	6	123	0
2	4	65	1	33	0
3	2	84	12	411	0
4	2	81	9	218	0
5	1	85	11	109	0
6	0	96	14	268	0
7	1	87	11	234	0
8	2	94	21	488	0
9	4	78	1	17	0
10	0	88	7	76	0
11	4	59	1	23	0
12	0	87	14	389	0
13	4	81	14	439	0
14	4	91	13	304	0
15	2	88	13	335	0
16	0	84	9	285	0
17	1	91	11	276	0
18	4	88	10	261	0
19	2	88	14	329	0
20	4	84	1	22	0
21	2	83	8	278	0
22	2	83	10	240	0
23	0	88	9	162	0
24	0	75	5	94	0
25	4	83	8	152	0
26	4	87	8	212	0
27	1	71	5	187	0
28	0	80	7	220	0
29	1	94	14	351	0
30	0	91	22	430	0
31	2	87	16	404	0
32	2	80	9	297	0
33	1	90	13	261	0
34	0	92	20	504	0
35	4	94	16	284	0
35	1	81	9	220	0
37	4	84	17	350	0
38	4	95	12	336	0
39	2	93	16	416	0
40	1	88	10	255	0

Table A-25: June 3, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	2	80	11	263	0
42	4	89	20	320	0
43	0	102	23	346	0
44	1	96	19	432	0
45	2	89	11	195	0
46	4	79	10	203	0
47	2	88	12	323	0
48	1	51	1	20	0
49	0	60	2	45	0
50	0	63	1	38	0
51	0	95	10	180	0
52	1	76	11	237	0
53	1	91	16	298	0
54	4	69	1	19	0
55	2	72	3	33	0
56	2	77	13	229	0
57	0	90	14	403	0
58	4	86	9	234	0
59	1	99	23	484	0
60	1	86	18	397	0
61	1	91	11	181	0
62	2	63	1	29	0
63	4	64	1	0	0
64	2	94	17	344	0
65	0	81	9	196	0
66	2	93	19	346	0
67	0	89	11	289	0
68	1	81	12	232	0
69	0	96	19	347	0
70	1	91	17	294	0
71	0	99	20	361	0
72	4	103	13	317	0
73	1	83	9	212	0
74	0	65	1	33	0
75	1	63	1	0	0
76	4	82	17	428	0
77	2	79	5	96	0
78	1	67	1	38	0
79	4	81	14	253	0
80	2	105	11	105	0

Table A-26: June 9, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	0	84	6	64	0
2	4	65	1	3	2
3	2	84	15	151	2
4	2	81	11	86	0
5	1	85	11	67	0
6	0	95	17	180	2
7	1	89	11	91	0
8	2	95	21	207	6
9	4	79	1	0	2
10	0	85	7	45	0
11	4	66	1	19	0
12	0	86	16	139	0
13	4	81	19	275	0
14	4	93	14	112	4
15	2	90	13	121	0
16	0	84	15	101	1
17	1	89	12	109	0
18	4	87	14	121	0
19	2	89	18	172	2
20	4	87	2	14	0
21	2	84	12	90	0
22	2	83	13	113	0
23	0	87	13	149	0
24	0	77	2	9	0
25	4	81	9	41	0
26	4	86	12	117	0
27	1	72	7	29	2
28	0	78	6	43	0
29	1	96	16	136	0
30	0	93	26	219	6
31	2	86	22	170	0
32	2	80	10	128	0
33	1	90	19	126	0
34	0	90	24	188	2
35	4	91	24	302	0
35	1	81	11	84	0
37	4	84	26	233	0
38	4	89	19	218	0
39	2	93	17	155	0
40	1	87	13	105	0

Table A-26: June 9, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	2	81	10	49	0
42	4	89	20	155	0
43	0	99	29	299	0
44	1	93	18	202	0
45	2	86	10	64	0
46	4	79	13	134	0
47	2	86	13	117	0
48	1	53	1	12	0
49	0	59	3	12	0
50	0	62	3	14	0
51	0	96	10	112	0
52	1	75	11	102	2
53	1	94	16	138	0
54	4	69	1	6	0
55	2	73	8	60	0
56	2	80	15	121	0
57	0	86	1	101	0
58	4	86	15	102	0
59	1	100	28	282	2
60	1	87	19	168	0
61	1	92	11	70	0
62	2	64	1	6	0
63	4	67	1	4	0
64	2	93	15	192	0
65	0	81	14	136	2
66	2	92	18	190	0
67	0	88	15	169	0
68	1	81	10	100	0
69	0	98	19	210	0
70	1	91	22	189	0
71	0	98	21	206	0
72	4	103	15	133	0
73	1	83	13	65	0
74	0	66	1	6	0
75	1	65	0	0	0
76	4	82	19	310	0
77	2	79	7	47	0
78	1	67	1	6	0
79	4	82	15	147	0
80	2	101	14	147	0

Table A-27: June 15, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	0	82	6	29	0
2	4	65	1	0	2
3	2	84	15	74	4
4	2	82	11	35	0
5	1	85	11	35	0
6	0	95	17	69	2
7	1	89	11	25	0
8	2	96	21	131	10
9	4	80	1	0	0
10	0	88	7	15	0
11	4	68	1	8	0
12	0	87	17	82	0
13	4	81	19	176	0
14	4	93	11	67	6
15	2	90	15	83	0
16	0	84	14	65	3
17	1	90	13	68	0
18	4	88	17	105	0
19	2	90	19	129	2
20	4	87	7	35	0
21	2	85	12	72	0
22	2	83	15	78	0
23	0	88	16	100	0
24	0	78	3	12	0
25	4	82	10	28	0
26	4	87	13	59	0
27	1	72	8	32	2
28	0	80	6	47	2
29	1	96	20	95	0
30	0	95	24	135	2
31	2	87	17	100	0
32	2	83	16	112	0
33	1	90	18	85	2
34	0	94	24	103	4
35	4	95	16	103	0
35	1	81	11	32	0
37	4	85	27	185	0
38	4	92	19	212	0
39	2	93	22	121	0
40	1	88	14	73	0

Table A-27: June 15, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	2	81	12	61	0
42	4	94	21	87	0
43	0	102	25	159	0
44	1	95	20	125	0
45	2	89	14	43	0
46	4	80	16	87	0
47	2	88	19	98	0
48	1	54	1	2	0
49	0	60	4	11	0
50	0	62	3	4	0
51	0	96	11	43	0
52	1	77	22	103	4
53	1	94	21	92	0
54	4	69	1	2	0
55	2	74	7	32	0
56	2	80	17	76	0
57	0	92	20	103	0
58	4	88	12	44	0
59	1	100	24	153	2
60	1	88	20	91	0
61	1	92	12	56	0
62	2	64	1	5	0
63	4	68	1	2	0
64	2	97	15	91	0
65	0	81	14	128	2
66	2	92	19	165	0
67	0	88	20	120	4
68	1	81	11	47	0
69	0	98	21	135	0
70	1	91	20	109	0
71	0	99	21	130	2
72	4	103	15	59	0
73	1	83	11	50	0
74	0	65	0	0	0
75	1	66	0	0	0
76	4	85	25	207	0
77	2	81	6	26	0
78	1	65	1	0	0
79	4	82	16	94	2
80	2	102	4	94	0

Table A-28: June 22, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	0	84	10	11	0
2	4	66	1	0	2
3	2	83	15	1	4
4	2	82	11	2	0
5	1	85	11	2	0
6	0	96	17	6	2
7	1	89	11	3	0
8	2	96	21	0	10
9	4	78	1	0	0
10	0	87	7	0	0
11	4	68	1	0	0
12	0	88	17	21	0
13	4	82	19	64	0
14	4	93	11	10	4
15	2	89	15	0	0
16	0	85	14	0	3
17	1	90	13	24	2
18	4	90	17	27	0
19	2	91	19	37	2
20	4	86	7	19	0
21	2	84	12	56	0
22	2	86	15	54	2
23	0	95	16	45	0
24	0	78	3	6	0
25	4	82	10	20	0
26	4	87	13	27	0
27	1	71	8	15	2
28	0	80	6	14	2
29	1	97	20	53	0
30	0	94	24	61	2
31	2	87	17	56	0
32	2	81	16	53	0
33	1	91	18	44	2
34	0	96	24	55	4
35	4	90	16	74	0
35	1	82	11	29	0
37	4	85	27	71	0
38	4	91	19	89	0
39	2	94	22	74	0
40	1	89	14	44	0

Table A-28: June 22, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	2	80	12	30	0
42	4	42	21	56	0
43	0	103	25	91	0
44	1	97	20	62	0
45	2	89	14	25	0
46	4	46	16	50	0
47	2	87	19	59	0
48	1	53	1	0	2
49	0	60	4	9	0
50	0	63	3	6	0
51	0	96	11	48	0
52	1	74	22	92	6
53	1	94	21	90	0
54	4	54	1	0	0
55	2	75	7	11	0
56	2	80	17	61	0
57	0	93	20	61	0
58	4	58	12	29	0
59	1	100	24	73	2
60	1	88	20	51	0
61	1	92	12	35	0
62	2	64	1	0	0
63	4	63	1	11	0
64	2	94	15	53	0
65	0	82	14	57	2
66	2	92	19	115	0
67	0	89	20	85	4
68	1	82	11	28	0
69	0	98	21	102	0
70	1	91	20	86	0
71	0	100	21	122	2
72	4	72	15	65	0
73	1	83	11	37	0
74	0	66	6	0	0
75	1	68	0	0	0
76	4	76	25	126	0
77	2	81	6	30	0
78	1	68	1	0	0
79	4	79	16	61	2
80	2	103	19	75	0

Table A-29: July 7, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	0	84	10	0	0
2	4	65	1	0	2
3	2	84	15	0	4
4	2	81	11	9	0
5	1	87	11	0	0
6	0	11	17	0	6
7	1	87	11	0	0
8	2	94	21	0	7
9	4	79	1	0	0
10	0	87	7	0	0
11	4	86	1	0	0
12	0	86	17	2	0
13	4	81	19	9	10
14	4	93	11	0	12
15	2	89	15	6	2
16	0	84	14	0	4
17	1	92	13	0	4
18	4	87	17	0	0
19	2	87	19	0	2
20	4	87	7	0	0
21	2	85	12	0	2
22	2	84	15	1	4
23	0	95	16	0	0
24	0	77	3	0	0
25	4	81	10	1	0
26	4	84	13	11	0
27	1	73	8	0	2
28	0	80	6	2	1
29	1	96	20	13	2
30	0	94	24	32	4
31	2	86	17	11	0
32	2	81	16	40	2
33	1	91	18	3	2
34	0	95	24	3	4
35	4	96	16	33	0
35	1	82	11	4	0
37	4	80	27	32	0
38	4	91	19	17	0
39	2	92	22	9	0
40	1	87	14	12	0

Table A-29: July 7, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	2	78	12	4	0
42	4	91	21	19	0
43	0	102	25	20	0
44	1	96	20	3	2
45	2	85	14	2	0
46	4	78	16	4	0
47	2	87	19	9	0
48	1	52	1	0	2
49	0	59	4	0	0
50	0	64	3	0	0
51	0	94	11	27	0
52	1	77	22	21	4
53	1	94	21	31	0
54	4	69	1	0	0
55	2	73	7	0	0
56	2	81	17	14	0
57	0	91	20	11	0
58	4	89	12	7	0
59	1	99	24	31	2
60	1	87	20	24	0
61	1	91	12	12	0
62	2	65	1	0	0
63	4	66	1	0	0
64	2	94	15	12	4
65	0	83	14	0	2
66	2	91	19	31	4
67	0	87	20	22	6
68	1	81	11	8	0
69	0	97	21	24	0
70	1	92	20	15	2
71	0	99	21	8	4
72	4	105	15	13	0
73	1	82	11	4	0
74	0	65	6	0	0
75	1	65	0	0	0
76	4	83	25	29	0
77	2	79	6	2	0
78	1	67	1	0	0
79	4	82	16	19	2
80	2	107	19	9	0

Table A-30: July 14, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	0	84	10	0	0
2	4	65	1	0	2
3	2	83	15	0	4
4	2	80	11	0	0
5	1	*	*	*	*
6	0	94	17	0	6
7	1	88	11	0	0
8	2	95	21	0	10
9	4	82	1	0	0
10	0	84	7	0	0
11	4	66	1	0	0
12	0	86	17	0	2
13	4	81	19	0	10
14	4	93	11	0	12
15	2	91	15	0	2
16	0	84	14	0	4
17	1	88	13	0	2
18	4	86	17	0	0
19	2	87	19	0	2
20	4	87	7	0	0
21	2	85	12	0	2
22	2	85	15	0	4
23	0	95	16	0	0
24	0	78	3	0	0
25	4	82	10	0	0
26	4	86	13	5	0
27	1	70	8	0	2
28	0	79	6	0	1
29	1	97	20	4	2
30	0	93	24	0	4
31	2	86	17	0	0
32	2	81	16	6	6
33	1	89	18	0	2
34	0	94	24	0	4
35	4	96	16	0	0
35	1	80	11	0	0
37	4	83	27	0	0
38	4	94	19	3	6
39	2	93	22	0	0
40	1	87	14	3	0

Table A-30: July 14, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	2	79	12	0	0
42	4	94	21	0	0
43	0	101	25	2	0
44	1	95	20	0	2
45	2	85	14	0	0
46	4	76	16	0	0
47	2	87	19	0	0
48	1	53	1	0	2
49	0	58	4	0	0
50	0	63	3	0	0
51	0	93	11	1	0
52	1	77	22	0	6
53	1	92	21	3	0
54	4	69	1	0	0
55	2	72	7	0	0
56	2	77	17	1	0
57	0	89	20	4	0
58	4	84	12	3	0
59	1	99	24	3	2
60	1	87	20	4	0
61	1	91	12	0	0
62	2	66	1	0	0
63	4	66	1	0	0
64	2	94	15	1	4
65	0	82	14	0	2
66	2	92	19	3	4
67	0	88	20	2	6
68	1	81	11	2	0
69	0	98	21	10	0
70	1	94	20	0	2
71	0	99	21	0	2
72	4	103	15	0	0
73	1	81	11	0	0
74	0	65	6	0	0
75	1	68	0	0	0
76	4	83	25	4	0
77	2	80	6	0	0
78	1	67	1	0	0
79	4	81	16	0	2
80	2	106	19	2	0

Table A-31: July 22, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	0	83	10	0	0
2	4	65	1	0	2
3	2	84	15	0	4
4	2	80	11	0	0
5	1	*	*	*	*
6	0	94	17	0	6
7	1	87	11	0	0
8	2	99	21	0	10
9	4	86	1	0	0
10	0	*	*	*	*
11	4	72	1	0	0
12	0	86	17	0	2
13	4	81	19	0	10
14	4	93	11	0	12
15	2	91	15	0	2
16	0	*	*	*	*
17	1	*	*	*	*
18	4	86	17	0	0
19	2	87	19	0	2
20	4	86	7	0	0
21	2	87	12	0	2
22	2	83	15	0	4
23	0	92	16	0	0
24	0	75	3	0	0
25	4	82	10	0	0
26	4	86	13	0	0
27	1	78	8	0	2
28	0	78	6	0	1
29	1	95	20	0	2
30	0	82	24	0	4
31	2	86	17	0	0
32	2	81	16	0	6
33	1	90	18	0	1
34	0	96	24	0	4
35	4	*	*	*	*
35	1	80	11	0	0
37	4	82	27	0	0
38	4	91	19	0	4
39	2	93	22	0	0
40	1	88	14	0	0

Table A-31: July 22, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	2	78	12	0	0
42	4	93	21	0	0
43	0	*	*	*	*
44	1	*	*	*	*
45	2	87	14	0	0
46	4	78	16	0	0
47	2	89	19	0	0
48	1	54	1	0	2
49	0	69	4	0	0
50	0	62	3	0	0
51	0	94	11	0	0
52	1	77	22	0	6
53	1	93	21	0	0
54	4	70	1	0	0
55	2	73	7	0	0
56	2	77	17	0	0
57	0	91	20	0	0
58	4	89	12	0	0
59	1	98	24	0	2
60	1	87	20	0	0
61	1	89	12	0	0
62	2	64	1	0	2
63	4	67	1	0	0
64	2	94	15	0	4
65	0	84	14	0	2
66	2	90	19	0	6
67	0	87	20	0	6
68	1	79	11	0	0
69	0	97	21	0	0
70	1	92	20	0	2
71	0	99	21	0	4
72	4	104	15	0	0
73	1	81	11	0	0
74	0	68	6	0	0
75	1	84	0	0	0
76	4	85	25	0	0
77	2	80	6	0	0
78	1	67	1	0	0
79	4	81	16	0	2
80	2	105	19	0	0

Table A-32: July 29, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	0	83	10	0	0
2	4	65	1	0	2
3	2	84	15	0	4
4	2	81	11	0	0
5	1	*	*	*	*
6	0	94	17	0	6
7	1	88	11	0	0
8	2	101	21	0	10
9	4	81	1	0	0
10	0	*	*	*	*
11	4	*	*	*	*
12	0	87	17	0	2
13	4	81	19	0	10
14	4	94	11	0	12
15	2	89	15	0	2
16	0	85	14	0	4
17	1	89	13	0	2
18	4	*	*	*	*
19	2	89	19	0	2
20	4	90	7	0	0
21	2	84	12	0	2
22	2	83	15	0	4
23	0	95	16	0	0
24	0	77	3	0	0
25	4	81	10	0	0
26	4	86	13	0	0
27	1	78	8	0	2
28	0	78	6	0	1
29	1	94	20	0	2
30	0	95	24	0	4
31	2	86	17	0	0
32	2	81	16	0	6
33	1	90	18	0	1
34	0	89	24	0	4
35	4	94	16	0	2
35	1	81	11	0	0
37	4	84	27	0	0
38	4	94	19	4	4
39	2	93	22	4	0
40	1	87	14	0	0

Table A-32: July 29, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	2	79	12	0	0
42	4	89	21	0	0
43	0	102	25	0	0
44	1	97	20	0	2
45	2	85	14	0	0
46	4	78	16	0	0
47	2	88	19	0	0
48	1	54	1	0	2
49	0	*	*	*	*
50	0	63	3	0	0
51	0	95	11	0	0
52	1	77	22	0	6
53	1	94	21	0	0
54	4	69	1	0	0
55	2	75	7	0	0
56	2	77	17	0	0
57	0	90	20	0	0
58	4	90	12	0	0
59	1	99	24	0	2
60	1	87	20	0	0
61	1	88	12	0	0
62	2	67	1	0	0
63	4	66	1	0	0
64	2	94	15	0	4
65	0	82	14	0	2
66	2	90	19	0	6
67	0	88	20	0	6
68	1	82	11	0	0
69	0	98	21	0	0
70	1	93	20	0	2
71	0	98	21	0	4
72	4	104	15	0	0
73	1	81	11	0	0
74	0	69	6	0	0
75	1	*	*	*	*
76	4	80	25	0	0
77	2	79	6	0	0
78	1	77	1	0	0
79	4	81	16	0	2
80	2	101	19	0	0

Table A-33: August 4, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	0	83	10	0	0
2	4	65	1	0	2
3	2	84	15	0	4
4	2	81	11	0	0
5	1	*	11	0	0
6	0	94	17	0	6
7	1	88	11	0	0
8	2	101	21	0	10
9	4	81	1	0	0
10	0	*	*	*	*
11	4	*	*	*	*
12	0	87	17	0	2
13	4	81	19	0	10
14	4	94	11	0	12
15	2	89	15	0	2
16	0	85	14	0	4
17	1	89	13	0	2
18	4	*	*	*	*
19	2	89	19	0	2
20	4	90	7	0	0
21	2	84	12	0	2
22	2	83	15	0	4
23	0	95	16	0	0
24	0	77	3	0	0
25	4	81	10	0	0
26	4	*	*	7	0
27	1	*	8	0	2
28	0	*	6	0	1
29	1	*	20	0	2
30	0	95	24	0	4
31	2	86	17	0	0
32	2	81	16	0	6
33	1	90	18	0	1
34	0	89	24	0	4
35	4	94	16	0	2
35	1	81	11	0	0
37	4	84	27	0	0
38	4	94	19	5	4
39	2	93	22	0	0
40	1	87	14	0	0

Table A-33: August 4, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	2	79	12	0	0
42	4	89	21	0	0
43	0	102	25	0	0
44	1	97	20	0	2
45	2	85	14	0	0
46	4	78	16	0	0
47	2	88	19	0	0
48	1	54	1	0	2
49	0	*	*	*	*
50	0	63	3	0	0
51	0	95	11	0	0
52	1	77	22	0	6
53	1	94	21	0	0
54	4	69	1	0	0
55	2	75	7	0	0
56	2	77	17	0	0
57	0	90	20	0	0
58	4	90	12	0	0
59	1	99	24	0	2
60	1	87	20	0	0
61	1	88	12	0	0
62	2	67	1	0	0
63	4	66	1	0	0
64	2	94	15	0	2
65	0	82	14	0	2
66	2	90	19	0	6
67	0	88	20	0	6
68	1	82	11	0	0
69	0	98	21	0	0
70	1	94	20	0	2
71	0	98	21	0	4
72	4	104	15	0	0
73	1	81	11	0	0
74	0	69	6	0	0
75	1	*	*	*	*
76	4	80	25	0	0
77	2	79	6	0	0
78	1	77	1	0	0
79	4	81	16	0	2
80	2	101	19	0	0

Table A-34: August 11, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	0	83	10	0	0
2	4	66	1	0	2
3	2	84	15	0	4
4	2	81	11	0	0
5	1	*	*	*	*
6	0	95	17	0	6
7	1	87	11	0	0
8	2	95	21	0	10
9	4	81	1	0	0
10	0	84	7	0	0
11	4	*	*	*	*
12	0	86	17	0	2
13	4	81	19	0	10
14	4	94	11	0	12
15	2	89	15	0	2
16	0	84	14	0	4
17	1	90	13	0	2
18	4	*	*	*	*
19	2	89	19	0	2
20	4	91	7	0	0
21	2	86	12	0	2
22	2	85	15	0	4
23	0	90	16	0	0
24	0	75	3	0	0
25	4	82	10	0	0
26	4	86	13	0	0
27	1	70	8	0	2
28	0	78	6	0	1
29	1	94	20	0	2
30	0	93	24	0	4
31	2	84	17	0	0
32	2	79	16	0	6
33	1	90	18	0	1
34	0	92	24	0	4
35	4	90	16	0	2
35	1	81	11	0	0
37	4	83	27	0	0
38	4	93	19	0	4
39	2	90	22	0	0
40	1	87	14	0	0

Table A-34: August 11, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	2	77	12	0	0
42	4	90	21	0	0
43	0	99	25	0	0
44	1	94	20	0	2
45	2	88	14	0	0
46	4	77	16	0	0
47	2	86	19	0	0
48	1	54	1	0	2
49	0	*	*	*	*
50	0	63	3	0	0
51	0	95	11	0	0
52	1	77	22	0	6
53	1	93	21	0	0
54	4	68	1	0	0
55	2	72	7	0	0
56	2	80	17	0	0
57	0	93	20	0	0
58	4	86	12	0	0
59	1	97	24	0	2
60	1	85	20	0	0
61	1	90	12	0	0
62	2	69	1	0	0
63	4	67	1	0	0
64	2	92	15	0	4
65	0	83	14	0	2
66	2	91	19	0	6
67	0	86	20	0	6
68	1	81	11	0	0
69	0	96	21	0	0
70	1	93	20	0	2
71	0	98	21	0	4
72	4	104	15	0	0
73	1	81	11	0	0
74	0	64	6	0	0
75	1	*	*	*	*
76	4	81	25	0	0
77	2	80	6	0	0
78	1	67	1	0	0
79	4	80	16	0	2
80	2	105	19	0	0

Table A-35: August 18, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	0	83	10	0	0
2	4	66	1	0	2
3	2	85	15	0	3
4	2	81	11	0	0
5	1	*	*	*	*
6	0	92	17	0	6
7	1	88	11	0	0
8	2	102	21	0	10
9	4	80	1	0	0
10	0	84	7	0	0
11	4	88	1	0	2
12	0	*	*	*	*
13	4	82	19	0	10
14	4	94	11	0	12
15	2	89	15	0	2
16	0	84	14	0	4
17	1	90	13	0	2
18	4	*	*	*	*
19	2	89	19	0	2
20	4	93	7	0	0
21	2	84	12	0	2
22	2	84	15	0	4
23	0	92	16	0	0
24	0	74	3	0	0
25	4	81	10	0	0
26	4	84	13	0	0
27	1	70	8	0	2
28	0	78	6	0	1
29	1	92	20	0	2
30	0	93	24	0	4
31	2	85	17	0	0
32	2	79	16	0	6
33	1	87	18	0	1
34	0	97	24	0	4
35	4	*	*	*	*
35	1	81	11	0	0
37	4	81	27	0	0
38	4	94	19	0	4
39	2	96	22	0	0
40	1	87	14	0	0

Table A-35: August 18, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	2	77	12	0	0
42	4	79	21	0	0
43	0	90	25	0	0
44	1	96	20	0	2
45	2	85	14	0	0
46	4	79	16	0	0
47	2	88	19	0	0
48	1	54	1	0	2
49	0	*	*	*	*
50	0	63	3	0	0
51	0	95	11	0	0
52	1	75	22	0	6
53	1	90	21	0	0
54	4	69	1	0	0
55	2	72	7	0	0
56	2	79	17	0	0
57	0	87	20	0	0
58	4	90	12	0	0
59	1	98	24	0	2
60	1	85	20	0	0
61	1	90	12		0
62	2	67	1	0	0
63	4	68	1	0	0
64	2	92	15	0	4
65	0	*	*	*	*
66	2	91	19	0	6
67	0	86	20	0	6
68	1	81	11	0	0
69	0	97	21	0	0
70	1	89	20	0	2
71	0	*	*	*	*
72	4	104	15	0	0
73	1	80	11	0	0
74	0	66	6	0	0
75	1	*	*	*	*
76	4	81	25	0	0
77	2	80	6	0	0
78	1	68	1	0	0
79	4	81	16	0	2
80	2	102	19	0	0

Table A-36: August 25, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	0	85	10	0	0
2	4	66	1	0	2
3	2	85	15	0	3
4	2	79	11	0	0
5	1	*	*	*	*
6	0	93	17	0	6
7	1	88	11	0	0
8	2	105	21	0	9
9	4	80	1	0	0
10	0	85	7	0	0
11	4	*	*	*	*
12	0	88	17	0	2
13	4	82	19	0	10
14	4	93	11	0	12
15	2	85	15	0	2
16	0	87	14	0	4
17	1	92	13	0	2
18	4	*	*	*	*
19	2	89	19	0	2
20	4	92	7	0	0
21	2	86	12	0	2
22	2	86	15	0	4
23	0	90	16	0	0
24	0	73	3	0	0
25	4	82	10	0	0
26	4	87	13	0	0
27	1	67	8	0	2
28	0	78	6	0	1
29	1	96	20	0	2
30	0	92	24	0	4
31	2	85	17	0	0
32	2	77	16	0	6
33	1	86	18	0	1
34	0	97	24	0	4
35	4	91	16	0	0
35	1	81	11	0	0
37	4	79	27	0	0
38	4	95	19	0	4
39	2	93	22	0	0
40	1	89	14	0	0

Table A-36: August 25, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	2	76	12	0	0
42	4	90	21	0	0
43	0	100	25	0	0
44	1	96	20	0	2
45	2	88	14	0	0
46	4	78	16	0	0
47	2	87	19	0	2
48	1	54	1	0	0
49	0	*	*	*	*
50	0	63	3	0	0
51	0	95	11	0	0
52	1	74	22	0	6
53	1	93	21	0	0
54	4	69	1	0	0
55	2	73	7	0	0
56	2	64	17	0	0
57	0	88	20	0	0
58	4	84	12	0	0
59	1	98	24	0	2
60	1	87	20	0	0
61	1	89	12	0	0
62	2	68	1	0	0
63	4	67	1	0	0
64	2	93	15	0	2
65	0	*	*	*	*
66	2	91	19	0	6
67	0	86	20	0	8
68	1	81	11	0	0
69	0	95	21	0	0
70	1	90	20	0	2
71	0	98	21	0	2
72	4	103	15	0	0
73	1	80	11	0	0
74	0	65	6	0	0
75	1	*	*	*	*
76	4	80	25	0	0
77	2	82	6	0	0
78	1	68	1	0	0
79	4	79	16	0	2
80	2	105	19	0	0

Table A-37: August 31, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	0	84	10	0	0
2	4	65	1	0	2
3	2	82	15	0	3
4	2	81	11	0	0
5	1	*	11	0	0
6	0	95	17	0	6
7	1	89	11	0	0
8	2	101	21	0	9
9	4	79	1	0	0
10	0	84	7	0	0
11	4	*	*	*	*
12	0	89	17	0	2
13	4	81	19	0	10
14	4	94	11	0	12
15	2	87	15	0	2
16	0	85	14	0	4
17	1	89	13	0	2
18	4	*	*	*	*
19	2	89	19	0	2
20	4	92	7	0	0
21	2	85	12	0	2
22	2	84	15	0	4
23	0	96	16	0	0
24	0	76	3	0	0
25	4	82	10	0	0
26	4	87	13	0	0
27	1	70	8	0	2
28	0	81	6	0	1
29	1	94	20	0	2
30	0	93	24	0	4
31	2	83	17	0	0
32	2	77	16	0	6
33	1	87	18	0	1
34	0	93	24	0	4
35	4	89	16	0	0
35	1	81	11	0	0
37	4	83	27	0	0
38	4	95	19	0	4
39	2	92	22	0	0
40	1	88	14	0	0

Table A-37: August 31, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	2	80	12	0	0
42	4	93	21	0	0
43	0	99	25	0	0
44	1	96	20	0	2
45	2	86	14	0	0
46	4	76	16	0	0
47	2	87	19	0	0
48	1	55	1	0	2
49	0	*	4	0	0
50	0	63	3	0	0
51	0	95	11	0	0
52	1	76	22	0	6
53	1	90	21	0	0
54	4	70	1	0	0
55	2	73	7	0	0
56	2	79	17	0	0
57	0	87	20	0	0
58	4	86	12	0	0
59	1	98	24	0	2
60	1	84	20	0	0
61	1	91	12	0	0
62	2	68	1	0	0
63	4	67	1	0	0
64	2	91	15	0	1
65	0	83	14	0	2
66	2	90	19	0	6
67	0	84	20	0	6
68	1	81	11	0	0
69	0	97	21	0	0
70	1	93	20	0	2
71	0	99	21	0	2
72	4	103	15	0	0
73	1	79	11	0	0
74	0	66	6	0	0
75	1	*	*	*	*
76	4	80	25	0	0
77	2	80	6	0	0
78	1	68	1	0	0
79	4	79	16	0	2
80	2	103	19	0	0

Table A-38: September 8, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	0	83	10	0	0
2	4	66	1	0	2
3	2	84	15	0	3
4	2	80	11	0	0
5	1	28	11	0	0
6	0	95	17	0	6
7	1	89	11	0	0
8	2	95	21	0	9
9	4	81	1	0	0
10	0	84	7	0	0
11	4	*	*	*	*
12	0	87	17	0	2
13	4	81	19	0	10
14	4	93	11	0	12
15	2	89	15	0	2
16	0	84	14	0	4
17	1	88	13	0	2
18	4	*	*	*	*
19	2	85	19	0	2
20	4	91	7	0	0
21	2	85	12	0	2
22	2	83	15	0	4
23	0	93	16	0	0
24	0	75	3	0	0
25	4	81	10	0	0
26	4	86	13	0	0
27	1	70	8	0	2
28	0	78	6	0	1
29	1	95	20	0	2
30	0	93	24	0	4
31	2	85	17	0	0
32	2	77	16	0	6
33	1	90	18	0	1
34	0	97	24	0	4
35	4	*	16	0	0
35	1	80	11	0	0
37	4	83	27	0	0
38	4	91	19	0	4
39	2	91	22	0	0
40	1	85	14	0	0

Table A-38: September 8, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	2	77	12	0	0
42	4	93	21	0	0
43	0	100	25	0	0
44	1	96	20	0	2
45	2	86	14	0	0
46	4	78	16	0	0
47	2	86	19	0	0
48	1	55	1	0	2
49	0	*	*	*	*
50	0	61	3	0	0
51	0	96	11	0	0
52	1	76	22	0	6
53	1	91	21	0	0
54	4	66	1	0	0
55	2	74	7	0	0
56	2	78	17	0	0
57	0	88	20	0	0
58	4	86	12	0	0
59	1	99	24	0	2
60	1	82	20	0	0
61	1	90	12	0	0
62	2	69	1	0	0
63	4	67	1	0	0
64	2	92	15	0	1
65	0	83	14	0	2
66	2	91	19	0	6
67	0	86	20	0	6
68	1	81	11	0	0
69	0	95	21	0	0
70	1	89	20	0	2
71	0	98	21	0	2
72	4	105	15	0	0
73	1	85	11	0	0
74	0	66	6	0	0
75	1	*	*	*	*
76	4	80	25	0	0
77	2	80	6	0	0
78	1	69	1	0	0
79	4	79	16	0	2
80	2	99	19	0	0

Table A-39: September 15, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	0	83	10	0	0
2	4	66	1	0	2
3	2	84	15	0	3
4	2	81	11	0	0
5	1	*	*	*	*
6	0	93	17	0	6
7	1	87	11	0	0
8	2	100	21	0	9
9	4	81	1	0	0
10	0	85	7	0	0
11	4	*	*	*	*
12	0	86	17	0	2
13	4	81	19	0	10
14	4	94	11	0	12
15	2	88	15	0	2
16	0	84	14	0	4
17	1	88	13	0	2
18	4	*	*	*	*
19	2	86	19	0	2
20	4	90	7	0	0
21	2	85	12	0	2
22	2	86	15	0	4
23	0	90	16	0	0
24	0	75	3	0	0
25	4	82	10	0	0
26	4	87	13	0	0
27	1	70	8	0	2
28	0	75	6	0	1
29	1	95	20	0	2
30	0	93	24	0	4
31	2	83	17	0	0
32	2	77	16	0	6
33	1	88	18	0	1
34	0	97	24	0	4
35	4	92	16	0	0
35	1	83	11	0	0
37	4	83	27	0	0
38	4	94	19	0	4
39	2	92	22	0	0
40	1	87	14	0	0

Table A-39: September 15, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	2	78	12	0	0
42	4	90	21	0	0
43	0	101	25	0	0
44	1	97	20	0	2
45	2	87	14	0	0
46	4	76	16	0	0
47	2	85	19	0	0
48	1	54	1	0	2
49	0	*	*	*	*
50	0	61	3	0	0
51	0	96	11	0	0
52	1	75	22	0	6
53	1	91	21	0	0
54	4	67	1	0	0
55	2	73	7	0	0
56	2	78	17	0	0
57	0	88	20	0	0
58	4	87	12	0	0
59	1	98	24	0	2
60	1	82	20	0	0
61	1	91	12	0	0
62	2	63	1	0	2
63	4	68	1	0	0
64	2	92	15	0	1
65	0	83	14	0	2
66	2	88	19	0	6
67	0	86	20	0	6
68	1	81	11	0	0
69	0	96	21	0	1
70	1	90	20	0	2
71	0	98	21	0	2
72	4	104	15	0	0
73	1	80	11	0	0
74	0	65	6	0	0
75	1	*	*	*	*
76	4	80	25	0	0
77	2	79	6	0	0
78	1	67	1	0	0
79	4	80	16	0	2
80	2	99	19	0	0

Table A-40: September 23, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
1	0	85	10	0	0
2	4	65	1	0	2
3	2	84	15	0	3
4	2	80	11	0	0
5	1	*	*	*	*
6	0	92	17	0	6
7	1	89	11	0	0
8	2	103	21	0	9
9	4	81	1	0	0
10	0	85	7	0	0
11	4	*	*	*	*
12	0	84	17	0	2
13	4	80	19	0	10
14	4	94	11	0	12
15	2	88	15	0	2
16	0	83	14	0	4
17	1	90	13	0	2
18	4	*	*	*	*
19	2	86	19	0	2
20	4	86	7	0	0
21	2	85	12	0	2
22	2	86	15	0	4
23	0	90	16	0	0
24	0	72	3	0	0
25	4	81	10	0	0
26	4	86	13	0	0
27	1	68	8	0	2
28	0	79	6	0	1
29	1	96	20	0	2
30	0	89	24	0	4
31	2	85	17	0	0
32	2	78	16	0	6
33	1	91	18	0	1
34	0	95	24	0	4
35	4	92	16	0	0
35	1	82	11	0	0
37	4	80	27	0	0
38	4	90	19	0	4
39	2	90	22	0	0
40	1	86	14	0	0

Table A-40: September 23, 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Height in cm.	Inflorescence #	Flower #	Pod #
41	2	78	12	0	0
42	4	87	21	0	0
43	0	101	25	0	0
44	1	94	20	0	2
45	2	86	14	0	0
46	4	76	16	0	0
47	2	84	19	0	0
48	1	54	1	0	2
49	0	59	4	0	0
50	0	61	3	0	0
51	0	96	11	0	0
52	1	76	22	0	6
53	1	91	21	0	0
54	4	69	1	0	0
55	2	73	7	0	0
56	2	74	17	0	0
57	0	88	20	0	0
58	4	86	12	0	0
59	1	96	24	0	2
60	1	82	20	0	0
61	1	91	12	0	0
62	2	69	1	0	2
63	4	67	1	0	0
64	2	92	15	0	0
65	0	79	14	0	2
66	2	88	19	0	6
67	0	86	20	0	6
68	1	80	11	0	0
69	0	95	21	0	0
70	1	92	20	0	2
71	0	98	21	0	2
72	4	104	15	0	0
73	1	79	11	0	0
74	0	65	6	0	0
75	1	*	*	*	*
76	4	80	25	0	0
77	2	79	6	0	0
78	1	68	1	0	0
79	4	81	16	0	2
80	2	102	19	0	0

Table A-41: 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Pod Length in cm.	Seed #
1	2	11.0	14
1	2	9.8	155
2	1	11.6	133
2	1	13.2	186
2	1	14.4	192
3	0	13.0	131
5	2	8.2	137
6	0	11.0	152
6	0	12.2	0
7	1	12.3	120
9	1	11.7	118
11	1	14.0	196
13	2	13.6	171
13	2	13.5	108
13	2	11.0	120
13	2	13.8	131
14	2	12.0	206
14	2	13.5	200
14	2	14.2	185
15	4	14.2	198
15	4	13.2	146
16	0	16.0	209
16	0	12.5	133
16	0	13.5	175
17	4	13.3	137
19	0	13.5	236
19	0	12.5	194
19	0	11.8	211
19	0	12.2	139
21	2	13.5	169
23	2	10.0	160
23	2	13.6	194
24	4	14.5	201
24	4	13.6	157
25	4	10.3	46
25	4	12.4	123
26	4	12.8	200
28	1	13.4	169
30	2	11.8	124
31	2	14.0	230
32	1	13.0	245
34	0	12.9	153
34	0	10.0	121

Table A-41: 1990 *Asclepias* Experimental Data

Plant #	Treatment #	Pod Length in cm.	Seed #
34	0	11.5	130
35	1	13.1	214
36	4	13.5	196
37	1	15.0	199
37	1	14.0	162
37	1	13.0	149
39	0	14.1	217
39	0	13.5	156
42	4	12.5	163
42	4	13.8	205
44	4	14.3	222
44	4	10.5	148
46	2	13.4	150
47	2	14.7	247
48	1	13.9	224
48	1	14.2	167
48	1	13.3	200
49	4	14.3	223
49	4	11.4	97
56	1	13.7	158
61	1	12.6	171
61	1	11.9	202
61	1	13.3	205
61	1	12.0	81
61	1	12.5	168
62	4	13.0	202
62	4	13.5	189
62	4	12.2	172
63	1	11.5	74
63	1	13.5	214
65	0	11.5	155
66	0	12.4	117
69	2	12.1	133
69	2	10.0	107
69	2	11.0	67
70	1	12.5	128
71	2	16.4	258
74	1	12.0	137
74	1	12.5	160
75	2	12.2	200
75	2	14.0	210
76	0	13.8	221

Table A-42: 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Pod Length in cm.	Pod Length in cm.	Seed #	Seed #
2	4	12.6	13.4	86	103
3	2	16.8	18.2	108	109
3	2	18.7	0.0	120	0
6	0	14.7	16.0	55	61
6	0	19.7	20.2	107	91
6	0	20.5	21.1	92	93
8	2	12.0	12.3	14	27
8	2	14.7	14.7	31	33
8	2	16.2	16.7	41	56
8	2	16.7	0.0	69	0
8	2	17.7	18.8	34	65
12	0	13.0	16.1	92	103
13	4	10.0	11.7	101	73
13	4	14.3	15.0	46	49
13	4	15.5	15.5	48	60
13	4	16.3	16.5	65	72
13	4	17.6	18.3	83	78
14	4	19.7	23.0	94	145
14	4	22.0	23.0	128	121
14	4	19.0	19.5	61	54
14	4	16.4	16.5	60	70
14	4	15.7	15.9	35	46
14	4	7.6	10.0	7	21
15	2	19.0	19.0	84	87
16	0	6.2	13.3	6	14
16	0	21.6	21.7	72	73
17	1	12.0	12.7	23	26
19	2	21.0	22.4	106	116
21	2	19.5	19.8	114	93
22	2	8.3	9.1	7	13
22	2	16.0	16.4	33	39
27	1	19.6	20.0	72	105
28	0	9.0	0.0	23	0
29	1	15.0	14.0	66	77
30	0	10.4	13.1	8	21
30	0	18.4	18.5	44	77
32	2	10.6	11.6	9	22
32	2	17.7	18.2	78	94
32	2	20.4	20.7	103	110
33	1	20.4	0.0	94	0
34	0	21.7	22.0	79	90
34	0	16.8	29.0	177	45
38	4	14.3	15.4	48	64

Table A-42: 1990 *Apocynum* Experimental Data

Plant #	Treatment #	Pod Length in cm.	Pod Length in cm.	Seed #	Seed #
38	4	12.5	13.3	52	42
44	1	6.1	9.7	1	12
48	1	15.8	16.2	52	67
52	1	24.0	24.2	114	126
52	1	18.4	18.4	102	103
52	1	10.2	10.2	20	24
59	1	20.4	21.0	64	94
62	2	14.9	15.4	53	75
65	2	18.7	19.0	49	60
66	2	4.1	14.1	0	57
66	2	14.3	14.4	40	40
66	2	16.6	17.2	52	80
67	0	23.0	23.5	136	148
67	0	19.0	19.6	7	71
67	0	12.9	14.0	25	21
70	1	19.6	20.3	70	110
71	0	16.2	16.2	26	28
79	4	19.0	19.3	79	101

Table A-43: Two-Way Analysis of Variance, 1989 Collection Data Ratio by Date by Species

Data Variable: Ratio First (row) categorical variable = Date Second (column) categorical variable = Plant					
Source	DF	Sum of Squares	Mean Squared	F Ratio	Probability F is significant
Total	179	4.3126			
Between Subcell	17	1.5728			
Columns	1	0.0945	0.0945	5.586	0.9818
Rows	8	0.9105	0.1138	6.729	1.0000
Interaction	8	0.5679	0.0710	4.197	0.9997
Within subcell	162	2.7398	0.0169		

Table A-44: 1989 *Apocynum* Experimental Data: Plant Height at Project Start

Data Variable = Height at Project Start Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	31	2075.9297	66.9655	
Between	3	91.5859	30.528	0.431
Within	28	1984.3437	70.8694	
Probability F is significant = 0.264				

Table A-45: 1989 *Apocynum* Experimental Data: Plant Height at Project Finish

Data Variable = Height at Project Finish Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	31	4142.3750	133.6250	
Between	3	107.8125	35.937	0.249
Within	28	4034.5625	144.0915	
Probability F is significant = 0.138				

Table A-46: 1989 *Apocynum* Experimental Data: Number of Flowers

Data Variable = Total Number of Flowers Produced Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	31	914383.4687	29496.2409	
Between	3	17844.0937	5948.031	0.186
Within	28	896539.3750	32019.2634	
Probability F is significant = 0.095				

Table A-47: 1989 *Apocynum* Experimental Data: Number of Pods Initiated

Data Variable = Number of Pods Initiated Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	31	71.8750	2.3185	
Between	3	2.125	0.708	0.284
Within	28	69.7500	2.4911	
Probability F is significant = 0.162				

Table A-48: 1989 *Apocynum* Experimental Data: Number of Mature Pods Produced

Data Variable = Number of Mature Pods Produced Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	31	54.8750	1.7702	
Between	3	5.1250	1.708	0.961
Within	28	49.7500	1.7768	
Probability F is significant = 0.57				

Table A-49: 1990 *Asclepias* Experimental Data: Height at Project Start

Data Variable = Height at Project Start Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	79	21282.4875	269.3986	
Between	3	707.7375	235.912	0.871
Within	76	20574.7500	270.7204	
Probability F is significant = 0.537				

Table A-50: 1990 *Asclepias* Experimental Data: Height at Project Finish

Data Variable = Height at Project Finish Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	79	31263.3875	395.7391	
Between	3	286.7375	95.579	0.234
Within	76	30976.6500	407.5875	
Probability F is significant = 0.127				

Table A-51: 1990 *Asclepias* Experimental Data: Total Flower Number

Data Variable = Total Flower Number Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	79	1837002	23253	
Between	3	13738	457	0.191
Within	76	1823264	23990	
Probability F is significant = 0.098				

Table A-52: 1990 *Asclepias* Experimental Data: Number of Pods Initiated

Data Variable = Number of Pods Initiated Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	79	559.9500	7.0880	
Between	3	16.6500	5.550	0.776
Within	76	543.3000	7.1487	
Probability F is significant = 0.486				

Table A-53: 1990 *Asclepias* Experimental Data: Number of Mature Pods Produced

Data Variable = Number of Mature Pods Produced Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	65	93.5303	1.4389	
Between	3	3.5058	1.168	0.805
Within	62	90.0245	1.4520	
Probability F is significant = 0.501				

Table A-54: 1990 *Apocynum* Experimental Data: Plant Height at Project Start

Data Variable = Plant Height at Project Start Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	79	9424.7500	119.3006	
Between	3	140.4500	46.816	0.383
Within	76	9284.3000	122.1618	
Probability F is significant = 0.231				

Table A-55: 1990 *Apocynum* Experimental Data: Plant Height at Project Finish

Data Variable = Plant Height at Project Finish Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	79	11129.2000	140.8759	
Between	3	175.3000	58.433	0.405
Within	76	10953.9000	144.1303	
Probability F is significant = 0.247				

Table A-56: 1990 *Apocynum* Experimental Data: Flower Number

Data Variable = Flower Number Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	79	6423068	81305	
Between	3	50896	1696	0.202
Within	76	6372172	83844	
Probability F is significant = 0.105				

Table A-57: 1990 *Apocynum* Experimental Data: Number of Pods Initiated

Data Variable = Number of Pods Initiated Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	79	541.9500	6.8601	
Between	3	8.5500	2.850	0.406
Within	76	533.4000	7.0184	
Probability F is significant = 0.247				

Table A-58: 1990 *Apocynum* Experimental Data: Number of Mature Pods Produced

Data Variable = Number of Mature Pods Produced Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	79	478.9474	6.3860	
Between	3	3.2974	1.099	0.166
Within	76	475.6500	6.6063	
Probability F is significant = 0.082				

Table A-59: 1990 *Asclepias* Experimental Data: Pod Length

Data Variable = Pod Length Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	84	163.9769	1.9521	
Between	3	4.0635	1.354	0.686
Within	81	159.9134	1.9742	
Probability F is significant = 0.433				

Table A-60: 1990 *Asclepias* Experimental Data: Seed Number

Data Variable = Seed Number Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	84	207021.6000	2464.5429	
Between	3	1719.9666	573.322	0.226
Within	81	205301.6334	2534.5881	
Probability F is significant = 0.122				

Table A-61: 1990 *Apocynum* Experimental Data: Pod Length 1

Data Variable = Pod Length 1 Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	60	1187.8502	19.7992	
Between	3	8.5913	2.863	0.138
Within	57	1179.3588	20.6905	
Probability F is significant = 0.064				

Table A-62: 1990 *Apocynum* Experimental Data: Pod Length 2

Data Variable = Pod Length 2 Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	60	2022.1620	33.7027	
Between	3	74.0667	24.688	0.722
Within	57	1948.0953	34.1771	
Probability F is significant = 0.454				

Table A-63: 1990 *Apocynum* Experimental Data: Seed Number 1

Data Variable = Seed Number 1 Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	60	90320.2623	1505.3377	
Between	3	736.6335	245.544	0.156
Within	57	89583.6288	1571.6426	
Probability F is significant = 0.075				

Table A-64: 1990 *Apocynum* Experimental Data: Seed Number 2

Data Variable = Seed Number 2 Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	60	84908.3607	1415.1393	
Between	3	1970.0819	656.694	0.451
Within	57	82938.2788	1455.0575	
Probability F is significant = 0.279				

Table A-65: 1990 *Asclepias* Experimental Data: June 3, 1990 Plant Height

Data Variable = June Plant Height Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	79	21282.4875	269.3986	
Between	3	707.7375	235.912	0.871
Within	76	20574.7500	270.7204	
Probability F is significant = 0.537				

Table A-66: 1990 *Asclepias* Experimental Data: June 3, 1990 Flower Number

Data Variable = June Flower Number Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	79	1312375	16612	
Between	3	62669	2089	1.270
Within	76	1249707	16444	
Probability F is significant = 0.710				

Table A-67: 1990 *Asclepias* Experimental Data: June 3, 1990 Pod Number

Data Variable = June Pod Number Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	78	0.0000	0.0000	
Between	3	0.0000	0.000	0.000
Within	75	0.0000	0.0000	
Probability F is significant = N/A All values 0.0				

Table A-68: 1990 *Asclepias* Experimental Data: June 22, 1990 Plant Height

Data Variable = June Plant Height Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	79	16509.2000	335.5595	
Between	3	508.9000	169.633	0.496
Within	76	26000.3000	342.1092	
Probability F is significant = 0.310				

Table A-69: 1990 *Asclepias* Experimental Data: June 22, 1990 Flower Number

Data Variable = June Flower Number Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	79	1154387	14612	
Between	3	6115	203	0.135
Within	76	1148272	15109	
Probability F is significant = 0.062				

Table A-70: 1990 *Asclepias* Experimental Data: June 22, 1990 Pod Number

Data Variable = June Pod Number Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	79	25.5500	0.3234	
Between	3	0.8500	0.283	0.872
Within	76	24.7000	0.3250	
Probability F is significant = 0.537				

Table A-71: 1990 *Asclepias* Experimental Data July 29, 1990 Plant Height

Data Variable = July Plant Height Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	77	30346.9872	394.1167	
Between	3	161.5951	53.865	0.872
Within	74	30185.3921	407.9107	
Probability F is significant = 0.060				

Table A-72: 1990 *Asclepias* Experimental Data July 29, 1990 Flower Number

Data Variable = July Flower Number Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	77	0.0000	0.0000	
Between	3	0.0000	0.000	0.000
Within	74	0.0000	0.0000	
Probability F is significant = N/A, All values 0.0				

Table A-73: 1990 *Asclepias* Experimental Data
July 29, 1990 Pod Number

Data Variable = July Pod Number Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	77	105.8462	1.3746	
Between	3	0.8856	0.295	0.208
Within	74	104.9605	1.4184	
Probability F is significant = 0.109				

Table A-74: 1990 *Asclepias* Experimental Data
August 31, 1990 Plant Height

Data Variable = August Plant Height Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	70	27343.8873	390.6270	
Between	3	411.7788	137.259	0.341
Within	67	26932.1085	401.9718	
Probability F is significant = 0.202				

Table A-75: 1990 *Asclepias* Experimental Data
August 31, 1990 Flower Number

Data Variable = August Flower Number Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	70	0.0000	0.0000	
Between	3	0.0000	0.000	0.000
Within	67	0.0000	0.0000	
Probability F is significant = N/A: All values = 0.0				

Table A-76: 1990 *Asclepias* Experimental Data
August 31, 1990 Pod Number

Data Variable = August Pod Number Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	70	99.2394	1.4177	
Between	3	2.5922	0.864	0.599
Within	67	96.6472	1.4425	
Probability F is significant = 0.378				

Table A-77: 1990 *Asclepias* Experimental Data
September 19, 1990 Plant Height

Data Variable = September Plant Height Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	65	22419.8182	344.9203	
Between	3	84.6768	28.225	0.078
Within	62	22335.1414	360.2442	
Probability F is significant = 0.029				

Table A-78: 1990 *Asclepias* Experimental Data
September 19, 1990 Flower Number

Data Variable = September Flower Number Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	65	0.0000	0.0000	
Between	3	0.0000	0.000	0.000
Within	62	0.0000	0.0000	
Probability F is significant = N/A: All values = 0.0				

Table A-79: 1990 *Asclepias* Experimental Data
September 19, 1990 Pod Number

Data Variable = September Pod Number Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	65	93.5303	1.4389	
Between	3	3.5058	1.168	0.805
Within	62	90.0245	1.4520	
Probability F is significant = 0.501				

Table A-80: 1990 *Apocynum* Experimental Data
June 3, 1990 Plant Height

Data Variable = June Plant Height Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	79	9424.7500	119.3006	
Between	3	140.4500	46.816	0.383
Within	76	9284.3000	122.1618	
Probability F is significant = 0.231				

Table A-81: 1990 *Apocynum* Experimental Data
June 3, 1990 Flower Number

Data Variable = June Flower Number Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	79	1453202	18395	
Between	3	34544	1151	0.617
Within	76	1418658	18667	
Probability F is significant = 0.390				

Table A-82: 1990 *Apocynum* Experimental Data
June 3, 1990 Pod Number

Data Variable = June Pod Number Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	79	0.0000	0.0000	
Between	3	0.0000	0.000	0.000
Within	76	0.0000	0.0000	
Probability F is significant = N/A, all values = 0.0				

Table A-83: 1990 *Apocynum* Experimental Data
June 22, 1990 Plant Height

Data Variable = June Plant Height Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	79	8965.9500	113.4930	
Between	3	201.2421	50.310	0.431
Within	76	8764.7079	116.8628	
Probability F is significant = 0.212				

Table A-84: 1990 *Apocynum* Experimental Data
June 22, 1990 Flower Number

Data Variable = June Flower Number Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	79	88308.4875	1117.8290	
Between	3	1255.3612	313.840	0.270
Within	76	87053.1263	1160.7084	
Probability F is significant = 0.104				

Table A-85: 1990 *Apocynum* Experimental Data
June 22, 1990 Pod Number

Data Variable = June Pod Number Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	79	215.3875	2.7264	
Between	3	4.8059	1.201	0.428
Within	76	210.5816	2.8078	
Probability F is significant = 0.210				

Table A-86: 1990 *Apocynum* Experimental Data
July 22, 1990 Plant Height

Data Variable = July Plant Number Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	73	6879.1486	94.2349	
Between	3	103.5598	34.519	0.357
Within	70	6775.5889	96.7941	
Probability F is significant = 0.213				

Table A-87: 1990 *Apocynum* Experimental Data
July 22, 1990 Flower Number

Data Variable = July Flower Number Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	73	54.7162	0.7495	
Between	3	0.7940	0.264	0.344
Within	70	53.9222	0.7703	
Probability F is significant = 0.204				

Table A-88: 1990 *Apocynum* Experimental Data
July 22, 1990 Pod Number

Data Variable = July Pod Number Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	73	462.2162	6.3317	
Between	3	7.2162	2.405	0.370
Within	70	455.0000	6.5000	
Probability F is significant = 0.222				

Table A-89: 1990 *Apocynum* Experimental Data
August 31, 1990 Plant Height

Data Variable = August Plant Height Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	74	7177.6800	96.9957	
Between	3	127.9443	42.648	0.430
Within	71	7049.7357	99.2921	
Probability F is significant = 0.264				

Table A-90: 1990 *Apocynum* Experimental Data
August 31, 1990 Flower Number

Data Variable = August Flower Number Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	74	0.0000	0.0000	
Between	3	0.0000	0.000	0.000
Within	71	0.0000	0.0000	
Probability F is significant = N/A, all values = 0.0				

Table A-91: 1990 *Apocynum* Experimental Data
August 31, 1990 Pod Number

Data Variable = August Pod Number Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	74	468.7467	6.3344	
Between	3	2.7098	0.903	0.138
Within	71	466.0368	6.5639	
Probability F is significant = 0.063				

Table A-92: 1990 *Apocynum* Experimental Data
September 23, 1990 Plant Height

Data Variable = September Plant Height Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	75	7935.6316	105.8084	
Between	3	42.0538	14.017	0.128
Within	72	7893.5778	109.6330	
Probability F is significant = 0.057				

Table A-93: 1990 *Apocynum* Experimental Data
September 23, 1990 Flower Number

Data Variable = September Flower Number Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	75	0.0000	0.0000	
Between	3	0.0000	0.000	0.000
Within	72	0.0000	0.0000	
Probability F is significant = N/A, all values = 0.0				

Table A-94: 1990 *Apocynum* Experimental Data
September 23, 1990 Pod Number

Data Variable = September Pod Number Categorical Variable = Treatment				
Source	DF	Sum of Squares	Mean Squared	F Ratio
Total	75	478.9474	6.3860	
Between	3	3.2974	1.099	0.166
Within	72	475.6500	6.6063	
Probability F is significant = 0.082				

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