AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D. C. 20523

BIBLIOGRAPHIC INPUT SHEET

FOR AID USE ONLY
Batch #31

1. SUBJECT CLASSIFICATION

A. PRIMARY
Agriculture AF30-1410-0000

B. SECONDARY
Plant breeding--Leguminous grains and vegetables--Beans

2. TITLE AND SUBTITLE

Evaluation of mungbean (Phaseolous aureus Roxb.) strains at Columbia,Missouri, in 1970

3. AUTHOR(S)

Yohe,J.M.; Watt,E.E.; Bashandi,M.M.H.; Sechler,D.T.; Poehlman,J.M.

4. DOCUMENT DATE	5. NUMBER OF PAGES	6. ARC NUMBER
1971	33p.	ARC

7. REFERENCE ORGANIZATION NAME AND ADDRESS

Mo.

8. SUPPLEMENTARY NOTES *(Sponsoring Organization, Publishers, Availability)*

9. ABSTRACT

10. CONTROL NUMBER
PN-AAB-833

11. PRICE OF DOCUMENT

12. DESCRIPTORS
Beans
Field tests
Mungbeans?
Varieties

13. PROJECT NUMBER

14. CONTRACT NUMBER
CSD-1921 211(d)

15. TYPE OF DOCUMENT

AID 590-1 (4-74)

CSD-1921
PN-AAB-833
Related to 211d grant
CRSPRDI

EVALUATION OF MUNGBEAN (PHASEOLUS AUREUS ROXB.) STRAINS AT COLUMBIA, MISSOURI, IN 1970

UNIV. OF

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(Preliminary Report)

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in cooperation with the
United States Agency for International Development
and the
United States Department of Agriculture
New Crops Research Branch
July, 1971

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EVALUATION OF MUNGBEAN (PHASEOLUS AUREUS ROXB.) STRAINS AT COLUMBIA, MISSOURI, IN 1970

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Three hundred and twenty-one strains of mungbeans (Phaseolus aureus Roxb.) were grown at Columbia, Missouri, in 1970 and evaluated for plant and seed characteristics. The strains originated from many sources and represented a diverse group of genotypes. Some of the strains were obvious genetic mixtures but no attempt was made to purify the seed collections. This research was financed by a USAID 211(d) grant to the University of Missouri and by the Department of Agronomy, Missouri Agricultural Experiment Station.

ORIGIN OF MUNGBEAN ACCESSIONS

A list of the mungbean accessions tested at Columbia, Missouri, in 1970 is given in Table 1. The principal source of the accessions was the United States Department of Agriculture, Regional Plant Introduction Station, Experiment, Georgia. Strains were also received from the United States Department of Agriculture, Regional Pulse Improvement Project (RPIP), then located in New Delhi, India; the Orissa (India) Pulses Research Station, Nayagarh; the Oklahoma Agricultural Experiment Station; and other sources. Where the information is available, the USDA Plant Introduction (P.I.) number, variety name or selection number, country of origin, and source of seed are listed in Table 1. The exact origin of all strains is not known. Accessions M-75 to M-123 were received from the Oklahoma Agricultural Experiment Station and unless a country of origin was specified they are listed as from the United States even though a number of the accessions have a P.I. number. Likewise, accessions M-135 to M-156, received from the U.S. Department of Agriculture, were labeled Beltsville and so are listed from the United States even though they have P.I. numbers and some of them may be introductions.

Grateful acknowledgement is made to all who have supplied us with the mungbean strains.

METHODS USED IN GROWING THE CROP

Two replications of each entry were grown in a randomized block design on the University of Missouri, Department of Agronomy, Bradford Experimental Farm, Columbia, Missouri, in 1970. A plot consisted of a single 20 ft (6 m) row with 36 in (90 cm) spacing between rows. Seeds were planted with 6 in (15 cm) spacing within the row, but due to non-uniform germination actual spacing of plants varied considerably. Plots were planted on June 8, 1970. Seed was inoculated with "EL" commercial culture inoculant before planting. The plots were fertilized with a 12-12-12 commercial fertilizer at a rate of 300 lbs/acre (337 kg/ha). An herbicide, chloramben (3-amino-2,5-dichlorobenzoic acid), was applied at time of planting at a rate of 3 lbs/acre (3.37 kg/ha). Plots were harvested in October after the leaves had shed following a frost and threshed in a soybean nursery thresher. Seed was screened through a table model cleaner after threshing.

The Bradford Farm is located approximately 39° north latitude, 92.5° west longitude, and 750 ft (228 m) altitude. The temperature and precipitation for the period June through October, 1970, follows:

	Temperature						Number of Days with Temperature			
	Mean Maximum		Mean Minimum		Average		90°F (32.2°C) or above	100°F (37.7°C) or above	Precipitation	
	F	C	F	C	F	C			in	cm
June	79.5	26.4	61.2	16.2	70.0	21.1	1	0	4.48	11.4
July	87.9	30.8	64.6	18.1	75.8	24.3	15	0	1.54	3.9
August	85.3	29.6	65.6	18.7	75.5	24.2	8	1	8.40	21.3
September	76.4	24.7	59.3	15.2	67.8	19.9	3	0	9.27	23.5
October	65.9	18.8	46.5	8.1	56.2	13.4	0	0	3.01	7.64

The excessive precipitation in August and September resulted in damage and loss of seed due to fungal growth on mature pods, preharvest germination, and shattering.

DATA AND HOW IT WAS OBTAINED

Morphological characteristics of mungbean strains are recorded in Table 2. Agronomic and chemical data are reported in Table 3. Procedures for collecting data and recording notes are given below.

Growth Habit - Visual observations were recorded for type of vertical and horizontal growth as follows:

Vertical Growth	Horizontal Growth
D = dwarf	B = bushy
E = erect	R = spreading
S = semi-erect	V = viny
P = prostrate	
A = semi-prostrate	

Example: SB = semi-erect, bushy; SBR = semi-erect, bushy, spreading

Leaf Size - Mature leaves were classified 1 to 8 for size by comparison with leaf outlines on a chart varying in area. The leaf size classes and area of each are as follows:

1 = 0.95 sq. in.	4 = 4.03 sq. in.	7 = 10.64 sq. in.
2 = 1.83 sq. in.	5 = 5.27 sq. in.	8 = 22.50 sq. in.
3 = 2.75 sq. in.	6 = 8.49 sq. in.	

Pubescence - Visual observation of density and length as follows:

Density of Pubescence	Length of Pubescence
T = dense	L = long
M = medium-density	M = medium
L = low-density	S = short
N = none	

Example: TL = dense, long; MS = medium-density, short

Flower Color - Visual observation made between 7:30 and 10:00 A.M. while flower was open.

Y = yellow LY = light yellow P = purple

Pod Length - Ten pods selected at random were measured and classed according to length as short (4-8 cm), medium (8-12 cm), or long (12-16 cm).

Pod Shape - Curved or straight.

Pod Color - Dark (black), medium (brown to brown-black), and light (tan to light brown).

Seed Color - Visually classed as follows:

DG = dark green	Bl = black
LG = light green	Brn = brown
T = tan	R = red

Some mixtures of seed color were observed within lines due to lack of genetic purity in strains.

Yield - Plots were cut after the first killing frost, plants dried and threshed in a soybean plot-thresher, and seed cleaned on a table model cleaner. Yields are recorded as kilograms/hectare.

Days to Flower - Number of days from planting to first open flower.

Days to Ripe - Number of days from planting to first pod showing a mature ripe color. The change in pod color from green to the mature ripe color normally occurred within a 24-hour period.

Plant Height - Average height of the main axis, in cm, of two randomly selected plants. Measurements were made 65 days after planting.

Branch Length - Average length in cm of first lateral branch from two randomly selected plants.

Pods/Plant - Average number of pods at time of harvest on two randomly selected plants.

Seeds/Pod - Average number of seeds in the ten pods measured for pod length.

1,000 Seed-Weight - Weight in grams of 100 randomly selected seeds and expressed on a 1,000 seed-weight basis.

Virus Score - Visual evaluation on a basis of 1 to 100 for virus injury in the plot as identified by leaf mosaic, leaf crinkling, or plant stunting. Identification of the virus (or viruses) present could not be made.

Mildew Score - Visual rating for mildew on the leaves based on a score of 1 (resistant) to 5 (susceptible).

Protein - A 10-gram sample was ground through a 40-mesh screen in a Micro-Wiley mill. The nitrogen content was determined by an automated Technicon system based on the ninhydrine reaction with alpha amino nitrogen. The standard curves were based on the classical Kjeldahl procedure. Protein is expressed as percent of the air-dry sample.

Lysine - The lysine was determined by an automated Technicon procedure based on lysine decarboxalase reaction and measurement of the liberated CO_2 by a colorimetric reaction. Lysine is expressed as percent of protein.

Methionine - The methionine determinations were done by gas liquid chromatography and confirmed by classical liquid ion exchange chromatography. The methionine content is expressed as percent of protein.

DISCUSSION OF RESULTS

Data reported for yield, days to flower, days to ripe, plant height, branch length, pods/plant, seeds/pod, 1,000 seed-weight, virus score, and mildew score are averages for the two replications except in a very limited number of strains where data was recorded on one replication only for one or more of the characters studied. For the chemical analyses--protein, lysine, and methionine--seed from the two replications were mixed and a single 10-gram sample was processed for the analyses.

Yield

Yields of the mungbean strains grown at Columbia in 1970 ranged from a high of 2,708 to a low of 8 kilograms/hectare with a mean of 777 kilograms/hectare. The accessions are ranked in order of yield in Table 4. Nine strains yielded above 2,000 kg/ha and 99 yielded above 1,000 kg/ha. Six strains did not produce any seed. Three of these (M-220, M-221 and M-320) did not flower. One strain (M-322) flowered late but did not produce seed. Two strains were so badly damaged with virus that they did not produce seed.(M-74 and M-163). Variability in yields in this experiment also occurred as a result of variability in stands and shattering of seeds.

The 9 strains exceeding 2,000 kg/ha, the yield of each, and the country of origin are as follows:

M-118	2708 kg/ha	India
M-203	2526 kg/ha	India
M-194	2397 kg/ha	India
M-174	2365 kg/ha	India
M-317	2240 kg/ha	China
M-232	2209 kg/ha	India
M-90	2124 kg/ha	India
M-238	2081 kg/ha	India
M-148	2009 kg/ha	USA

The 32 (10%) highest yielding strains are listed in Table 4 along with the other data obtained on these accessions. Mean yield of these 32 strains was 1928 kg/ha.

Days to Flower

The mungbean strains ranged from 40 to 114 days to first flower with a mean of 61 days. Three strains did not flower (M-220, M-221 and M-320). Date of flowering was not recorded on one strain (M-325). The 32 highest yielding strains listed in Table 5 ranged from 48 to 76 days to flowering with a mean of 55 days. The 32 high yielding strains did not include any of the extremely early or extremely late strains.

Days to 1st Ripe

Days to 1st ripe pod ranged from 57 days to 117 days with a mean of 77 days. No date of ripening was recorded for ten strains. Three of these (M-220, M-221 and M-320) did not flower and one flowered but did not produce seed (M-322). Several of the latest flowering strains did not produce ripe seeds before frost. The average days to 1st ripe pod for the 32 high yielding strains (Table 5) was 75 days. As an average overall it required 22 days for the pods to mature after flowering.

Height of Plants

Height was recorded on all 321 strains and ranged from 104 cm to 19 cm with an overall mean of 56 cm. The 32 high yielding strains ranged from 42 to 90 cm in height with an overall mean of 67 cm. Height is apparently an expression of plant vigor and there was a tendency for the high yielding plants also to be tall. However, there were exceptions as the data below will illustrate:

Tall Strains			Short Strains		
Accession No.	Yield Rank	Ht. cm	Accession No.	Yield Rank	Ht. cm
M-118	1	72	M-148	9	43
M-203	2	80	M-140	10	50
M-194	3	78	M-101	18	38
M-174	4	78	M-121	19	42
M-90	7	85	M-99	23	45

There was also a tendency for the tall plants to be late in flowering.

Branch Length

The length of the first (lower) lateral branch was measured and recorded as branch length for all strains. The range was from 99 cm for the longest branches to 15 cm for the shortest with an overall mean of 49 cm. The 32 highest yielding strains (Table 5) also had a considerable range in branch length varying from 38 to 96 cm with a mean of 61 cm. In this experiment the rows and the plants within the rows were widely spaced so that spread of the branches would be larger than at conventional seeding rates. Also, variability in stands in the different strains affected to some extent the branch lengths.

Examples of high yielding strains with long and short lateral branches are as follows:

Long Branches			Short Branches		
Accession No.	Yield Rank	Branch Length cm	Accession No.	Yield Rank	Branch Length cm
M-194	3	89	M-148	9	36
M-174	4	85	M-140	10	49
M-90	7	90	M-121	19	39
M-235	14	96	M-99	23	40
M-206	15	75	M-304	25	38

Pods/Plant

Pods/Plant is one of the components of yield. The number of pods per plant varied from a high of 238 down to 2 with an experiment mean of 66. No data was recorded for ten strains including the three which did not flower. The 32 high yielding strains varied from 41 to 134 pods/plant with a mean of 80. The 10 high strains for number of pods per plant were M-176 (238), M-248 (193), M-68 (187), M-261 (173), M-213 (168), M-218 (164), M-281 (163), M-264 (155), M-280 (155) and M-1 (146). None of these were among the 32 highest yielding strains. As with branch length, spacing of plants will affect the number of pods per plant so that the number may be reduced with closer spacing than was used in this experiment. Also, in this experiment, the variability in stands affected to some extent the number of pods/plant.

Seeds/Pod

Seeds/pod is a second component of yield. Seeds/pod was recorded on 278 strains with a maximum of 15, a minimum of 5, and a mean of 11 seeds. The 32 high yielding strains ranged from 15 to 11 seeds per pod with a mean of 12 seeds. The 10 strains with largest number of seeds per pod and the number of seeds recorded for each are M-105 (15), M-118 (15), M-98 (14), M-103 (14), M-164 (14), M-214 (14), M-205 (14), M-95 (14), M-110 (14) and M-300 (14). Four of these strains were among the 32 high yielding strains, M-118 (1st in yield), M-214 (6th in yield), M-110 (29th in yield), and M-95 (30th in yield). These data indicate that a large number of seeds per pod is an important character associated with high seed yields.

1,000 Seed-Weight

Seed-weight is a third component of yield. The 1,000 seed-weight was measured on 306 strains. The weights ranged from a high of 85 to a low of 10 grams per 1,000 seeds, with a mean of 30 grams. The 32 high yielding strains ranged from 30 to 75 grams per 1,000 seeds with a mean of 44 grams. The 10 strains with the largest seeds were M-324 (85 gm), M-101 (75 gm), M-323 (70 gm), M-120 (63 gm), M-317 (63 gm), M-90 (60 gm), M-174 (60 gm), M-214 (60 gm), M-81 (58 gm), and M-97 (58 gm). Four were among the 32 high yielding strains, M-174 (4th in yield), M-317 (5th in yield), M-90 (6th in yield) and M-214 (12th in yield). The data indicate that seed weight is an important character contributing to high yield.

Virus Score

As noted, virus symptoms were observed in a large number of strains although the exact virus or viruses were not identified. None of the strains exhibited the bright leaf-yellowing characteristic of the bean yellow mosaic virus (BYMV). The virus score reported is a visual observation on the basis of 1 to 100, and is an attempt to assess and record the overall damage to the plot. Comparable symptoms and damage were not always observed in the two replications. This may indicate an uneven spread of the virus (or viruses) by the vectors. No visible virus symptoms were observed in 58 strains. No visible virus symptoms were observed in 17 of the 32 highest yielding strains and virus scores above 15 were recorded in only 7 strains. Eleven strains had a virus score of 100. The yields of the latter strains ranged from no yield (M-74) to 562 kg/ha. One strain, M-163, with a virus score of 95 also failed to produce any yield. Plants within strains varied in the expression of virus symptoms with both normal and badly stunted plants being observed in the same strain.

Mildew Score

Mildew was widespread throughout the nursery. Strains were visually scored on a scale of 1 (resistant) to 5 (susceptible). In contrast to the virus symptoms, all plants within a plot were uniformly affected and mildew scores between replications were consistent. Three strains had a mildew score of 1 (resistant): M-221, M-320, and M-322. Four strains, M-118, M-210, M-319, and M-324, had a score of 2. Eleven additional strains had an average score of 2.5: M-19, M-101, M-109, M-158, M-163, M-165, M-167, M-176, M-188, M-243, and M-274. Only 3 of the strains listed above were among the 32 high yielding lines: M-118 (1st in yield), M-101 (18th in yield), and M-109 (22nd in yield). The overall mean for mildew score was 3.9 and the mean mildew score for the 32 high yielding strains was 3.7. These results indicate that mildew was less damaging to the yield of mungbean strains in this experiment than was the virus in strains where the latter was present.

Protein Percent

Protein analyses were run on 313 of the strains and are expressed as percent of the air dry weight. The strains ranged from a high of 28.3 to a low of 19.1 percent protein with a mean of 24.0 percent. The 32 high yielding strains ranged from 27.4 to 19.1 percent with a mean of 23.6 percent. The ten high protein strains are as follows: M-112 (28.3%), M-254 (28.2%), M-25 (28.0%), M-67 (28.0%), M-248 (27.8%), M-2 (27.7%), M-72 (27.7%), M-292 (27.7%), M-36 (27.5%), and M-119 (27.5%). None of these strains were among the 32 high yielding strains, although M-61, which ranked 11th in yield, had a protein content of 27.4%. Most of the high protein strains tended to have small seeds as shown in the 1,000 seed-weights as follows:

M-112	25 grams	M-2	35 grams
M-254	30 grams	M-72	25 grams
M-25	20 grams	M-292	28 grams
M-67	25 grams	M-36	25 grams
M-248	25 grams	M-119	45 grams

Lysine (as percent of protein)

The 313 strains of mungbeans analyzed for protein percentage were also analyzed for lysine which is reported as percent of protein. The strains ranged in lysine from 7.9 to 6.9 percent with an overall mean of 7.0 percent. The strain with the highest lysine content was M-29 (7.9%). Five strains contained 7.8% (M-20, M-28, M-38, M-40, and M-317) and 9 additional strains contained 7.7% (M-12, M-27, M-150, M-306, M-307, M-311, M-318, M-326, and M-328). Only 2 of the above strains were among the 32 high yielding strains: M-317 (5th in yield) and M-307 (32nd in yield). None were among the ten high protein strains. Strains with the best combination of high protein and high lysine were M-29 (25.7% protein and 7.9% lysine), M-311 (26.9% protein and 7.7% lysine), and M-326 (26.4% protein and 7.7% lysine).

Methionine (as percent of protein)

Of the 313 strains of mungbeans analyzed for protein, 311 were also analyzed for methionine which is reported as percent of protein. The strains ranged in methionine from 1.78% to 0.55% with an overall mean of 1.2 percent. The 8 strains highest in methionine are listed below along with the protein and lysine content:

Acc. No.	Methionine %	Protein %	Lysine %
M-310	1.78%	19.7%	6.9%
M-168	1.76%	21.6%	7.5%
M-104	1.69%	23.1%	7.2%
M-227	1.63%	22.1%	7.1%
M-279	1.63%	21.5%	7.5%
M-38	1.61%	23.0%	7.8%
M-179	1.61%	21.6%	7.5%
M-241	1.60%	20.4%	6.9%
M-179	1.57%	21.6%	7.5%
M-241	1.57%	20.4%	6.9%

These data indicate that strains high in methionine tend to be low in protein. The best combination of high methionine and high protein is found in M-104. However strains M-168 and M-38 have good combinations of methionine and lysine. Only one of the above strains was among the 32 highest yielding strains (M-101).

Table 1

List of Mungbean (Phaseolus aureus) Accessions

Tested by

University of Missouri, Columbia, 1970

Mo. Acc. No.	USDA PI No.	Name	Origin	Source
M-1	"	24-3	India	RPIP
M-2	"	Baisakhi	"	" (same as M-13, M-73)
M-3	"	Moong 54	"	" (same as M-134)
M-4	"	Shining Moong 1	"	"
M-5	"	Puri Rd. desi	"	Cultivator, Orissa
M-6	"	Moong 305	"	RPIP
M-7	"	BBS desi-1	"	Market, Bhubaneswar
M-8	"	BBS desi-2	"	"
M-9	"	24-2	"	RPIP
M-10	"	BR-2	"	"
M-11	"	B-1	"	"
M-12	"	T-44	"	"
M-13	"	Baisakhi	"	(same as M-2, M-73)
M-14	"	Jalagaon 781	"	"
M-15	"	"	Taiwan	Health Store, St. Louis
M-16	"	Klalikhole 2-2	India	Orissa
M-17	"	" " 1-5	"	"
M-18	"	Jharsuguda 2-3	"	"
M-19	"	" " 3-2	"	"
M-20	"	" " 4-8	"	"
M-21	"	Jhain Mung 1-4	"	"
M-22	"	" 5-1	"	"
M-23	"	" 3-1	"	"
M-24	"	" 4-4-5	"	"
M-25	"	Bhalili 3-4	"	"
M-26	"	" 1-3	"	"
M-27	"	" 2-7	"	"
M-28	"	" 2-3-7	"	"
M-29	"	Kendrapada 1-2	"	"
M-30	"	" 2-4	"	"
M-31	"	" 1-7	"	"
M-32	"	" 1-4	"	"
M-33	"	Kusumi 2-6	"	"
M-34	"	" 2-11	"	"
M-35	"	" 1-5	"	"
M-36	"	" 1-7	"	"
M-37	"	" 3-8	"	"
M-38	"	" 1-10	"	"
M-39	"	Banpur 2-6	"	"
M-40	"	" 1-4	"	"
M-41	"	Bhudia 2-6-10	"	"
M-42	"	Purunagarh 1-11	"	"
M-43	"	" 2-2	"	"

Table 1

Mo. Acc. No.	USDA PI No.	Name	Origin	Source
M-44		Moong Yellow 3	India	Orissa
M-45		Kaira 1-2	"	"
M-46		" 2-13	"	"
M-47		Angul 3-6(A)	"	"
M-48		" 3-6(B)	"	"
M-49		Rampur 1-10	"	"
M-50		" 1-1	"	"
M-51		Nayagarh 2-4	"	"
M-52		" 3-6	"	"
M-53		" 2-13-1	"	"
M-54		Lasatala 2-4	"	"
M-55		" 2-5	"	"
M-56		" 3-1	"	"
M-57		" 1-6	"	"
M-58		" 1-10	"	"
M-59		Khargaon 1	"	"
M-60		Sundargarh 1-12	"	"
M-61		Kopergaon	"	"
M-62		T-51	"	RPIP
M-63		K-11	"	"
M-64		D-45-6	"	"
M-65		D-2-15	" "	"
M-66	"	NP-18	"	"
M-67	"	NP-23	" "	"
M-68	"	RS-4	" "	"
M-69	"	RS-5	"	"
M-70	"	Hybrid 45	"	"
M-71	"	T-1	"	"
M-72	"	T-2	"	"
M-73	"	Pusa Baisakhi	"	(same as M-2, M-13)
M-74	"	ST-7	"	"
M-75	"	Kiloga	"	Okla. St. U.
M-76	"	Olila	"	"
M-77	"	Oaem 56 Comp 3	"	"
M-78	"	Jumbo	"	"
M-79	"	Texas Jumbo	"	"
M-80	"	Golden	"	"
M-81	"	EB 6	"	"
M-82	238,394	"	India	"
M-83	288,344-1	"	Burma	"
M-84	164,301	"	"	"
M-85	200,840	"	"	"
M-86	207,504	"	"	"
M-87	211,066	"	"	"
M-88	211,067	"	"	"
M-89	211,736	"	"	"
M-90	223,711	"	India	"
M-91	223,802	"	"	"

Table 1

Mo. Acc. No.	USDA PI No.	Name	Origin	Source
M-92	227,041			Okla. St. U. 143
M-93	227,247			" 144
M-94	227,248			" 145
M-95	"	OAEM 8-1		" 151
M-96	"	OAEM 55-79		" 75
M-97	"	Berken		" 339
M-98	"	OAEM 56-4		" 349
M-99	"	OAEM 59-6		" 660
M-100	167,356		Turkey	" 731
M-101	271,401		India	" 732
M-102	271,402		"	" 733
M-103	271,406	"	"	" 735
M-104	271,407	"	"	" 736
M-105	271,492	"	"	" 740
M-106	271,498	"		" 750
M-107	271,408	"	India	" 737
M-108	271,490	"	"	" 738
M-109		"	Peru	" 767
M-110	288,585	"		" 771
M-111	288,586	"		" 772
M-112	274,402	"		" 773
M-113		Lincoln		" 882
M-114	323,282	"		" 898
M-115	323,292	"		Okla St. U.
M-116	163,110	"	India	"
M-117	171,435	"	China	"
M-118	180,311	"	India	"
M-119	183,407		"	"
M-120	291,365	"		"
M-121		OAEM 58-62		"
M-122		OAEM 58-70		"
M-123	288,596			"
M-132		Khargaon	India	Orissa
M-133		Nean 15	"	"
M-134		No. 54	"	" (same as M-8)
M-135	31,080			USDA
M-136	31,281			"
M-137	31,287			"
M-138	31,288			"
M-139	31,289	"		"
M-140	31,290	"		"
M-141	31,291	"		"
M-142	31,293	"		"
M-143	31,321	"		"
M-144	31,322	"		"
M-145	31,323	"		"
M-146	31,324	"		"
M-147	31,325	"		"

Table 1

No. Acct. No.	USDA PI No.	Name	Origin	Source
M-148	31,332			USDA
M-149	31,343			"
M-150	31,344			"
M-151	31,345			"
M-152	31,569			"
M-153	31,616			"
M-154	31,633			"
M-155	31,710			"
M-156	31,728			"
M-157	140,043		Brazil	"
M-158	163,051		India	"
M-159	163,112		"	"
M-160	163,113		"	"
M-161	163,114		"	"
M-162	164,181		"	"
M-163	164,265		"	"
M-164	164,336		"	"
M-165	164,392		"	"
M-166	164,427		"	"
M-167	164,442		"	"
M-168	164,622		"	"
M-169	164,644		"	"
M-170	164,725		"	"
M-171	164,726		"	"
M-172	164,745		"	"
M-173	164,770		"	"
M-174	164,775		"	"
M-175	164,889		Guatemala	"
M-176	167,274		"	"
M-177	173,932		India	"
M-178	174,298		Turkey	"
M-179	174,887		India	"
M-180	175,241		"	"
M-181	177,493		Turkey	"
M-182	177,705		"	"
M-183	179,399		"	"
M-184	179,703		India	"
M-185	179,707		"	"
M-186	179,708		"	"
M-187	179,710		"	"
M-188	179,711		"	"
M-189	179,952		"	"
M-190	179,954		"	"
M-191	179,957		"	"
M-192	179,960		"	"
M-193	179,962		"	"
M-194	180,313		"	"
M-195	180,315		"	"
M-196	180,456		"	"

Table 1

Mo. Acc. No.	USDA PI No.	Name	Origin	Source
M-197	100,457		India	USDA
M-198	180,460		"	"
M-199	183,063		"	"
M-200	183,064		"	"
M-201	183,065		"	"
M-202	183,135		"	"
M-203	183,136		"	"
M-204	183,337		"	"
M-205	183,458		"	"
M-206	183,459		"	"
M-207	183,460		"	"
M-208	183,936		"	"
M-209	183,937		"	"
M-210	199,740		Philippines	"
M-211	201,866		Iran	"
M-212	201,867		Iran	"
M-213	201,868		"	"
M-214	201,869		"	"
M-215	201,870		"	"
M-216	201,871		"	"
M-217	201,872		"	"
M-218	201,873		"	"
M-219	201,874		"	"
M-220	205,137		India	"
M-221	207,655		Philippines	"
M-222	208,459		India	"
M-223	211,612		Afghanistan	"
M-224	211,613		"	"
M-225	211,614		"	"
M-226	211,615		"	"
M-227	211,735		"	"
M-228	211,737		"	"
M-229	212,109		"	"
M-230	212,319		"	"
M-231	212,614		"	"
M-232	212,907		India	"
M-233	212,908		"	"
M-234	213,012		"	"
M-235	213,015		"	"
M-236	214,062		"	"
M-237	214,063		"	"
M-238	214,334		"	"
M-239	214,335		"	"
M-240	215,650		"	"
M-241	217,953		Pakistan	"
M-242	217,954		"	"
M-243	217,955		"	"
M-244	217,956		"	"
M-245	217,957		"	"

Table 1

Mo. Acc. No.	USDA PI No.	Name	Origin	Source
M-246	218,103	"	Pakistan	USDA
M-247	219,613	"	"	"
M-248	219,699	"	"	"
M-249	220,108	"	Afghanistan	"
M-250	220,303	"	"	"
M-251	220,304	"	"	"
M-252	220,305	"	"	"
M-253	220,671	"	"	"
M-254	220,672	"	"	"
M-255	220,815	"	"	"
M-256	220,816	"	"	"
M-257	222,116	"	"	"
M-258	222,816	"	Iran	"
M-259	222,823	"	"	"
M-260	223,002	"	"	"
M-261	223,003	"	"	"
M-262	223,280	"	Afghanistan	"
M-263	223,281	"	"	"
M-264	223,282	"	"	"
M-265	223,522	"	"	"
M-266	223,523	"	"	"
M-267	223,710	"	India	"
M-268	226,520	"	Iran	"
M-269	226,657	"		"
M-270	226,658	"		"
M-271	227,754	"	Guatemala	"
M-272	228,291	"		"
M-273	229,707	"		"
M-274	229,708	"		"
M-275	237,114	"	India	"
M-276	237,115	"	"	"
M-277	246,130	"	Madgascar	"
M-278	251,033	"	Iran	"
M-279	251,034	"	"	"
M-280	251,035	"	"	"
M-281	251,036	"	"	"
M-282	253,724	"	Iraq	"
M-283	254,556	"	Afghanistan	"
M-284	254,557	"	"	"
M-285	254,558	"	"	"
M-286	254,559	"	"	"
M-287	255,825	"	"	"
M-288	256,073	"	"	"
M-289	256,074	"	"	"
M-290	264,686	"	Philippines	"
M-291	268,412	"	Afghanistan	"
M-292	268,413	"	"	"
M-293	269,521	"	Pakistan	"

Table 1

Mo. Acc. No.	PI No.	Name	Origin	Source
M-294	269,523		Pakistan	USDA
M-295	269,524		"	"
M-296	269,525		"	
M-297	271,403		India	
M-298	271,404		"	
M-299	271,405		"	
M-300	271,491		"	
M-301	271,493		"	
M-302	271,494		"	
M-303	271,495		"	
M-304	273,487		Korea	
M-305	274,305		Pakistan	
M-306	276,364		India	
M-307	276,365		"	
M-308	276,366		"	
M-309	276,370		"	
M-310	282,991		"	
M-311	286,297		Ivory Coast	
M-312	286,298		"	
M-313	288,824		India	
M-314	288,825		"	
M-315	298,911		China	
M-316	298,913		"	
M-317	298,915		"	
M-318	298,917		USA	
M-319	305,070		Thailand	
M-320	305,072		"	
M-321	305,073		"	
M-322	305,074		"	
M-323	305,075		"	
M-324	305,076		"	
M-325	305,077		"	
M-326	317,463		Afghanistan	
M-327	317,464		"	
M-328	317,465		"	
M-329		Jumbo	California	Stamper, Moberly

Table 2
General Observations on Mungbean Accessions

Grown at Columbia, Missouri, in 1970

Acc. No.	Growth Habit	Leaf Size	Pubes-cence	Flower Color	Pod Length	Pod Shape	Pod Color	Seed Color
M-1	SB	4.5	ML	LY	M	S	D	DG
M-2	SB	5.5	LM	LY	M	S	M	LG
M-3	SBR	6.5	LM	LY	M	S	D	LG
M-4	PR	7.3	MM	LY	L	S	D	LG
M-5	SD	4.5	MM	LY	M	S	D	LG
M-6	BR	6.5	TM	LY	M	S	D	LG
M-7	SD	3.0	TM	LY	M	S	M	DG
M-8	SBR	6.5	MM	LY	M	S	M	LG
M-9	SB	5.5	TM	LY	M	C	M	LG
M-10	SB	4.5	TM	LY				LG
M-11	ED	4.0	MS	LY	M	C	M	T
M-12	SB	6.5	LS	LY	L	S	M	LG
M-13	SR	6.5	LS	LY	M	S	L	LG
M-14	PR	7.8	TS	LY	L	S	M	LG
M-15	SB	7.5	MM	LY	L	C	D	LG
M-16	SD	2.5	TS	LY	M	C	M	LG
M-17	SB	4.0	TS	LY	M	C	M	DG
M-18	SB	4.0	TM	LY	M	C	M	LG
M-19	SB	5.5	MM	LY				LG
M-20	SB	4.5	MS	LY	M	C	M	LG
M-21	SB	3.0	TS	LY	M	S	M	DG
M-22	SB	5.0	TM	LY	M	C	M	LG
M-23	SD	4.0	TM	LY	M	S	M	DG
M-24	EB	3.5	MS	LY	M	C	M	DG
M-25	SB	4.5	MS	LY	M	C	M	LG
M-26	SBR	4.0	MS	LY				
M-27	SB	4.5	MM	LY	M	S	M	LG
M-28	SB	5.0	MM	LY	M	S	M	LG
M-29	ED	3.5	MS	LY	M	C	M	BL
M-30	SD	4.0	TS	LY	M	C	M	LG
M-31	SB	3.5	TM	LY	M	C	M	BL
M-32	ED	4.5	MM	LY	M	C	M	BL
M-33	AB	3.0	TM	LY	M	S	M	BRN-BL
M-34	SD	2.0	TS	LY	M	S	M	BRN
M-35	SD	4.5	LM	LY				LG
M-36	SB	4.5	MM	LY	M	C	M	BRC
M-37	SD	3.0	TS	LY	M	S	M	LG
M-38	SBV	4.5	TS	LY	M	S	D	LG
M-39	SB	4.5	TS	LY	M	S	M	LG
M-40	SB	5.5	TS	LY	M	S	M	LG
M-41	SBR	4.5	LS	LY	M	S	M	LG
M-42	SD	4.0	TM	LY	M	S	M	DG
M-43	SB	3.5	TM	LY				T
M-44	SB	4.0	MM					
M-45	SBD	3.0	MS	LY	M	S	M	DG
M-46	SBV	7.0	LM	LY	M	S	M	LG
M-47	SB	4.0	MM	LY	M	C	M	BRN

Table 2 (cont.)

Acc. No.	Growth Habit	Leaf Size	Pubes-cence	Flower Color	Pod Length	Pod Shape	Pod Color	Seed Color
M-48	SB	5.0	TM	LY				BL
M-49	SB	3.5	TS	LY				BL
M-50	SB	3.0	TS	LY	M	C	M	LG
M-51	SD	2.0	TS	LY	M	S	D	LG
M-52	EB	4.0	MS	LY	M	S	M	BRN-BL
M-53	SB	1.5	TS	LY				BRN
M-54	SBD	2.0	TM	LY				BRN
M-55	SB	5.5	TM	LY	M	S	M	DG
M-56	SB	5.0	MM	LY	M	S	M	LG
M-57	SB	5.0	MS	LY	M	S	M	BRN
M-58	SB	5.5	MM	LY	M	C	M	LG
M-59	ARV	7.75	MM	LY	L	C	D	LG
M-60	AV	7.5	MM	LY	M	S	M	LG
M-61	PR	7.5	LS	LY	L	C	M	LG
M-62	SR	7.0	MM	LY	L	S	D	LG
M-63	AB	6.0	MS	LY				
M-64	ARV	6.75	LM	LY	M	S	M	LG
M-65	ARV	7.0	MM	LY	M	S	M	LG
M-66	S	6.0	LM	LY	M	S	D	LG
M-67	AR	6.5	MM	LY	M	C	M	LG
M-68	SBV	7.0	TM	LY	M	C	D	LG
M-69	SBR	5.5	LS	LY	M	S	M	LG
M-70	SB	7.0	MM	LY	M	C	M	LG
M-71	SBD	6.0	MS	LY	L	S	M	LG
M-72	SB	7.0	MM	LY	M	S	M	DG
M-73	SB	6.5	LM	LY	M	S	M	LG
M-74	SD	3.0	TS	LY				
M-75	SB	6.5	MS	LY	L	S	M	LG
M-76	SB	7.0	LS	LY	M	S	M	LG
M-77	SR	8.0	MM	LY	L	C	M	LG
M-78	SB	7.25	TM	LY	L	S	D	LG
M-79	SB	7.0	MM	LY	L	S	D	LG
M-80	SB	5.0	MM	LY	M	S	M	LG
M-81	SRV	7.25	MM	LY	L	S	M	LG
M-82	SR	6.5	MM	LY	M	S	M	LG
M-83	SB	7.0	MM	LY	M	S	M	LG
M-84	SBR	6.5	LM	LY	M	S	D	LG
M-85	SB	6.0	MM	LY				
M-86	SRV	5.5	MM	LY	M	C	M	LG
M-87	SB	5.5	MM	LY				LG-BRN
M-88	SB	6.5	MM	LY				
M-89	SBV	5.5	MM	LY	M	S	M	LG
M-90	SRV	7.75	MM	LY	L	S	M	LG
M-91	SBV	5.5	MM	LY	M	S	M	G-BRN
M-92	SB	6.0	MM	LY				G-BRN
M-93	SBV	5.0	MS	LY	M	C	M	LG
M-94	SBV	6.5	MM	LY	M	S	M	LG
M-95	SB	6.0	LM	LY	ML	C	D	LG
M-96	S	6.0	TS	LY	M	C	D	LG
M-97	SB	7.25	MS		L	C	D	LG
M-98	Ed	6.5	MM	LY	L	C	D	LG

Table 2 (Cont.)

Acc. No.	Growth Habit	Leaf Size	Pubes-cence	Flower Color	Pod Length	Pod Shape	Pod Color	Seed Color
M-99	SR	6.5	MS	LY	M	C	D	LG
M-100	SR	6.5	MM	LY				LG
M-101	PRV	7.75	LM	LY	L	S	D	LG
M-102	SB	6.0	MM	LY	M	C	D	LG
M-103	SR	7.25	LS	LY	L	C	D	LG
M-104	SR	7.4	LL	LY	L	C	D	LG
M-105	BRV	6.5	MM	LY	L	S	D	LG
M-106	SR	6.0	TL	Y	S	S	D	BL
M-106	SR	6.0	TL	Y	S	S	D	BL
M-107	SR	7.0	MM	LY	ML	S	M	LG
M-108	BR	6.5	MM	LY	L	C	M	LG
M-109	SAV	7.2	MM	LY	ML	S	M	LG
M-110	SA	7.0	MM	LY	L	C	D	LG
M-111	S	7.0	MM	LY	M	S	M	DG
M-112	SB	5.5	MM	LY	M	C	M	LG
M-113	SR	7.0	MM	LY	L	C	M	LG
M-114	SB	6.5	MS	LY	M	C	M	LG
M-115	SR	6.5	LM	LY	M	C	M	LG
M-116	SR	6.5	MM	LY	M	C	M	DG
M-117	A	7.25	MM	LY	ML	C	D	LG
M-118	ARV	7.25	ML	LY	L	C	D	LG
M-119	SRV	7.1	LS	LY	L	S	D	LG
M-120	AR	7.0	LS	LY	L	C	D	LG
M-121	SR	6.0	LS	LY	M	S	M	LG
M-122	AR	5.5	MS	LY	ML	S	M	LG
M-123	SB	5.5	MS	LY	M	C	M	LG
M-132	RV	7.0	LM	LY	L	S	D	LG
M-133	SBV	4.5	TS	LY	M	C	M	DG
M-134	SB	6.0	ML	LY	M	C	M	LG
M-135	AV	7.0	MS	LY	M	S	M	LG
M-136	SB	6.0	LS	LY	M	C	D	LG
M-137	SBV	7.15	LM	LY	M	C	M	LG
M-138	SBV	7.0	MS	LY	L	C	D	LG
M-139	SRV	6.5	MM	LY	M	C	D	LG
M-140	AV	7.0	MM	LY	M	C	M	LG
M-141	SRV	7.0	LS	LY	M	C	M	LG
M-142	AV	7.15	LS	LY	ML	S	D	LG
M-143	SR	7.5	LS	LY	ML	S	D	LG
M-144	SBV	6.0	LS	LY	ML	C	M	LG
M-145	SR	6.0	MS	LY	M	S	D	LG
M-146	SR	6.75	MS	LY	M	C	D	LG
M-147	SR	7.25	LS	LY	ML	C	D	LG
M-148	SRV	6.5	LS	LY	M	C	D	LG
M-149	SR	6.5	LS	LY	ML	C	D	LG
M-150	SR	7.0	MS	LY	ML	S	D	LG
M-151	SR	6.5	MS	LY	ML	S	M	LG
M-152	SR	6.5	LS	LY	L	S	D	LG
M-153	SRV	7.5	LM	LY	M	S	D	LG
M-154	SR	6.6	MM	LY	M	S	M	LG

Table 2 (Cont.)

Acc. No.	Growth Habit	Leaf Size	Pubes-cence	Flower Color	Pod Length	Pod Shape	Pod Color	Seed Color
M-155	SR	7.25	MM	LY	L	S	D	LG
M-156	SR	7.0	MS	LY	ML	S	D	LG
M-157	SR	7.0	LS	LY	L	S	D	DG
M-158	SB	6.5	TM	LY				
M-159	SB	6.0	MS	LY	M	S	D	LG
M-160	SBR	7.0	MM	LY				LG
M-161	SBR	6.0	TM	LY	M	C	M	LG
M-162	SBD	4.0	TS	LY				LG
M-163	SBD	6.5	TM	LY				
M-164	SRV	7.15	MM	LY	L	C	D	LG
M-165	SB	7.15	TM	LY	M	S	M	LG
M-166	SR	6.5	MM	LY	L	C	L	LG
M-167	SB	6.0	TM	LY	M	S	M	LG
M-168	SB	5.5	TS	LY				
M-169	SB	5.5	TS	LY	MS	S	M	LG
M-170	SR	6.75	MM	LY	M	S	D	LG
M-171	SB	5.5	MM	LY	M	S	D	LG
M-172	SB	7.0	MM	LY	L	C	M	LG
M-173	SB	6.0	MM	LY	M	S	M	LG
M-174	SRV	7.5	MM	LY	L	S	M	LG
M-175	BRV	6.0	MM	LY	M	S	M	LG
M-176	ARV	7.0	MM	LY				
M-177	ARV	7.0	MM	LY	M	C	M	LG
M-178	SR	6.0	TM	LY	M	S	M	BRN
M-179	SB	6.5	MM	LY	M	C	M	LG
M-180	SB	7.0	TM	LY				
M-181	SB	7.0	TM	LY	M	S	D	LG
M-182	SB	6.5	MS	LY	M	C	M	DG
M-183	SB	6.5	MM	LY	M	C	M	LG
M-184	SB	5.0	TM	LY				LG
M-185	AR	6.0	MM	LY	L	S	M	LG
M-186	SBR	7.25	MM	LY	M	S	D	LG
M-187	ARV	6.5	TL	LY	M	C	M	LG
M-188	BR	6.0	MM	Y	MS	S	D	BRN-BL
M-189	BR	7.25	ML	LY	M	C	M	LG
M-190	SR	6.0	MM	LY	L	S	D	LG
M-191	SB	6.0	MM	LY	M	S	M	LG
M-192	SB	7.2	MS	LY	M	S	M	LG
M-193	SB	7.4	LM	LY	L	C	D	LG
M-194	SRV	7.7	MM	LY	M	S	D	LG
M-195	SRV	8.0	MM	LY	L	S	D	LG
M-196	SBR	6.5	TM	LY	M	C	M	LG
M-197	SB	5.5	MS	LY	M	S	M	LG
M-198	SBR	7.5	MM	LY	M	S	M	LG
M-199	SBR	7.0	MM	LY	M	S	M	LG
M-200	SB	6.0	MM	LY	M	S	M	LG
M-201	SB	6.0	MM	LY	M	S	D	T
M-202	SRV	7.25	LM	LY	M	S	M	DG
M-203	SBR	7.6	MM	LY	ML	S	M	LG
M-204	SB	6.2	TL	LY	M	S	D	LG

Table 2 (Cont.)

Acc. No.	Growth Habit	Leaf Size	Pubes-cence	Flower Color	Pod Length	Pod Shape	Pod Color	Seed Color
M-205	SR	7.0	LM	LY	L	C	D	LG
M-206	SRV	7.6	LM	LY	M	S	D	LG
M-207	SB	6.5	MM	LY	M	S	D	LG
M-208	SB	6.5	MM	LY	M	S	D	LG
M-209	SB	6.0	TL	LY	M	C	M	LG
M-210	SB	7.0	ML	LY	M	S	M	
M-211	SBV	7.0	MM	LY	M	C	M	LG
M-212	SB	7.0	MS	LY	M	S	D	LG
M-213	SB	6.5	TM	LY	M	S	M	LG
M-214	SRV	7.75	LM	LY	L	C	D	LG
M-215	SRV	5.5	MM	LY	L	C	M	LG
M-216	SBV	5.5	MM	LY	M	S	M	T
M-217	SBR	6.0	MM	LY	M	S	D	LG
M-218	SBV	5.5	MM	LY	M	C	M	LG
M-219	SRR	7.2	MM	LY	L	C	D	LG
M-220	SB	6.0	TS					
M-221	EB	7.0	LS					
M-222	SBR	6.5	MM	LY	M	C	M	LG
M-223	SB	5.0	MS	LY	M	S	M	LG
M-224	SB	5.5	TM	LY	S	S	M	LG
M-225	SBR	5.0	MS	LY	M	S	D	LG
M-226	SBR	5.5	MM	LY				LG
M-227	AV	5.5	TM	LY	M	S	M	LG
M-228	SBR	5.0	MS	LY	MS	S	M	LG
M-229	SB	5.5	MM	LY				LG
M-230	SBR	5.5	ML	LY	M	S	D	LG
M-231	SBR	6.0	MM	LY	M	S	M	DG
M-232	ARV	7.75	TS	LY				LG
M-233	SRV	7.75	MM	LY	D	S	M	LG
M-234	SR	7.0	MM	LY	L	S	M	T
M-235	SRV	7.5	MM	LY	L	S	M	LG
M-236	SB	4.5	TM	LY	M	S	M	LG
M-237	SB	6.0	LS	LY	M	C	D	LG
M-238	SRV	7.75	MM	LY	L	S	M	LG
M-239	ARV	6.5	MM	LY	M	S	M	LG
M-240	SB	6.0	MM	LY				LG
M-241	SR	7.0	TS	LY				LG
M-242	SR	6.0	MS	LY				LG
M-243	SR	4.5	TS	LY				BRN
M-244	SR	6.5	TM	LY				LG
M-245	SR	6.5	MS	LY	M	S	M	LG
M-246	AR	6.0	MM	LY	M	S	D	BL-BRN
M-247	SB	5.0	MM	LY				DG
M-248	SR	6.5	MS	LY	M	C	D	LG
M-249	SB	5.5	MM		M	S	M	LG
M-250	SBV	6.0	MM	LY	L	S	M	LG
M-251	SBV	5.0	TM	LY	M	C	M	LG
M-252	SBV	6.0	MM	LY	M	S	M	LG
M-253	SBR	5.5	MM	LY	M	S	D	LG
M-254	SBR	6.5	MM	LY	M	S	M	LG

Table 2 (Cont.)

Acc. No.	Growth Habit	Leaf Size	Pubes-cence	Flower Color	Pod Length	Pod Shape	Pod Color	Seed Color
M-255	SB	4.5	MM	LY	M	S	M	LG
M-256	SBV	6.0	MS	LY	M	S	M	LG
M-257	SBV	5.5	MS	LY	M	S	M	LG
M-258	SB	7.0	MM	LY	M	C	M	DG
M-259	SBV	6.0	MM	LY	M	C	M	DG
M-260	SBR	6.0	TM		M	C	M	LG
M-261	SB	6.5	MM	LY	M	S	D	LG
M-262	SB	5.5	TM	LY	S	C	D	LG
M-263	SBV	6.0	MM	LY	M	C	M	LG
M-264	SBV	5.5	MM	LY	M	S	M	LG
M-265	EBD	3.5	MS	LY	M	S	M	LG
M-266	SBV	6.0	MM	LY	M	S	M	LG
M-267	SB	6.0	TM	LY				BL
M-268	SB	6.0	TM	LY	M	C	M	LG
M-269	SB	5.0	MM	LY				LG
M-270	SB	6.0	TM	LY				DG
M-271	AR	6.0	TS	LY	M	S	D	LG
M-272	SB	5.5	MM	LY	M	S	M	LG
M-273	SBV	6.0	MS	LY	M	S	M	LG
M-274	SB	6.5	MM	LY	ML	C	M	LG
M-275	AR	3.5	TS	LY	M	S	M	DG
M-276	SB	6.5	MM	LY	M	C	M	LG
M-277	EB	7.1	MM	LY	ML	S	M	LG
M-278	SB	5.5	MM	LY				BRN
M-279	SB	6.0	MM	LY	S	C	M	LG
M-280	SBV	5.0	MM	LY	M	C	D	LG
M-281	SBV	6.5	MM	LY	M	C	M	LG
M-282	SBV	4.5	MM	LY	M	C	M	LG
M-283	SBV	6.0	MM	LY	M	S	M	LG
M-284	SB	5.0	MS	LY	M	S	M	LG
M-285	SBV	6.0	MM	LY	MS	S	M	LG
M-286	SBV	5.5	MM	LY	M	S	M	LG
M-287	SBV	6.0	TL	LY	M	S	M	LG
M-288	SBR	5.0	MM	LY	MS	S	M	LG
M-289	SBV	4.5	MM	LY	M	C	M	LG
M-290	SR	6.0	LM	LY	ML	C	M	LG
M-291	SBV	6.0	MM	LY	M	S	D	LG
M-292	SBR	5.5	MM	LY	MS	S	D	LG
M-293	SR	7.0	MM	LY	M	C	M	LG
M-294	SB	6.5	MS	LY	M	C	M	LG
M-295	SBR	6.5	MM	LY				BL
M-296	SB	6.5	MM	LY	M	S	M	LG
M-297	SBD	6.0	LM	LY	M	S	M	LG
M-298	SB	5.0	MS	LY	M	C	M	DG
M-299	EB	5.0	LS	LY	M	C	M	LG
M-300	SB	7.2	MM	LY	L	S	D	LG
M-301	SB	6.5	TM	LY				LG
M-302	SBR	6.5	MM	LY	M	C	M	LG
M-303	SBR	5.0	TM	LY	M	C	M	LG
M-304	EB	6.5	LM	LY	L	S	D	LG

Table 2 (Cont.)

Acc. No.	Growth Habit	Leaf Size	Pubes-cence	Flower Color	Pod Length	Pod Shape	Pod Color	Seed Color
M-305	SBR	7.0	MM	LY	M	S	M	LG
M-306	SB	6.5	MS	LY	M	S	D	LG
M-307	SB	7.0	MM	LY	M	S	M	LG
M-308	SBV	7.0	MM	LY	M	C	M	LG
M-309	SBD	5.5	MS	LY	M	C	D	DG
M-310	ARV	7.5	MM	LY	M	S	M	LG
M-311	SR	7.0	LM	LY	M	C	D	LG
M-312	SRV	7.0	LM	LY	M	S	D	LG
M-313	AR	6.5	MM	LY	M	C	D	LG
M-314	SB	7.0	MM	LY	M	S	M	LG
M-315	E	6.0	MS	LY	M	S	D	[illegible]
M-316	ED	5.0	TS	LY	L	C	M	DG
M-317	SB	7.15	MM	LY	L	S	L	LG
M-318	SB	7.15	MM	LY	ML	S	M	LG
M-319	SB	6.5	MM					
M-320	SBV	7.0	TM					
M-321	AB	4.5	TM	LY	S	S	D	DBRN
M-322	E	6.0	TM	P				
M-323	S	6.0	MM	LY	L	S	L	LG
M-324	EB	5.5	N	P	L	C	L	R
M-325	S	8.0	MM					
M-326	SBV	5.5	MM	LY	MS	S	M	BRN
M-327	SBR	3.5	MM	LY	M	S	M	LG
M-328	SBR	5.5	TM	LY	M	S	M	DG
M-329	SB	6.5	MM	LY	ML	C	D	LG

Table 3
Agronomic Data on Mungbean Accessions

Grown at Columbia, Missouri, in 1970

Acc. No.	Yield Kg/Ha	Days to Flower	Days to Ripe	Hgt. cm.	Branch Length cm.	Pods/ Plant	Seeds/ Pod	1000 Seed gms.	Virus Score	Mil-dew Score	Pro-tein %	Lysine % of Pro-tein	Methi-onine % of Pro-tein
M-1	958	79	102	55	50	146	13	20	10	3.5	24.2	6.8	1.16
M-2	853	49	66	37	33	89	13	35	0	4.5	27.7	6.9	1.01
M-3	1393	49	65	85	77	111	12	35	50	5.0	21.6	7.0	1.25
M-4	1421	52	73	48	64	97	13	50	0	3.0	27.4	7.2	1.02
M-5	95	63	84	31	24	28	11	20	40	4.0	25.0	7.2	1.28
M-6	1030	67	88	92	76	81	13	20	50	3.3	22.1	7.3	1.22
M-7	100	61	83	34	43	62	11	20	0	4.5	25.0	7.0	1.02
M-8	984	74	98	83	72	110	13	20	50	4.5	25.5	6.9	1.53
M-9	722	79	102	77	70	72	10	20	50	3.5	22.0	7.6	1.41
M-10	798	80	101	50	42	32		40	80	3.0	22.3	7.2	1.35
M-11	145	50	67	26	17	39	8	20	50	4.0	22.7	7.1	1.50
M-12	1188	44	62	39	35	103	13	30	10	5.0	24.7	7.7	1.09
M-13	870	47	68	35	34	75	12	30	0	5.0	26.3	7.3	1.22
M-14	1897	63	83	59	55	134	11	45	35	3.0	23.5	7.3	1.45
M-15	959	54	76	61	43	36	11	50	20	4.5	21.9	7.2	1.16
M-16	86	57	79	29	24	37	12	15	0	4.0	25.2	7.4	1.59
M-17	397	60	81	45	31	50	12	25	50	4.0	25.4	7.6	1.14
M-18	253	67	86	42	38	44	11	20	20	4.5	26.2	7.6	1.11
M-19	11	114		50	42			15	50	2.5	23.1	6.8	
M-20	304	69	89	48	41	85	10	20	50	3.5	25.5	7.8	.82
M-21	39	62	83	31	23	18	9	35	90	4.0	25.7	7.0	1.32
M-22	293	67	89	42	37	92	10	20	50	4.0	25.3	7.2	1.11
M-23	62	73	95	26	20	63	11	20	70	4.0	25.2	7.0	1.35
M-24	210	64	81	40	31	39	8	15	40	4.0	25.7	7.0	1.32
M-25	961	56	78	52	44	74	11	20	0	4.5	28.0	6.9	1.25
M-26	144	66	88	30	24	31	8	20	50	4.0	24.0	7.2	1.33
M-27	218	63	84	47	29	36	10	20	30	4.5	20.4	7.7	1.08
M-28	508	64	102	57	44	77	11	23	10	3.5	22.3	7.8	1.39
M-29	86	64	81	24	18	24	12	15	60	4.0	25.7	7.9	1.21
M-30	98	60	84	24	20	49	11	15	50	4.0	24.2	7.2	1.24
M-31	248	59	80	37	29	80	8	20	50	4.5	24.7	7.0	1.26
M-32	27	69	91	23	32	26	11	20	50	4.5	26.2	7.1	1.34
M-33	77	61	78	63	50	29	12	20	40	4.0	22.8	7.5	1.40
M-34	11	67	84	19	15	11	10	20	10	4.5	26.9	7.1	1.26
M-35	222	58	99	26	19	49	9	20	10	4.0	23.3	7.4	1.42
M-36	300	55	82	55	55	44	12	25	50	5.0	27.5	7.1	1.05
M-37	148	57	78	24	16	107	10	20	50	4.0	24.7	7.1	1.17
M-38	345	59	88	44	37	43	11	18	20	4.0	23.0	7.8	1.61
M-39	280	72	95	52	45	72	11	18	0	3.5	23.0	7.3	.90
M-40	332	62	81	45	41	90	11	23	90	4.0	25.2	7.8	1.39
M-41	299	52	75	50	47	24	9	20	50	4.5	21.3	7.0	1.17
M-42	156	70	89	39	31	28	11	25	40	4.0	24.2	7.2	1.20
M-43	41	63	06	37	27	7		25	50	4.0	21.6	7.1	1.25

Table 3 (Cont.)

Acc. No.	Yield KG/HA	Days to Flower	Days to Ripe	Hgt. cm.	Branch Length cm.	Pods/ Plant	Seeds/ Pod	1000 Seed gms.	Virus Score	Mil-dew Score	Protein %	Lysine % of Protein	Methio. % of Protein
M-44	59	113		46	43				100	3.0	26.0	7.2	1.19
M-45	100	64	81	27	15	57	11	20	90	4.5	26.4	7.4	.95
M-46	1679	53	77	90	71	43	11	30	40	4.5	22.0	7.6	1.14
M-47	187	67	90	42	36	43	10	15	50	4.0	26.7	6.3	1.24
M-48	83	74	97	52	40	39		15	0	4.0	24.7	7.1	1.30
M-49	56	83	108	37	28	16		20	100	4.0			
M-50	135	63	84	37	30	55	10	15	50	4.0	25.2	7.4	1.39
M-51	31	56	78	38	32	57	10	15	10	4.5	25.5	6.6	1.22
M-52	83	72	92	33	15	39	12	15	50	4.0	23.1	7.5	1.30
M-53	11	73	96	29	21	7		20	90	4.0	24.8	7.1	1.25
M-54	162	63	93	22	24	76		20	50	4.0	24.0	7.3	1.33
M-55	501	68	90	50	42	87	11	20	50	4.0	23.0	7.4	1.35
M-56	191	76	96	44	29	48	11	15	20	4.0	24.0	7.2	1.25
M-57	418	60	82	50	47	96	11	20	40	4.0	23.3	6.8	1.07
M-58	528	56	77	45	31	44	10	20	0	4.0	24.0	7.1	1.29
M-59	1728	53	71	86	77	127	13	45	35	3.0	21.9	6.7	1.37
M-60	805	56	78	78	55	96	12	30	30	4.5	24.4	6.9	1.19
M-61	1979	51	71	70	65	77	11	40	0	4.5	27.4	6.6	1.35
M-62	1046	49	71	47	38	61	13	30	10	5.0	25.8	6.7	1.36
M-63	357	52	73	63	53	17			0	5.0	25.8	7.0	1.32
M-64	985	59	81	75	70	63	5	31	50	3.5	23.5	7.1	1.28
M-65	1170	62	84	84	70	113	12	35	50	3.5	25.5	6.4	1.25
M-66	588	51	72	40	33	80	9	20	0	5.0	20.1	7.4	1.34
M-67	660	53	74	73	60	73	12	25	50	5.1	28.0	6.7	1.14
M-68	460	70	84	75	67	187	12	30	40	3.0	23.3	7.5	1.42
M-69	1312	58	79	87	72	88	12	25	40	4.5	27.2	7.2	1.32
M-70	662	55	77	44	37	81	12	28	10	4.0	20.9	7.6	1.15
M-71	868	47	66	32	25	63	10	35	0	5.0	23.5	7.1	1.32
M-72	808	50	70	57	48	77	10	25	50	4.5	27.7	6.8	1.01
M-73	804	45	64	43	38	53	12	30	10	4.5	24.7	7.0	1.21
M-74		91	115	30	28				100	5.0			
M-75	1157	50	70	49	54	61	12	43	10	5.0	27.0	7.1	.89
M-76	1636	49	70	43	42	49	13	35	0	4.5	22.8	7.1	1.02
M-77	597	55	76	48	49	36	13	43	50	3.0	23.4	7.4	1.00
M-78	539	57	80	39	31	49	13	53	50	4.0	23.1	7.3	1.19
M-79	976	56	77	63	57	45	14	40	60	5.0	25.5	7.2	1.10
M-80	254	81	106	49	46	10	8	10	100	3.0	26.0	7.0	1.23
M-81	1465	53	74	65	74	57	12	58	0	3.5	26.0	7.3	.92
M-82	923	56	78	72	74	22	11	25	50	4.5	24.5	7.2	1.12
M-83	490	57	78	60	63	71	11	25	60	5.0	24.5	7.3	1.07
M-84	962	53	73	53	52	55	12	30	50	4.5	26.7	7.1	1.35
M-85	163	75	98	61	52	8			100	3.5	25.0	7.4	1.36
M-86	470	49	70	55	50	62	11	30	50	4.5	25.3	7.3	.95
M-87	607	77	98	68	64	54		30	100	4.0	26.2	7.1	1.22
M-88	329	84	108	53	50	38		20	70	3.0	23.1	7.1	1.47
M-89	585	78	99	59	56	94	12	18	50	4.0	25.3	6.5	1.23
M-90	2124	55	79	85	90	114	11	60	0	3.0	24.5	7.6	.96
M-91	1699	76	98	88	59	133	12	35	50	4.0	25.3	7.4	1.38

Table 3 (Cont.)

Acc. No.	Yield KG/HA	Days to Flower	Days to Ripe	Hgt. cm.	Branch Length cm.	Pods/ Plant	Seeds/ Pod	1000 Seed gms.	Virus Score	Mil-dew Score	Pro-tein %	Lysine % of Pro-tein	Methio. % of Pro-tein
M-92	176	67	91	61	57	32		25	100	4.0	23.5	7.3	1.36
M-93	269	77	98	60	59	55	13	20	90	4.0	25.1	7.1	1.27
M-94	562	64	94	82	68	11	13	25	100	4.0	24.3	7.4	.98
M-95	1638	53	79	57	47	84	14	33	0	3.5	22.1	7.3	1.09
M-96	509	55	78	40	27	29	12	45	50	5.0	25.1	6.9	.91
M-97	937	51	72	57	54	41	11	58	80	4.5	25.0	7.2	.89
M-98	406	64	87	32	23	29	14	53	10	3.5	23.9	7.2	.92
M-99	1752	48	69	45	40	67	11	38	0	5.0	25.7	7.2	.86
M-100	760	76	99	77	59	66		20	20	3.5	22.1	7.4	1.22
M-101	1813	52	72	38	43	57	12	75	0	2.5	22.5	6.7	1.24
M-102	480	46	61	48	32	74	11	30	60	4.5	26.0	7.3	1.15
M-103	1445	55	75	63	53	44	14	40	10	5.0	22.6	7.3	.95
M-104	1279	56	77	64	48	38	13	45	50	4.5	26.3	6.7	1.52
M-105	1135	54	74	56	43	55	15	40	30	3.5	23.0	6.8	1.04
M-106	1234	56	86	62	56	82	6	30	100	3.5	25.7	7.0	1.42
M-107	821	55	75	65	57	80	11	50	10	4.5	20.2	7.2	.94
M-108	1129	55	77	53	50	40	13	50	50	5.0	22.5	7.3	1.29
M-109	1758	55	78	77	71	79	13	40	10	2.5	22.3	7.4	.89
M-110	1655	55	75	73	61	41	14	45	0	4.5	24.2	7.2	.86
M-111	1611	59	85	58	50	135	10	30	30	3.5	23.6	7.3	.94
M-112	211	61	84	58	50	51	11	25	100	4.5	28.3	6.5	1.38
M-113	877	56	77	54	45	40	12	40	50	4.5	25.7	7.4	.89
M-114	632	56	78	58	51	50	11	25	50	4.5	24.8	7.2	1.09
M-115	1115	50	71	64	58	39	12	28	10	5.0	25.2	6.9	1.12
M-116	975	53	75	54	46	109	11	35	50	4.5	25.2	6.9	1.23
M-117	1433	50	71	59	49	100	13	43	40	4.5	22.8	6.8	1.23
M-118	2708	55	76	72	60	104	15	45	5	2.0	24.2	7.3	1.24
M-119	799	50	71	60	51	33	11	45	0	5.0	27.5	6.9	.81
M-120	1568	43	64	49	39	60	12	63	50	4.5	24.3	6.9	.98
M-121	1801	49	69	42	39	85	11	40	10	4.0	23.8	6.9	1.06
M-122	1289	49	69	44	42	97	12	38	0	4.5	23.1	7.2	.97
M-123	462	59	80	56	59	27	11	25	60	4.5	25.7	7.2	.91
M-132	652	56	76	58	56	135	13	55	80	4.0	24.0	7.2	1.46
M-133	95	61	86	46	32	63	10	15	30	4.5	26.5	7.2	1.13
M-134	540	56	80	61	51	74	12	25	60	3.5	23.3	7.3	1.33
M-135	1326	49	68	52	47	59	12	38	0	4.0	23.5	6.9	1.04
M-136	1138	51	72	56	42	87	12	33	0	3.5	23.8	7.1	1.22
M-137	1539	49	70	44	48	67	12	33	0	3.5	23.6	7.3	1.11
M-138	1682	51	72	57	49	51	12	45	0	4.0	22.5	7.1	.98
M-139	1094	50	71	56	60	125	13	40	0	4.0	23.7	7.3	1.05
M-140	1993	49	72	50	49	91	12	40	0	3.5	23.6	7.4	1.06
M-141	988	50	70	40	46	79	12	38	20	3.5	24.5	7.2	.94
M-142	986	53	74	66	55	62	14	40	0	4.0	23.3	7.5	1.09
M-143	1110	59	79	72	72	54	12	40	0	4.5	25.5	7.5	.91
M-144	1569	51	72	47	41	63	12	40	0	4.5	24.2	7.5	1.05
M-145	807	55	74	58	53	69	12	43	0	5.0	25.3	7.5	.92
M-146	1410	52	73	63	59	42	12	38	10	5.0	24.3	7.3	.98
M-147	1054	52	72	67	57	44	12	40	0	5.0	23.6	7.4	1.17

Table 3 (Cont.)

Acc. No.	Yield KG/HA	Days to Flower	Days to Ripe	Hgt. cm.	Branch Length cm.	Pods/ Plant	Seeds/ Pod	1000 Seed gms.	Virus Score	Mil-dew Score	Protein %	Lysine % of Protein	Methio. % of Protein
M-148	2009	50	71	43	36	74	12	35	0	5.0	23.8	7.4	1.12
M-149	1281	51	71	68	63	54	12	43	10	5.0	26.4	7.3	.91
M-150	1245	54	75	66	68	32	12	38	0	5.0	24.7	7.7	1.07
M-151	1775	48	67	59	55	46	12	35	0	4.0	23.4	7.6	.87
M-152	1093	46	66	36	33	62	13	38	0	5.0	24.5	7.6	1.10
M-153	1367	51	69	64	57	47	12	48	0	5.0	24.4	7.6	1.07
M-154	878	55	75	63	50	41	12	40	0	5.0	25.5	7.3	1.01
M-155	1125	53	73	58	54	38	13	48	0	5.0	25.7	7.4	.96
M-156	1003	51	71	65	56	37	12	45	10	5.0	24.2	7.1	.91
M-157	1531	52	72	59	60	38	12	40	30	5.0	21.3	7.4	1.27
M-158	366	81	104	52	47	36			10	2.5	22.1	7.3	1.36
M-159	941	57	80	58	59	78	10	25	50	4.0	23.6	7.4	1.27
M-160	513	81	104	88	64	58		20	30	3.5	22.0	7.5	1.14
M-161	882	81	104	92	77	108	11	25	0	3.0	23.1	7.0	1.30
M-162	194	82	106	28	19	18		15	50	3.0	22.0	7.5	1.32
M-163	.	84	107	41	32	2			100	2.5			
M-164	1225	49	70	58	46	72	14	30	50	5.0	23.1	7.2	1.69
M-165	424	78	100	82	72	59	12	23	10	2.5	23.0	7.2	1.22
M-166	1236	53	74	68	54	108	10	40	40	4.0	25.8	7.1	1.32
M-167	119	80	103	59	53	18	10	20	60	2.5	23.8	7.1	1.30
M-168	19	70	.	36	32	26			100	3.0	21.6	7.5	1.76
M-169	198	59	83	44	34	59	10	20	40	4.0	23.3	7.4	1.37
M-170	1097	53	74	32	39	99	13	30	0	4.0	22.1	7.3	1.12
M-171	445	48	69	54	45	77	12	30	50	4.0	25.5	6.8	1.07
M-172	1279	50	70	52	42	95	11	35	50	4.5	25.2	6.9	1.27
M-173	1029	47	69	57	63	89	10	25	0	4.5	24.7	7.2	1.38
M-174	2365	60	79	78	85	57	12	60	0	3.5	22.8	7.4	1.40
M-175	1865	58	71	53	45	67	11	30	45	4.5	25.6	6.7	.84
M-176	1263	81	106	78	63	238		25	20	2.5	21.3	7.2	1.31
M-177	1221	57	79	78	67	101	10	15	40	4.0	21.8	7.1	1.06
M-178	817	53	72	50	45	96	11	30	30	4.0	27.2	7.1	1.29
M-179	302	78	99	72	56	91	11	20	70	3.5	21.6	7.5	1.57
M-180	155	82	106	57	48	46		30	80	3.0	23.5	7.3	1.28
M-181	659	75	89	66	51	88	9	25	50	3.5	22.5	7.2	1.24
M-182	464	59	79	58	42	40	10	30	50	4.5	26.3	7.3	1.29
M-183	1306	61	79	63	52	119	11	55	30	4.0	21.5	7.1	1.16
M-184	233	60	83	43	36	48		25	90	3.0	23.1	7.4	1.30
M-185	959	58	88	97	90	12	12	30	50	3.5	23.8	7.4	1.34
M-186	721	66	88	80	66	67	10	20	50	4.0	23.0	7.1	1.30
M-187	961	56	78	75	60	123	10	25	10	4.0	24.5	7.1	1.14
M-188	666	62	101	62	42	104	6	30	50	2.5	23.2	7.2	1.38
M-189	782	64	84	68	62	75	12	30	60	4.5	22.3	7.4	1.30
M-190	883	50	73	77	61	60	12	40	50	4.5	22.1	7.2	1.27
M-191	479	65	88	73	70	67	12	25	20	4.5	26.5	7.1	1.43
M-192	482	67	89	69	44	51	11	25	50	3.5	25.3	7.2	1.50
M-193	1421	52	73	60	58	32	13	35	20	5.0	24.8	7.1	1.21
M-194	2397	56	79	78	89	68	13	30	5	3.0	25.7	7.4	1.13
M-195	1835	65	87	68	65	130	12	50	40	3.5	24.7	7.1	1.26

Table 3 (Cont.)

Acc. No.	Yield KG/HA	Days to Flower	Days to Ripe	Hgt. cm.	Branch Length cm.	Pods/ Plant	Seeds/ Pod	1000 Seed gms.	Virus Score	Mil-dew Score	Pro-tein %	Lysine % of Pro-tein	Methio. % of Pro-tein
M-196	450	65	89	75	65	72	14	20	40	3.5	24.7	7.4	1.05
M-197	634	76	96	56	51	29	9	10	90	3.0	21.9	7.4	1.05
M-198	1403	52	72	57	54	79	13	30	30	5.0	23.6	7.3	1.02
M-199	1009	56	77	65	57	43	11	35	10	5.0	23.0	7.5	1.22
M-200	273	70	96	71	68	64	11	23	60	3.5	21.6	7.1	1.30
M-201	229	61	80	43	39	73	9	20	50	4.0	25.2	7.1	.98
M-202	1250	48	69	59	56	114	11	30	40	4.0	23.4	6.8	1.37
M-203	2526	59	78	80	70	90	12	45	0	3.0	19.1	7.0	1.21
M-204	346	78	99	65	55	132	12	25	40	3.5	23.3	7.0	1.24
M-205	1542	51	72	64	59	80	14	45	30	4.5	22.5	7.1	1.11
M-206	1867	60	79	75	75	73	13	30	20	3.0	22.8	7.2	1.01
M-207	270	76	100	65	55	51	10	30	50	3.0	23.5	6.9	.89
M-208	663	46	63	41	29	113	13	25	50	4.5	24.0	7.5	1.38
M-209	58	79	105	48	39	14	11	20	80	3.0	26.2	7.2	1.22
M-210	185	73	95	67	49	9	9	28	40	2.0	22.1	7.3	1.54
M-211	594	80	102	74	54	96	11	30	50	4.0	22.5	7.5	1.24
M-212	1425	52	71	57	45	34	12	25	30	5.0	25.9	7.1	1.47
M-213	795	79	101	58	53	168	13	25	60	3.0	22.8	7.5	1.23
M-214	1933	50	73	69	66	70	14	60	50	4.0	23.8	7.1	1.05
M-215	1409	77	99	82	83	127	12	25	50	4.0	23.1	7.4	1.04
M-216	167	62	84	58	52	56	11	15	10	4.0	24.2	6.8	1.40
M-217	859	69	92	76	72	90	12	15	50	3.5	23.8	7.6	1.43
M-218	313	74	94	52	34	164	11	20	60	3.5	24.8	6.9	1.09
M-219	1471	52	72	70	55	55	12	30	50	5.0	26.9	7.1	.82
M-220				45	35				80	4.0			
M-221				58	34				0	1.0			
M-222	610	65	86	84	76	127	12	20	30	4.0	24.0	7.0	1.38
M-223	321	72	95	53	55	68	9	20	40	4.5	23.5	7.2	1.23
M-224	438	77	99	46	39	58	7	25	20	4.0	23.5	7.3	1.11
M-225	254	80	102	52	46	62	13	30	80	4.0	24.8	7.3	1.17
M-226	657	74	95	60	51	81		35	30	4.5	24.5	7.1	1.14
M-227	217	78	100	61	60	35	9	25	40	4.5	22.1	7.1	1.63
M-228	392	75	97	51	46	107	10	25	50	4.5	26.9	7.0	1.15
M-229	172	76	98	45	44	57		25	10	4.0	22.5	6.9	1.33
M-230	911	70	91	64	49	113	12	25	40	4.5	24.4	7.2	1.13
M-231	501	56	76	54	54	76	12	20	20	4.0	23.5	7.1	.91
M-232	2209	53	74	65	57	88	13	40	0	3.5	20.8	6.9	1.49
M-233	1791	59	80	88	75	72	12	45	5	3.0	22.6	7.2	1.24
M-234	1006	56	69	55	48	26	12	30	0	4.5	23.7	7.2	1.22
M-235	1883	65	84	80	96	49	12	55	0	3.5	22.6	7.3	1.11
M-236	175	55	95	30	25	35	11	20	70	4.5	23.6	7.0	1.06
M-237	866	45	65	43	35	89	11	40	20	4.5	25.3	7.4	1.42
M-238	2081	54	90	68	61	53	11	50	0	3.0	22.6	6.9	.91
M-239	524	79	101	78	65	45	10	20	40	3.0	24.8	7.2	1.53
M-240	455	82	105	69	50	85		30	100	3.5	21.7	6.6	1.34
M-241	607	70	95	78	66	62		20	50	4.0	20.4	6.9	1.57
M-242	678	57	79	82	70	116		25	50	4.5	22.3	7.2	1.35

Table 3 (Cont.)

Acc. No.	Yield KG/HA	Days to Flower	Days to Ripe	Hgt. cm.	Branch Length cm.	Pods/ Plant	Seeds/ Pod	1000 Seed gms.	Virus Score	Mil-dew Score	Pro-tein %	Lysine % of Pro-tein	Methio. % of Pro-tein
M-243	457	82	108	51	60	76		40	60	225	22.0	7.2	1.23
M-244	444	65	87	104	73	70		25	40	345	21.6	6.9	1.20
M-245	744	48	68	56	47	72	10	30	50	540	21.5	6.9	1.12
M-246	683	72	94	65	52	98	11	25	50	340	25.3	7.2	1.42
M-247	43	112		44	38	60		20	100	340			
M-248	660	60	74	61	53	193	12	25	50	570	27.8	6.9	1.26
M-249	570	81	102	63	54	67	10	25	40	440	25.9	6.9	1.07
M-250	547	67	92	56	54	32	13	30	50	445	22.5	7.2	.98
M-251	524	78	102	57	43	45	11	25	20	345	21.8	7.4	1.42
M-252	1315	75	95	93	99	95	11	28	10	4.0	24.0	7.2	.95
M-253	900	75	97	71	51	83	10	25	30	4.5	26.7	6.9	1.24
M-254	965	76	98	76	72	100	11	30	10	4.0	28.2	7.0	.84
M-255	345	75	97	44	44	61	8	23	50	4.5	20.1	7.6	1.39
M-256	552	56	77	67	61	49	11	25	20	4.5	22.0	6.7	1.05
M-257	1034	75	97	60	61	130	11	25	10	4.5	24.3	7.1	.91
M-258	531	65	99	45	40	81	11	20	50	3.0	22.5	7.6	1.42
M-259	599	67	107	51	46	100	7	20	50	3.0	21.8	7.4	1.51
M-260	910	82	105	59	53	114	11	20	50	4.0	20.6	7.6	1.41
M-261	888	54	75	69	60	173	12	40	50	3.0	21.0	7.5	1.48
M-262	386	77	98	47	44	103	10	15	10	3.5	24.7	7.2	1.30
M-263	1165	76	98	79	76	77	11	28	40	4.5	25.2	7.0	1.10
M-264	857	69	100	83	70	155	10	28	0	4.0	26.2	6.9	1.49
M-265	69	53	74	26	16	10	10	20	50	4.5	23.8	7.1	.84
M-266	1044	53	77	61	52	74	11	25	30	4.0	23.5	7.1	1.28
M-267	101	82	106	65	51	34		25	50	3.0	22.5	7.5	1.07
M-268	8	113		63	45		9	25	80	3.0	23.3	7.0	1.37
M-269	43	90	111	57	54	6			80	3.5	24.8	7.3	1.09
M-270	204	95	117	57	50	8		25	50	3.5	22.3	7.0	1.37
M-271	1653	81	72	73	53	84	12	38	0	5.0	25.0	7.0	1.20
M-272	736	65	96	62	55	92	12	18	50	3.5	25.7	6.8	1.17
M-273	551	75	81	69	52	72	12	20	50	3.5	25.8	6.8	1.24
M-274	660	63	84	51	55	70	13	43	40	2.5	25.5	6.9	1.18
M-275	56	69	89	47	38	36	10	18	20	4.0	24.5	7.2	1.43
M-276	847	58	79	67	63	37	12	20	40	4.5	25.8	7.2	1.20
M-277	740	54	73	68	49	29	11	40	30	4.5	24.0	7.4	1.08
M-278	401	78	100	64	58	58		30	60	4.0	23.1	7.4	1.26
M-279	511	78	101	74	65	53	6	20	50	4.5	21.5	7.5	1.63
M-280	848	76	98	74	63	155	13	25	50	4.5	24.2	7.3	1.20
M-281	881	72	100	68	61	163	12	25	50	5.0	23.6	7.3	1.40
M-282	343	56	77	45	55	34	10	30	60	4.5	23.3	7.0	1.24
M-283	1469	76	98	90	77	99	12	28	20	4.5	23.6	6.9	1.27
M-284	254	55	77	48	48	66	9	23	50	5.0	24.2	6.9	1.20
M-285	1106	72	94	79	74	127	10	25	30	4.5	25.2	7.2	1.23
M-286	1080	74	96	92	77	57	11	28	10	4.0	24.5	7.1	1.10
M-287	605	85	108	64	65	95	12	20	20	3.0	21.5	7.2	1.30
M-288	574	59	74	48	48	68	10	25	50	4.0	24.2	7.2	1.16
M-289	686	67	94	47	38	57	10	28	50	4.0	24.5	7.1	1.14

Table 3 (Cont.)

Acc. No.	Yield KG/HA	Days to Flower	Days to Ripe	Hgt. cm.	Branch Length cm.	Pods/ Plant	Seeds/ Pod	1000 Seed gms.	Virus Score	Mildew Score	Protein %	Lysine % of Protein	Methio. % of Protein
M-290	444	49	68	52	43	32	11	50	60	4.5	24.7	7.2	1.30
M-291	1068	75	96	55	54	95	12	25	40	4.5	24.5	7.4	1.14
M-292	460	79	97	61	60	64	8	28	50	4.5	27.7	7.3	1.41
M-293	1610	106	78	76	74	92	10	30	40	4.5	21.8	7.3	1.19
M-294	308	80	105	54	45	54	12	25	60	3.5	20.6	7.3	1.07
M-295	982	78	100	57	52	115		20	10	3.0	21.3	7.0	1.83
M-296	675	82	105	62	43	80	11	20	50	4.5	20.9	7.3	1.00
M-297	115	43	61	36	27	64	10	25	100	4.0	24.0	7.2	1.29
M-298	167	40	67	44	26	21	8	25	0	5.0	25.6	7.1	1.29
M-299	361	42	57	31	23	38	8	40	0	5.0	26.8	7.2	1.08
M-300	783	56	76	60	52	38	14	40	40	4.5	20.2	7.4	1.29
M-301	73	54	73	69	26	7		20	80	3.0	22.1	7.3	1.09
M-302	481	65	86	73	67	93	11	25	20	4.0	21.3	7.2	1.13
M-303	521	81	103	57	50	47	11	15	40	3.5	23.1	7.1	1.34
M-304	1726	51	72	50	38	89	13	53	0	4.0	27.1	7.3	1.22
M-305	822	54	73	68	57	121	11	25	10	5.0	22.5	7.4	1.47
M-306	777	50	71	55	45	41	12	33	40	4.5	23.1	7.7	1.39
M-307	1612	60	81	82	69	102	12	30	10	4.5	24.5	7.7	1.43
M-308	1293	59	80	74	61	64	11	20	50	5.0	22.1	7.3	1.22
M-309	44	65	85	23	18	23	7	20	50	4.0	24.2	7.0	.87
M-310	1108	53	74	63	68	65	12	45	0	4.0	19.7	6.9	1.78
M-311	843	49	70	50	42	52	11	30	50	5.0	26.9	7.7	1.08
M-312	1456	53	73	60	54	41	13	33	50	5.0	25.2	7.6	1.23
M-313	309	71	93	72	63	82	10	25	50	3.5	23.1	7.0	1.34
M-314	52	81	104	60	49	43	12	25	100	4.0	26.7	6.9	.97
M-315	41	69	90	35	25	28	10	30	80	4.0	24.1	7.2	1.04
M-316	61	77	95	20	17	46	12	35	100	4.0	26.2	7.3	1.26
M-317	2240	52	73	68	57	95	13	63	35	4.5	24.8	7.8	1.21
M-318	406	55	76	55	39	58	13	45	60	4.5	24.7	7.7	1.21
M-319	143	112		68	53				50	2.0	25.2	7.0	1.23
M-320				59	82				0	1.0			
M-321	1448	54	67	58	48	89	6	25	50	5.0	24.3	7.2	1.44
M-322		97		65	55				10	1.0			
M-323	137	58	78	55	33	22	9	70	50	4.5	22.5	7.0	1.42
M-324	1127	51	69	64	53	42	9	85	0	2.0	24.7	6.7	1.26
M-325	130			72	58				60	3.0	22.5	7.2	1.24
M-326	887	77	99	80	57	53	8	25	10	3.5	26.4	7.7	1.40
M-327	329	77	98	68	51	41	11	25	40	4.0	22.6	7.3	1.37
M-328	935	79	100	84	71	59	8	30	10	3.5	23.8	7.7	1.30
M-329	1023	53	73	46	39	54	13	48	60	4.0	23.8	7.3	1.18
L.S.D., 5% Level of Significance													
	205	25	25	26	26	96				6			

Table 4

Data on the 32 (10%) Highest Yielding Mungbean

Strains at Columbia, Missouri in 1970

Acc. No.	Yield	Days to Flower	Days to Ripe	Hgt.	Branch Length	Pods/ Plant	Seeds/ Pod	1000 Seed wt.	Virus Score	Mildew Score	Protein %	Lysine % of Protein	Methionine % of Protein
M118	2708	55	76	72	60	104	15	45	5	2.0	24.2	7.3	1.24
M203	2526	59	78	80	70	90	12	45	0	3.0	19.1	7.0	1.21
M194	2397	56	79	78	89	68	13	30	5	3.0	25.7	7.4	1.13
M174	2366	60	79	78	85	57	12	60	0	3.5	22.8	7.4	1.40
M317	2240	52	73	68	57	95	13	63	35	4.5	24.8	7.8	1.21
M232	2209	53	74	65	57	88	13	40	0	3.5	20.8	6.9	1.49
M90	2124	55	79	85	90	114	11	60	0	3.0	24.5	7.6	0.96
M238	2081	54	90	68	61	53	11	50	0	3.0	22.6	6.9	0.91
M148	2009	50	71	43	36	74	12	35	0	5.0	23.8	7.4	1.12
M140	1993	49	72	50	49	91	12	40	0	3.5	23.6	7.4	1.06
M61	1979	51	71	70	65	77	11	40	0	4.5	27.4	6.6	1.35
M214	1933	50	73	69	66	70	14	60	50	4.0	23.8	7.1	1.05
M14	1897	63	83	59	55	134	11	45	35	3.0	23.5	7.3	1.45
M235	1883	65	84	80	96	49	12	55	0	3.5	22.6	7.3	1.11
M206	1867	60	79	75	75	73	13	30	15	3.0	22.8	7.2	1.01
M175	1865	58	71	53	45	67	11	30	45	4.5	25.6	6.7	0.84
M195	1835	65	87	68	65	130	12	50	40	3.5	24.7	7.1	1.26
M101	1812	52	72	38	43	57	12	75	0	2.5	22.5	6.7	1.60
M121	1801	49	69	42	39	85	11	40	10	4.0	23.8	6.9	1.06
M233	1791	59	80	88	75	72	12	45	5	3.0	22.6	7.2	1.24
M151	1775	48	67	59	55	46	12	35	0	4.0	23.4	7.6	0.87
M109	1758	55	78	77	71	79	13	40	10	2.5	22.3	7.4	0.89
M99	1752	48	69	45	40	67	11	38	0	5.0	25.7	7.2	0.86
M59	1728	53	71	86	77	127	13	45	35	3.0	21.9	6.7	1.37
M304	1726	51	72	50	38	89	13	53	0	4.0	27.3	7.3	1.22
M91	1699	76	98	88	59	133	12	35	5	4.0	25.3	7.4	1.38
M138	1681	51	72	57	49	51	12	45	0	4.0	22.5	7.1	0.98
M46	1679	53	77	90	71	43	11	30	40	4.5	22.0	7.6	1.14
M110	1655	55	75	73	61	41	14	45	0	4.5	24.2	7.2	0.86
M95	1638	53	79	57	47	84	14	33	0	3.5	22.1	7.3	1.09
M76	1636	49	70	43	42	49	13	35	0	4.5	22.8	7.1	1.02
M307	1612	60	81	82	69	102	12	30	10	4.5	24.5	7.7	1.43
Mean	1928	55	77	67	61	80	12.3	44	11	3.7	23.6	7.2	1.15
Range, all Strains	2708 to 8	40 to 114	57 to 117	42 to 90	15 to 99	238 to 2	15 to 5.1	85 to 10	0 to 100	1.0 to 5.0	27.4 to 19.1	7.9 to 6.3	1.78 to 0.55
Mean, all Strains	777	61	81	56	48	65	10.7	30	36	3.9	24.0	7.0	1.20

Table 5

Distribution by Country of Origin of Strains

Superior for Characters Studied

Origin of Strains	Total No. Grown	Number of Strains Superior for: Yield	Days to Flower	Days to Ripe	Hgt.	Branch Length	Pods/ Plant	Seeds/ Pod	1,000 Seed Wt.	Virus Score[1]	Mildew Score[2]	Protein %	Lysine %	Methionine %
Afghanistan	35				8	7	4	2		1		5	3	2
Brazil	1													
Burma	1													
China	4	1						2	1					
Guatemala	3	1					1	1		1	2		1	
India	110	14	18	17	15	14	11	14	9	21	8	11	6	11
India (Orissa)	52	3	1		3	3	2	1	1	7	1	7	9	4
Iraq	1													
Iran	23	1			1	2	7		1		1	1		4
Ivory Coast	2		1									1	3	
Korea	1	1						1	1	1		1	2	
Madagascar	1													
Pakistan	13		1	1	2	2	4	1			1	1		2
Peru	1	1				1		1			1			
Philippines	3		1	1					1	1	2			1
Taiwan	1								1					
Thailand	7			2		1			2	2	4			
Turkey	5						1		1			2		
USA[3]	57	10	11	8	2	2	3	9	5	24		4	5	1
Total	321	32	33	29	31	32	33	32	23	58	20	33	29	25
Percent of Total		10.0	10.3	9.0	9.7	10.0	10.3	10.0	7.2	18.1	6.2	10.3	9.0	7.8

[1] 58 strains had a virus score of zero

[2] 20 strains had a mildew score not exceeding 2.5

[3] Includes all strains from USDA and OSU which did not list another country of origin. Some of these had P.I. numbers and may have originated as introductions.