BIBLIOGRAPHY

BOLON, GLORY ANN A. APRIL 2010. Adaptability of AVRDC Soybean Accessions Under Guinaoang, Mankayan, Benguet. Benguet State University, La Trinidad, Benguet.

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ABSTRACT

Adaptability trial of ten AVRDC soybean accessions was conducted at Guinaoang, Mankayan, Benguet to identify the best accession/s based on yield and resistance to insects and diseases.

The AVRDC accessions had early emergence, flowering, pod setting and maturity as compared with the local check, 'Ifugao'. AGS 435 produced the tallest plants at 30 days after planting.

The local check, 'Ifugao', produced the highest number and heaviest weight of marketable pods, and one- two- and three-seeded pods, however, it produced the narrowest and shortest pods.

Among the AVRDC accessions, AGS 436 produced the highest marketable, total and computed fresh pod yield.

High resistance to soybean pod borer and soybean rust was noted in all the accessions.

As to sensory evaluation of green pods, all the accessions were slightly aromatic except for AGS 440 which was moderately aromatic. All accessions are acceptable by the farmers except for ‘Ifugao’ which was disliked moderately.

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INTRODUCTION

Soybean (*Glycine max*) is an annual warm season crop and short-day plant. It can withstand brief periods of drought and flooding. Soybean can be grown as an upland crop where most production occurs in areas where normal rainfall provides the entire moisture supply for the crop. Soybeans introduced from geographical zones of high latitudes have been observed to produce a good plant type during wet season (Lantican and Garaza, 1977).

Soybean is grown in the Philippines even it is not a native crop. Excellent soybeans in experiment plots and in farmers' field were observed and yield reported by farmers are in line with yield obtained in soybean production on areas over the world (Smith, 1971).

Soybean is highly nutritious food for both children and adults. It is cholesterol free, has high protein content and has been found to contain substances such as isoflavones and gnistein that helps prevent cancer (PCCARD, 2002).

With the importance of soybean, it is therefore necessary to expand its cultivation in other areas like the Philippine highlands. However, to expand production, adaptation trials of different accessions should be conducted.

The study aimed to evaluate the adaptability of different soybean accessions acquired from AVRDC and to identify the best soybean accession/s based on yield and resistance to insect and diseases under Guinaoang, Mankayan, Benguet condition.

The study was conducted at Guinaoang, Mankayan, Benguet from November 2008 to March 2009.

REVIEW OF LITERATURE

Adaptation of Soybean

The environmental adaptation of soybean is similar to that of corn. The crop is grown from latitudes of 0 to 55^{o}C. However, management practices and cultivar selection and the concentration of commercial production vary considerably across those latitudes. In tropical latitudes, soybean is grown from below sea level to 2,000 m altitudes. The variation in environmental conditions for this latitude and altitude range illustrates the adaptability of soybean to different environmental conditions. The major commercial production of soybean is between 25^{o} to 45^{o} latitude at altitudes of less than 1,000 m (Bishop, 1983).

Soybean can be grown as an upland crop in 7 to 8 months of natural rainfall in the Philippines. In the potential areas of soybean production, the first crop maybe planted at the onset of the southwest monsoon starting in June. During this season, rainfall is usually high, day length goes beyond 12 hours and light quality is much affected by persistent cloud cover. This period is commonly referred to as the “wet” season. The second crop maybe planted on October. Precipitation is less intense, temperature is lower and day length is less than 12 hours: the dry season (Lantican and Garaza, 1977).

During the dry season, the trend of adaptation between the tropical and introduced groups of soybeans is usually reversed. The tropical types tend to be more adaptive and high yielding whereas the counterparts from high latitudes do not attain sufficient vegetative development to ensure high yield (Lantican and Garaza, 1977).

Germplasm Collection and Varietal Evaluation

Soybean improvement programs in the USA, Canada, Brazil, Japan, Taiwan, and Africa now have resources of hybridization and selection larger than has been possible hitherto. These programs emphasize the importance of collecting, exchanging, introducing and maintaining germplasm to provide a wide range of genetic diversity for plant breeders to exploit (Shunmugasudaram, 1979).

Several authors have discussed the merits of using photoperiod and sensitive cultivars, particularly in areas of the tropic and subtropic were more than one soybean can be grown per year (Hinson, 1974, Shunmugasudaram, 1981). Such genotypes are now available and could presumably incorporated in varietal improvement programs (Summerfields, 1981).

Morphological characterization and evaluation done by Doco (2009) at La Trinidad, Benguet revealed that AGS 437 and AGS 439 produced the highest fresh pod yield among the AVRDC accessions. Moderate to mild resistance to pod borer, cutworm, and leaf miner and high resistance to leaf blight were also noted in the same study.

The study of Menzi (2009) on adaptability and acceptability conducted at Pacso, Kabayan showed that AVRDC soybean accessions specifically AGS 439 and AGS 433 produced the widest, longest and heaviest pods among the AVRDC accessions. Mild to moderate resistance to soybean rust and leaf miner were observed.

Adaptability and acceptability trial conducted at Gambang, Bakun (Wa-ilen, 2009) showed AGS 438 was the best performer among the AVRDC soybean accessions producing the highest number, widest, longest and heaviest of one-two and three- seeded pods. Green pods of all the accessions were found to be acceptable by the farmers.

MATERIALS AND METHODS

An area of 160 m^2 was thoroughly cleaned and prepared. The area was divided into three equal blocks each with 11 plots measuring 1 m x 5 m. The experiment was laid-out using the randomized complete block design (RCBD).

The 11 accessions tested were as follows:

TREATMENT	ACCESSION
A1	AGS 432
A2	AGS 433
A3	AGS 434
A4	AGS 435
A5	AGS 436
A6	AGS 437
A7	AGS 438
A8	AGS 439
A9	AGS 440
A10	AGS 292
A11	Local check

Planting and Planting Distance

Seeds were sown at a distance of 40 cm x 30 cm between rows and hills at a depth of 4-5 cm with one seed per hill.

Cultural Management Practices

Mushroom compost was applied at the rate of 5 kg per 5 m^2 two weeks before planting. Vermicompost was applied at the rate of 15 kg per 160 m^2 during the vegetative stage.

Cultural management practices like weeding and irrigation were uniformly employed.

Data Gathered:

1. Agro Climatic data. Air temperature (^oC), relative humidity (percentage), and rainfall (mm) were recorded during the conduct of study.

2. Maturity

2.1. Number of days from sowing to emergence. This was recorded by subtracting the date of sowing from the date of emergence when at least 50% of the plants have fully emerged.

2.2. Number of days from emergence to flowering. This was recorded by counting the number of days from emergence to the day when 50% of the plants have flowered.

2.3. Number of days from emergence to pod setting. This was recorded by counting the number of days from emergence until the days when the pods are developed.

2.4. Number of days from emergence to first harvest. This was recorded by counting the number of days from emergence until the days when pods are ready to harvest.

2.5. Number of days from emergence to last harvest. This was recorded by counting the number of days from emergence until the day last harvest was done.

3. Stem characters

3.1. Initial plant height (cm). This was measured from the base of the plant at ground level to the tip of the youngest shoot, using a meter stick from five sample plants per plot at 30 days after planting.

3.2. Final plant height (cm). This was measured from the base of the plant at ground level to the tip of the youngest shoot, using a meter stick from five sample plants per plot.

3.3. Number of nodes per plant. This was recorded by counting the number of nodes of five sample plants on the main stem.

4. Pod Characters

4.1. Pod color. This was observed during harvesting using the following pod color rate:

Scale	Description
1	Dark green
2	Green
3	Yellow green
4	Yellow

4.2. Number of one-seeded and two-seeded pods per five plants. This was taken by counting the one-seeded pods using the same five plants where the pods were stripped.

4.3. Weight of one-seeded and two-seeded pods per five plants (kg). This was taken by weighing the one- seeded and two-seeded pods after counting.

4.4. Length of one-seeded and two-seeded pods (cm). This was taken by randomly selecting filled pods from the stripped pods of the sample plants and measured from end to end using a foot rule.

4.5. Width of one-seeded and two-seeded pods (cm). This was measured by measuring the width of the same pods which was measured for pod length using a foot rule.

5. Yield and Yield Components

5.1. Weight of marketable fresh pod per plot (kg). This was recorded by weighing the marketable fresh pods per plot of each treatment. Marketable pods are free from disease and insect damage and not deformed.

5.2. Weight of non-marketable fresh pod per plot (kg). This was obtained by weighing the non-marketable pods per plot of each treatment. Non-marketable pods were observed as diseased, damaged and deformed.

5.3. Total pod yield per harvest plot (kg). This was recorded by getting the total weight of marketable and non-marketable fresh pods per plot of each treatment throughout the harvesting period.

5.4. Computed fresh pod yield (t/ha). Total yield per hectare in tons was computed using the following formula

$$\text{Yield (t/ha)} = \text{total yield per plot} \times 2$$

Where 2 is the factor to be used to convert yield in kg/5m^2 ton per hectare assuming it is one hectare effective area.

6. Reaction to Pest and Diseases

6.1. Reaction to pod borer. The reaction of infestation of pod borer was obtained using the rating scale:

Scale	Description	Remarks
1	No infestation	High resistance
2	1-25% of total plant was infested	Mild resistance
3	25-50% of total plant was infested	Moderate resistance
4	51-75% of total plant was infested	Susceptible
5	76-100% of total plant was infested	Very susceptible

6.2. Reaction to soybean rust. The reaction of infestation to soybean rust was obtained using the rating scale:

Scale	Description	Remarks
1	No infection	High resistance
2	1-25% of total plant was infected	Mild resistance
3	25-50% of total plant was infected	Moderate resistance
4	51-75% of total plant was infected	Susceptible
5	76-100% of total plant was infected	Very susceptible

7. Lodging. This was recorded by using the following rating scale:

Scale	Definition	Remarks
1	All plants erect	Resistant
2	All plants leaning slightly or 10% of the plants are lodging	Moderately resistant

3	Ten to 50% of the plant lodging	Intermediate
4	Fifty to 50% of the plant lodging	Moderately susceptible
5	Almost all of the plants lodging	Susceptible

8. Sensory Evaluation. Samples of newly harvested pods were blanched and evaluated by panels consisting of 10 students, 10 faculty members from the College of Agriculture and 10 farmers. The pods were evaluated in terms of aroma and acceptability using the following scale:

8.1. Aroma

Scale	Description
1	Not aromatic
2	Slightly aromatic
3	Moderately aromatic
4	Very aromatic
5	Extremely aromatic

8.2. Acceptability

Scale	Description
1	Dislike very much
2	Dislike moderately
3	like
4	Like moderately
5	Like very much

Data Analysis

All qualitative data were analyzed using Analysis of Variance (ANOVA) for randomized complete block design (RCBD) with three replications. The significance of differences among the treatment means was tested using Duncan's Multiple Range Test (DMRT) at 5% level of significance.

RESULTS AND DISCUSSION

Meteorological Data During
the Conduct of the Study

Table 1 shows the temperature, relative humidity and amount of rainfall during the conduct of the study. Temperature ranged from 14^{o}C to 26^{o}C. Mean relative humidity was 73.5 %. Rainfall amount recorded was 80.25ml, which occurred only in November.

Soybean grows best in areas with 10^{o}C to 40^{o}C although it can be grown in most agro-climatic regions but preferred areas are dry zone (Bishop, 1983).

Table 1. Meteorological data during the conduct of study

MONTHS	TEMPERATURE (^{o}C)	RELATIVE HUMIDITY (%)	RAINFALL AMOUNT (ml)
November	22	76	80.25
December	14	70	--
January	24	77	--
February	26	71	--
Mean	21.5	38	

Maturity

Days from sowing to emergence. Significant differences were observed among the AVRDC accessions on the number of days from sowing to emergence. AGS 437 and AGS 434 were the earliest to emerge at eight days while the rest of the accessions emerged at nine days after sowing (Table 2).

Days from emergence to flowering. Highly significant differences were observed among the accessions as shown in Table 2. Among the ten accessions tested, AGS 438

was the earliest to flower at 35 days after emergence. 'Ifugao' was the last to flower at 47 days after emergence.

The same result was found by Doco and Menzi (2009) that days from emergence to flowering ranged from 34 to 47 days in La Trinidad and Kabayan, respectively.

Days from flowering to pod setting. Significant differences were noted among the AVRDC accessions (Table 2) on the number of days from emergence to pod setting. 'Ifugao' was the latest to produce pods at ten days after flowering while the accessions from AVRDC produced pods at eight and nine days after flowering.

Wa-ilen (2009) also observed that pod setting of the same accessions were seven to eight days after flowering under Bakun, Benguet condition.

Days from emergence to first harvest. No significant differences were observed among the AVRDC soybean accessions on the number of days from emergence to first harvest. First harvesting was done on AVRDC accessions at 71 to 72 days after emergence. This result confirms with the study of Menzi and Wa-ilen (2009) in Kabayan and Bakun, respectively.

'Ifugao' reached the R6 stage (full seed or when pod containing a green seed that fills the pod cavity at one of the four uppermost nodes on the main stem with a fully developed leaf) at 79 days after emergence.

Days from emergence to last harvest. As shown on Table 2, highly significant differences were noted among the AVRDC soybean accessions. AGS 432 and AGS 292 were the earliest to be harvested at 90 days after emergence. Wa-ilen (2009) also noted that the same accessions were harvested at 91 and 92 days after emergence in Bakun. Last harvesting was on 'Ifugao' at 102 days after emergence.

Table 2. Days from sowing to emergence, emergence to flowering, flowering to pod setting, emergence to first harvest and last harvest of the AVRDC soybean accessions

ACCESSION	DAYS				
	SOWING TO EMERGENCE	EMERGENCE TO FLOWERING	FLOWERING TO POD SETTING	EMERGENCE TO FIRST HARVEST	EMERGENCE TO LAST HARVEST
AGS 432	8	38	8[b]	71	90[e]
AGS 433	9	39	9[b]	72	91[cde]
AGS 434	8	39[bc]	8[b]	71	90[de]
AGS 435	8	40[b]	8[b]	72	91[cde]
AGS 436	8	38[bcd]	8[b]	71	91[cde]
AGS 437	8	36[de]	8[b]	71	92[bc]
AGS 438	8	35[e]	8[b]	72	93[b]
AGS 439	8	37[cd]	9[b]	71	91[bcd]
AGS 440	8	38[cd]	9[b]	71	91[cde]
AGS 292	8	38[cd]	8[b]	72	90[e]
Ifugao	9	47[a]	10[a]	79	102[a]
CV (%)	5.33	2.35	5.44	2.36	0.84

*Means with the same letter are not significantly different by DMRT (P> 0.05)

Plant Height and Growth Pattern

Plant height at 30 and 60 DAP. Table 3 shows the height of the plants at 30 and 60 DAP. AGS 435 was measured to be the tallest (14.61cm) at 30 DAP but comparable with AGS 433 and AGS 438 at 13.95 cm and 13.54 cm, respectively. Significant differences on final plant height varying from 15.30 cm to 23 cm were recorded with AGS 439 as the shortest and 'Ifugao' the tallest.

The study of Menzi and Wa-ilen (2009) also showed that 'Ifugao' produced the tallest plants.

The results confirm the findings of Lantican (1987) that introduced varieties generally lack the necessary height, produce limited amounts of vegetative parts and flower very early, consequently producing poor yields. Temperate varieties generally have limited use during dry season especially if seed for planting were imported from their place of origin.

All the accessions have determinate habit of growth.

Number of Nodes per Plant

Highly significant differences were observed on the number of nodes per plant. 'Ifugao', AGS 433, AGS 435 and AGS 436 were recorded to have the highest number of nodes but comparable with AGS 438, AGS 432, AGS 439 which have the least number of nodes among the eleven soybean accessions evaluated.

Doco (2009) also observed that 'Ifugao' had the highest number of nodes and AGS 439 had the least number of nodes under La Trinidad, Benguet condition.

Pod Characters

Pod color. All the AVRDC accessions exhibited green pods. 'Ifugao' has yellow-green pods.

Menzi and Wa-ilen (2009) noted the same pod color. However, Doco (2009) observed dark green pods of 'Ifugao'.

The result of the various studies on soybean accessions confirm the statement of Shanmugasundaram (1990) that pod color is highly influenced by the environment.

Table 3. Plant height at 30 and 60 DAP and number of nodes of the AVRDC soybean accessions

ACCESSION	HEIGHT (cm)		NUMBER OF NODE
	30 DAP	60 DAP	
AGS 432	12.43^{bc}	15.68^{fg}	5.00
AGS 433	13.95^{ab}	20.94^{bc}	8.00
AGS 434	12.78^{bc}	17.69^{e}	6.00
AGS 435	14.61^{a}	21.39^{ab}	8.00
AGS 436	13.04^{bc}	20.51^{bc}	8.00
AGS 437	12.00^{c}	18.33^{de}	7.00
AGS 438	13.54^{ab}	19.47^{cd}	7.00
AGS 439	11.55^{c}	15.30^{g}	5.00
AGS 440	12.88^{bc}	17.16^{ef}	6.00
AGS 292	11.89^{c}	18.50^{de}	6.00
Ifugao	12.67^{bc}	23.00^{a}	8.00
CV (%)	6.29	5.15	7.66

*Means with the same letter are not significantly different by DMRT (P> 0.05)

Number of One-,Two-,and Three-Seeded Pods

Highly significant differences were observed among the number of one-two-and three-seeded pods (Table 4).

'Ifugao' exhibited the highest number of one-two-and three-seeded pods at 553, 775 and 117, respectively. All the AVRDC accessions were not significantly different from each other.

Numerically, the highest number of one-seeded pod was obtained from AGS 437 and two-seeded pod was obtained from AGS 436.

Doco and Menzi (2009) also reported that 'Ifugao' produced the highest number of pods in La Trinidad and Kabayan, respectively. However, Wa-ilen (2009) found that AGS 438 produced the highest number of one-, two- and three-seeded pods among the AVRDC soybean accessions in Bakun.

Length of One-, Two-, and Three- Seeded Pods

'Ifugao' had the shortest one-two-and three seeded pods (Table 5). AGS 433 was noted to have the longest one-seeded pods at 4.24 cm while AGS 438 was recorded to have the longest two-seeded pods but did not significantly differ from AGS 434, 439 and 440. Accessions AGS 433, AGS 434, AGS 438, AGS 439 and AGS 440 were recorded to have the longest three-seeded pods.

Width of One-, Two-, and Three- Seeded Pods

'Ifugao" had the narrowest one-two-and three-seeded pods at 1.38, 1.39, and 1.38 cm, respectively. The widest one-seeded pod was recorded from AGS 435 and AGS 438 both measuring 1.67 cm. The other accessions have comparable pods (Table 6).

AGS 435 was measured to have the widest two-seeded pods but comparable with the other accessions. AGS 292 has the widest three-seeded pods measuring 1.66 cm but comparable with the other accessions.

Table 4. Number of one- two- and three-seeded pods of the AVRDC soybean accessions

ACCESSION	NUMBER		
	ONE-SEEDED POD	TWO-SEEDED POD	THREE-SEEDED POD
AGS 432	19.00[b]	12.00[b]	4.00[b]
AGS 433	28.00[b]	16.00[b]	4.00[b]
AGS 434	17.00[b]	16.00[b]	5.00[b]
AGS 435	29.00[b]	19.00[b]	5.00[b]
AGS 436	20.00[b]	38.00[b]	5.00[b]
AGS 437	31.00[b]	13.00[b]	2.00[b]
AGS 438	19.00[b]	20.00[b]	3.00[b]
AGS 439	24.00[b]	34.00[b]	6.00[b]
AGS 440	24.00[b]	27.00[b]	6.00[b]
AGS 292	25.00[b]	16.00[b]	2.00[b]
Ifugao	553.00[a]	775.00[a]	117.00[a]
CV (%)	8.54	10.29	35.26

*Means with the same letter are not significantly different by DMRT (P> 0.05)

Weight of One-, Two-, and Three-Seeded Pods

Results showed that 'Ifugao' had the highest weight of one, two and three-seeded pods at 664 g, 1470 g and 262 g, respectively (Table 7).

Menzi and Wa-ilen (2009) also reported that 'Ifugao' had the highest weight of one- two- and three-seeded pods.

Table 5. Length of one-two- and three-seeded pods of the AVRDC soybean accessions

ACCESSION	LENGTH (cm)		
	ONE-SEEDED POD	TWO-SEEDED POD	THREE-SEEDED POD
AGS 432	3.67[c]	4.98[bc]	5.77[b]
AGS 433	4.24[a]	5.23[ab]	6.23[a]
AGS 434	3.60[c]	5.43[a]	6.47[a]
AGS 435	4.12[ab]	4.78[c]	5.63[b]
AGS 436	3.93[abc]	5.23[ab]	6.37[a]
AGS 437	3.73[bc]	4.82[c]	5.80[b]
AGS 438	3.75[bc]	5.56[a]	6.37[a]
AGS 439	4.12[ab]	5.50[a]	6.50[a]
AGS 440	4.09[ab]	5.35[a]	6.17[a]
AGS 292	3.96[abc]	4.77[c]	5.70[b]
Ifugao	3.17[d]	4.14[d]	4.83[c]
CV (%)	5.62	3.74	3.25

*Means with the same letter are not significantly different by DMRT (P> 0.05)

Pod Yield

Weight of marketable fresh pod per plot. Highly significant differences were observed among the accessions on the weight of marketable fresh pods (Table8). 'Ifugao' produced the highest marketable fresh pods with a mean of 3.15 kg and the lowest was obtained from AGS 432 with 0.23 kg. However, there were no noted significant differences among the AVRDC accessions.

Table 6. Width of one- two- and three seeded pods of the AVRDC soybean accessions

ACCESSION	WIDTH (cm)		
	ONE-SEEDED POD	TWO-SEEDED POD	THREE-SEEDED POD
AGS 432	1.56[b]	1.61[bc]	1.58[b]
AGS 433	1.61[ab]	1.64[ab]	1.63[ab]
AGS 434	1.54[b]	1.58[c]	1.63[ab]
AGS 435	1.67[a]	1.68[a]	1.64[ab]
AGS 436	1.57[ab]	1.60[bc]	1.63[ab]
AGS 437	1.63[ab]	1.63[abc]	1.61[ab]
AGS 438	1.67[a]	1.66[ab]	1.64[ab]
AGS 439	1.62[ab]	1.64[ab]	1.63[ab]
AGS 440	1.64[ab]	1.65[ab]	1.66[a]
AGS 292	1.62[ab]	1.64[ab]	1.64[ab]
Ifugao	1.38[c]	1.39[a]	1.38[c]
CV (%)	3.66	1.84	1.5

*Means with the same letter are not significantly different by DMRT (P> 0.05)

Weight of non-marketable fresh pod per plot. No significant differences were observed among the accessions on the weight of non-marketable fresh pods per plot. 'Ifugao' had the highest weight of non-marketable fresh pods with a mean of 0.09 kg.

Total pod yield per plot. The total pod yield per plot among the AVRDC accessions was recorded to be highly significant (Table 8). The local check produced the heaviest weight with a mean of 3.52 kg. AVRDC accessions did not show any significant differences.

Table 7. Weight of one- two- and three-seeded pods of the AVRDC soybean accessions

ACCESSION	WEIGHT		
	ONE-SEEDED POD	TWO-SEEDED POD	THREE-SEEDED POD
AGS 432	24.00	24.00	9.00
AGS 433	33.00	36.00	9.00
AGS 434	18.00	38.00	11.00
AGS 435	33.00	36.00	11.00
AGS 436	22.00	73.00	12.00
AGS 437	35.00	24.00	4.00
AGS 438	21.00	38.00	9.00
AGS 439	26.00	65.00	15.00
AGS 440	26.00	57.00	14.00
AGS 292	28.00	31.00	5.00
Ifugao	664.00	1470.00	262.00
CV (%)	13.99	6.34	2.29

*Means with the same letter are not significantly different by DMRT (P> 0.05)

Computed fresh pod yield. Among the accessions evaluated, 'Ifugao' produced the highest computed fresh pod yield with 6.80 t/ha followed by AGS 436 with 1.16 t/ha. The lowest computed fresh pod yield was produced by AGS 432 with 0.55 t/ha (Table 8).

Table 8. Pod yield of the AVRDC soybean accessions

ACCESSION	POD YIELD (kg/5m^2)			COMPUTED YIELD (t/ha)
	MARKETABLE	NON MARKETABLE	TOTAL	
AGS 432	0.23 [b]	0.05 [b]	0.28[b]	0.56[d]
AGS 433	0.32 [b]	0.05 [b]	0.37 [b]	0.74[cd]
AGS 434	0.28 [b]	0.04 [b]	0.32 [b]	0.64[d]
AGS 435	0.36 [b]	0.02 [b]	0.38 [b]	0.76[cd]
AGS 436	0.61 [b]	0.04 [b]	0.65[b]	1.30 [b]
AGS 437	0.28 [b]	0.02 [b]	0.30 [b]	0.60 [d]
AGS 438	0.47 [b]	0.07 [b]	0.54 [b]	1.08[bc]
AGS 439	0.47 [b]	0.04 [b]	0.51 [b]	1.02[bc]
AGS 440	0.46 [b]	0.08 [b]	0.54 [b]	1.08[bc]
AGS 292	0.33 [b]	0.03 [b]	0.36[b]	0.72[cd]
Ifugao	3.15 [a]	0.09 [b]	3.24 [a]	6.48 [a]
CV (%)	27.58	2.50	27.03	14.86

*Means with the same letter are not significantly different by DMRT (P> 0.05).

Reaction to Pests and Diseases

Reaction to pod borer. No infestation of pod borer was observed among the accessions. However, Doco (2009) reported mild to moderate resistance to pod borer of the AVRDC accessions under La Trinidad, Benguet condition.

In Japan, the genotypes with glabrous or curly pubescent types were reported to be resistant to soybean pod borer, but were susceptible to potato leaf hopper (Bernard and Weiss, 1973).

Reaction to soybean rust. No infestation of soybean rust was noted in all of the accessions. The same case was noted by Wa-ilen (2009) in Bakun, however, Menzi (2009) noted mild to moderate resistance to soybean rust in Kabayan, Benguet.

As reported by PCCARD (1986) soybean rust favors cool temperature and high humidity.

Reaction to Lodging

All the accessions were resistant to lodging. This could be accounted to the short stature of the plants.

Factors such as high plant population, high soil moisture, and high soil fertility can stimulate vegetative growth and increase plant height, leading to lodging. As plant populations increase, soybean stems become longer and more slender and plant standability decreases (Klein and Elmore, 2000).

Sensory Evaluation

Samples of newly harvested pods were blanched and were evaluated by 10 farmers, 10 students and 10 faculty members.

AGS 440 was rated moderately aromatic while the rest of the accessions were rated slightly aromatic. Based on the acceptability test, all the accessions from AVRDC were moderately liked while ‘Ifugao’ was disliked moderately. This could be due to the fact that ‘Ifugao’ is being cultivated for grain and not as vegetable soybean (Table 9).

For sensory evaluation of fresh pod yield, consumers are considering the color and width of the fresh pods. Apparently, green to dark green and wide fresh pods area acceptable in addition to their aroma (Pog-ok, 2001).

Table 9. Sensory evaluation of the AVRDC soybean accessions

ACCESSION	AROMA	ACCEPTABILITY
AGS 432	Slightly aromatic	Liked
AGS 433	Slightly aromatic	Liked
AGS 434	Slightly aromatic	Liked
AGS 435	Slightly aromatic	Liked
AGS 436	Slightly aromatic	Liked
AGS 437	Slightly aromatic	Liked
AGS 438	Slightly aromatic	Liked
AGS 439	Slightly aromatic	Liked
AGS 440	Moderately aromatic	Liked
AGS 292	Slightly aromatic	Liked
'Ifugao' (check)	Slightly aromatic	Disliked moderately

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

This study was conducted at Guinaoang, Mankayan, Benguet to evaluate the adaptability of different soybean accessions and identify the best soybean accession/s based on yield and resistance to insect pest and diseases under Guinaoang, Mankayan, Benguet.

The study showed significant differences among the AVRDC soybean accessions and 'Ifugao' on the number of days from sowing to emergence, emergence to flowering, flowering to pod setting, emergence to last harvest, plant height, number of nodes, number, length and width of one-two and three-seeded pods, and pod yield.

Results showed that the accessions from AVRDC exhibited early emergence, flowering, pod setting and maturity. AGS 435 was noted to have the tallest plants at 30 days after planting while 'Ifugao' recorded the tallest plants at 60 days after planting. It also produced the highest number and heaviest weight of one-, two and three-seeded pods, marketable, total and computed fresh pod yield.

Among the AVRDC accessions, AGS 436 produced the highest marketable, total and computed fresh pod yield. As for the sensory evaluation of boiled green pods, all the accessions from AVRDC were acceptable while 'Ifugao' was disliked moderately. All the accessions were slightly aromatic except for AGS 440 which was moderately aromatic.

All the accessions showed high resistance to soybean rust, pod borer and lodging.

Conclusions

The best among the AVRDC soybean accessions based on marketable, total and computed fresh pod yield is AGS 436. All the accessions are resistant to pod borer and soybean rust.

Although 'Ifugao' produced the highest pod yield, it is not intended for vegetable soybean production but for grain production.

Recommendations

AGS 436 can be recommended as vegetable soybean in Guinaoang, Mankayan, Benguet.

Due to low yield obtained during the conduct of the study it is recommended that further studies should be conducted under different planting dates.

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APPENDICES

Appendix Table 1. Days from sowing to emergence of AVRDC soybean accessions

ACCESSION	BLOCK			TOTAL	MEAN
	I	II	III		
AGS 432	8	9	9	26	8.67
AGS 433	9	9	9	27	9.00
AGS 434	8	8	8	24	8.00
AGS 435	9	9	8	26	8.67
AGS 436	9	9	8	26	8.67
AGS 437	8	8	8	24	8.00
AGS 438	8	9	8	25	8.33
AGS 439	8	9	9	26	8.67
AGS 440	8	9	8	25	8.33
AGS 292	9	8	8	25	8.33
Ifugao	10	10	9	29	9.67

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	F VALUE	Tabular F	
					0.05	0.01
Replication	2	1.15	0.58			
Treatment	10	6.73	0.67	3.21*	2.35	3.37
Error	20	4.18	0.21			
TOTAL	32	12.06				

*-Significant CV% = 5.33%

Appendix Table 2. Days from emergence to flowering of AVRDC soybean accessions

ACCESSION	BLOCK			TOTAL	MEAN
	I	II	III		
AGS 432	38	39	39	116	38.67
AGS 433	39	39	39	117	39.00
AGS 434	39	39	39	117	39.00
AGS 435	40	39	41	120	40.00
AGS 436	38	38	39	115	38.33
AGS 437	37	35	38	110	36.67
AGS 438	34	36	37	107	35.67
AGS 439	36	39	38	113	37.67
AGS 440	37	38	39	114	38.00
AGS 292	38	38	38	114	38.00
Ifugao	47	48	46	141	47.00

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	F VALUE	Tabular F	
					0.05	0.01
Replication	2	4.55	2.27			
Treatment	10	257.39	25.74	30.66**	2.35	3.37
Error	20	16.79	0.84			
TOTAL	32	278.73				

**-Highly Significant CV% = 2.35%

Appendix Table 3. Days from flowering to pod setting of AVRDC soybean accessions

ACCESSION	BLOCK			TOTAL	MEAN
	I	II	III		
AGS 432	38	39	39	116	38.67
AGS 433	39	39	39	117	39.00.
AGS 434	39	39	39	117	39.00
AGS 435	40	39	41	120	40.00
AGS 436	38	38	39	115	38.33
AGS 437	37	35	38	110	36.67
AGS 438	34	36	37	107	35.67
AGS 439	36	39	38	113	37.67
AGS 440	37	38	39	114	38.00
AGS 292	38	38	38	114	38.00
Ifugao	47	48	46	141	47.00

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	F VALUE	Tabular F	
					0.05	0.01
Replication	2	0.73	0.36			
Treatment	10	9.58	0.96	4.16**	2.35	3.37
Error	20	4.61	0.23			
TOTAL	32	14.91				

**-Highly Significant CV% = 5.44%

Appendix Table 4. Days from emergence to first harvest of AVRDC soybean accessions

ACCESSION	BLOCK			TOTAL	MEAN
	I	II	III		
AGS 432	71	72	71	214	71.33
AGS 433	73	72	72	217	72.33
AGS 434	71	71	72	214	71.33
AGS 435	72	72	72	216	72.00
AGS 436	73	71	71	215	71.67
AGS 437	72	72	71	215	71.67
AGS 438	73	72	71	216	72.00
AGS 439	71	71	71	213	71.00
AGS 440	70	72	72	214	71.33
AGS 292	72	73	72	217	72.33
'Ifugao'	78	80	80	238	79.33

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	F VALUE	Tabular F	
					0.05	0.01
Replication	2	8.91	4.46			
Treatment	10	56.06	5.61	1.94^{ns}	2.35	3.37
Error	20	57.76	2.89			
TOTAL	32	122.73				

^{ns}- Not Significant CV% = 2.36%

Appendix Table 5. Days from emergence to last harvest of AVRDC soybean accessions

ACCESSION	REPLICATION			TOTAL	MEAN
	I	II	III		
AGS 432	90	90	91	271	90.33
AGS 433	91	91	91	273	91.00
AGS 434	90	91	90	271	90.33
AGS 435	90	92	92	274	91.33
AGS 436	91	91	91	273	91.00
AGS 437	92	92	93	277	92.33
AGS 438	93	93	93	279	93.00
AGS 439	92	90	93	275	91.67
AGS 440	91	90	92	273	91.00
AGS 292	90	90	90	270	90.00
Ifugao	102	103	101	306	102.00

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	F VALUE	Tabular F	
					0.05	0.01
Replication	2	1.27	0.64			
Treatment	10	341.58	34.16	56.6**	2.35	3.37
Error	20	12.06	0.60			
TOTAL	32	354.91				

** - Highly Significant CV = 0.84%

Appendix Table 6. Plant height 30 DAP of AVRDC soybean accessions

ACCESSION	BLOCK			TOTAL	MEAN
	I	II	III		
AGS 432	12.2	13.44	11.64	37.28	12.43
AGS 433	13.1	14.26	14.50	41.86	13.95
AGS 434	12.56	13.50	12.28	38.34	12.78
AGS 435	13.36	14.90	15.58	43.84	14.61
AGS 436	13.00	13.68	12.44	39.12	13.04
AGS 437	10.72	13.06	12.22	36.00	12.00
AGS 438	13.70	12.76	14.16	40.62	13.54
AGS 439	11.12	11.56	11.96	34.64	11.55
AGS 440	11.50	13.06	14.08	38.64	12.88
AGS 292	11.34	12.98	11.34	35.66	11.89
Ifugao	10.78	14.26	12.96	38.00	12.67

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	F VALUE	Tabular F	
					0.05	0.01
Replication	2	9.47	4.73			
Treatment	10	25.22	2.52	3.86**	2.35	3.37
Error	20	13.06	0.65			
TOTAL	32	47.75				

** - Highly Significant CV = 6.29%

Appendix Table 7. Plant height at 60 DAP of AVRDC soybean accessions

ACCESSION	BLOCK			TOTAL	MEAN
	I	II	III		
AGS 432	16.10	15.70	15.25	47.04	15.65
AGS 433	20.67	22.10	20.04	62.81	20.94
AGS 434	19.20	17.63	16.25	53.08	17.69
AGS 435	21.50	20.03	22.64	64.17	21.39
AGS 436	20.36	20.16	21.00	61.52	20.51
AGS 437	17.19	18.39	19.40	54.98	18.33
AGS 438	18.75	19.47	20.19	58.41	19.47
AGS 439	14.65	15.92	15.33	45.90	15.30
AGS 440	16.78	17.49	17.20	51.47	17.16
AGS 292	17.64	18.54	19.31	55.49	18.50
Ifugao	23.71	21.41	22.67	67.79	23.00

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	F VALUE	Tabular F	
					0.05	0.01
Replication	2	0.41	0.21			
Treatment	10	165.67	16.57	17.51 **	2.35	3.37
Error	20	18.92	0.95			
TOTAL	32	185.00				

** - Highly Significant CV = 5.15%

Appendix Table 9. Number of one-seeded pod of AVRDC soybean accessions

ACCESSION	BLOCK			TOTAL	MEAN
	I	II	III		
AGS 432	18	27	12	57	19.00
AGS 433	28	24	32	84	28.00
AGS 434	18	19	13	50	16.67
AGS 435	19	28	41	88	29.33
AGS 436	17	33	11	61	20.33
AGS 437	40	24	29	93	31.00
AGS 438	20	23	14	57	19.00
AGS 439	28	21	24	73	24.33
AGS 440	26	25	22	73	24.33
AGS 292	29	25	21	75	25.00
Ifugao	500	816	342	1658	552.67

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	F VALUE	Tabular F	
					0.05	0.01
Replication	2	11843.15	5921.58			
Treatment	10	763739.52	76373.96	14.47 **	2.35	3.37
Error	20	105566.85	5278.34			
TOTAL	32	881149.52				

** - Highly Significant CV = 8.54%

Appendix Table 10. Number of two-seeded pod of AVRDC soybean accessions

ACCESSION	BLOCK			TOTAL	MEAN
	I	II	III		
AGS 432	8	14	13	35	11.67
AGS 433	17	19	13	49	16.33
AGS 434	18	24	7	49	16.33
AGS 435	24	16	18	58	19.33
AGS 436	42	43	29	114	38.00
AGS 437	14	18	6	38	12.67
AGS 438	18	21	21	60	20.00
AGS 439	39	26	38	103	34.33
AGS 440	30	21	30	81	27.00
AGS 292	24	13	12	49	16.33
Ifugao	537	921	868	2326	775.33

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	F VALUE	Tabular F	
					0.05	0.01
Replication	2	6680.06	3340.03			
Treatment	10	1553230.73	155323.07	38.54**	2.35	3.37
Error	20	80601.27	4030.06			
TOTAL	32	1640512.06				

** - Highly Significant CV = 10.29 %

Appendix Table 11. Number of three-seeded pod of AVRDC soybean accessions

ACCESSION	BLOCK			TOTAL	MEAN
	I	II	III		
AGS 432	4	5	2	11	3.67
AGS 433	4	7	1	12	4.00
AGS 434	5	3	6	14	4.67
AGS 435	7	5	2	14	4.67
AGS 436	8	3	4	15	5.00
AGS 437	3	2	1	6	2.00
AGS 438	4	4	2	10	3.33
AGS 439	6	4	9	19	6.33
AGS 440	4	1	12	17	5.67
AGS 292	2	3	2	7	2.33
Ifugao	88	168	94	350	116.67

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	F VALUE	Tabular F	
					0.05	0.01
Replication	2	296.97	148.49			
Treatment	10	34568.55	3456.86	18.14**	2.35	3.37
Error	20	3810.36	190.52			
TOTAL	32	38675.88				

** - Highly Significant CV = 35.26 %

Appendix Table 12. Weight of one-seeded pod of AVRDC soybean accessions

ACCESSION	BLOCK			TOTAL	MEAN
	I	II	III		
AGS 432	0.025	0.032	0.014	0.071	0.024
AGS 433	0.033	0.028	0.037	0.098	0.033
AGS 434	0.020	0.020	0.014	0.054	0.018
AGS 435	0.020	0.032	0.046	0.098	0.033
AGS 436	0.018	0.036	0.013	0.067	0.022
AGS 437	0.045	0.027	0.032	0.104	0.035
AGS 438	0.022	0.025	0.015	0.062	0.021
AGS 439	0.031	0.023	0.023	0.077	0.026
AGS 440	0.028	0.027	0.023	0.078	0.026
AGS 292	0.033	0.026	0.024	0.083	0.028
'Ifugao'	0.603	0.980	0.410	1.993	0.664

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	F VALUE	Tabular F	
					0.05	0.01
Replication	2	0.02	0.01			
Treatment	10	1.11	0.11	14.58**	2.35	3.37
Error	20	0.15	0.01			
TOTAL	32	1.28				

** - Highly Significant CV = 13.99 %

Appendix Table 13. Weight of two-seeded pods of AVRDC soybean accessions

ACCESSION	BLOCK			TOTAL	MEAN
	I	II	III		
AGS 432	0.016	0.027	0.030	0.073	0.024
AGS 433	0.036	0.042	0.029	0.107	0.036
AGS 434	0.041	0.053	0.019	0.113	0.038
AGS 435	0.045	0.030	0.033	0.108	0.036
AGS 436	0.080	0.083	0.056	0.219	0.073
AGS 437	0.027	0.035	0.010	0.072	0.024
AGS 438	0.035	0.039	0.040	0.114	0.038
AGS 439	0.075	0.049	0.072	0.196	0.065
AGS 440	0.058	0.039	0.055	0.152	0.057
AGS 292	0.046	0.025	0.022	0.093	0.031
Ifugao	1.02	1.75	1.65	4.42	1.470

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	F VALUE	Tabular F	
					0.05	0.01
Replication	2	0.02	0.01			
Treatment	10	5.60	0.56	38.36**	2.35	3.37
Error	20	0.29	0.02			
TOTAL	32	5.91				

** - Highly Significant CV = 6.34 %

Appendix Table 14. Weight of three-seeded pods of AVRDC soybean accessions

ACCESSION	BLOCK			TOTAL	MEAN
	I	II	III		
AGS 432	0.010	0.013	0.004	0.027	0.009
AGS 433	0.009	0.016	0.002	0.027	0.009
AGS 434	0.012	0.005	0.016	0.033	0.011
AGS 435	0.017	0.012	0.003	0.032	0.011
AGS 436	0.019	0.007	0.010	0.036	0.012
AGS 437	0.008	0.003	0.002	0.013	0.004
AGS 438	0.011	0.009	0.006	0.026	0.009
AGS 439	0.015	0.010	0.021	0.046	0.015
AGS 440	0.010	0.002	0.031	0.043	0.014
AGS 292	0.004	0.007	0.004	0.015	0.005
Ifugao	0.210	0.370	0.206	0.786	0.262

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	F VALUE	Tabular F	
					0.05	0.01
Replication	2	0.001	0.001			
Treatment	10	0.174	0.017	20.13**	2.35	3.37
Error	20	0.017	0.001			
TOTAL	32	0.192				

** - Highly Significant CV = 2.29 %

Appendix Table 15. Length of one-seeded pod of AVRDC soybean accessions

ACCESSION	BLOCK			TOTAL	MEAN
	I	II	III		
AGS 432	3.98	3.67	3.35	11.00	3.67
AGS 433	4.20	4.40	4.12	12.72	4.24
AGS 434	3.56	3.45	3.78	10.79	3.60
AGS 435	4.37	3.98	4.02	12.37	4.12
AGS 436	3.78	3.89	4.11	11.78	3.93
AGS 437	3.86	3.62	3.70	11.18	3.73
AGS 438	3.64	3.68	3.92	11.24	3.75
AGS 439	4.30	4.17	3.89	12.36	4.12
AGS 440	3.95	4.10	4.23	12.28	4.09
AGS 292	3.65	3.82	4.40	11.87	3.96
Ifugao	3.11	3.20	3.19	9.50	3.17

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	F VALUE	Tabular F	
					0.05	0.01
Replication	2	0.02	0.01			
Treatment	10	2.90	0.29	6.19**	2.35	3.37
Error	20	0.92	0.05			
TOTAL	32	3.86				

** - Highly Significant CV = 5.62 %

Appendix Table 16. Length of two-seeded pod of AVRDC soybean accessions

ACCESSION	BLOCK			TOTAL	MEAN
	I	II	III		
AGS 432	4.75	5.20	5.00	14.95	4.98
AGS 433	5.20	5.00	5.50	15.70	5.23
AGS 434	5.65	5.43	5.22	16.30	5.43
AGS 435	4.80	4.62	4.91	14.33	4.78
AGS 436	5.46	5.01	5.22	15.69	5.23
AGS 437	4.75	4.82	4.90	14.47	4.82
AGS 438	5.60	5.44	5.65	16.69	5.56
AGS 439	5.70	5.30	5.50	16.50	5.50
AGS 440	5.49	5.46	5.10	16.05	5.35
AGS 292	4.55	4.90	4.85	14.30	4.77
Ifugao	4.20	4.13	4.08	12.41	4.14

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	F VALUE	Tabular F	
					0.05	0.01
Replication	2	0.03	0.02			
Treatment	10	5.43	0.54	15.09**	2.35	3.37
Error	20	0.72	0.04			
TOTAL	32	6.18				

** - Highly Significant CV = 3.74 %

Appendix Table 17. Length of three-seeded pod of AVRDC soybean accessions

ACCESSION	BLOCK			TOTAL	MEAN
	I	II	III		
AGS 432	5.7	5.9	5.7	17.30	5.77
AGS 433	6.2	6.0	6.5	18.70	6.23
AGS 434	6.7	6.3	6.4	19.40	6.47
AGS 435	5.9	5.2	5.8	16.90	5.63
AGS 436	6.3	6.4	6.4	19.10	6.37
AGS 437	5.8	6.0	5.6	17.40	5.80
AGS 438	6.6	6.2	6.3	19.10	6.37
AGS 439	6.5	6.6	6.4	19.50	6.50
AGS 440	6.2	6.0	6.3	18.50	6.17
AGS 292	5.8	5.4	5.9	17.10	5.70
Ifugao	4.9	4.8	4.8	14.50	4.83

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	F VALUE	Tabular F	
					0.05	0.01
Replication	2	0.16	0.08			
Treatment	10	7.49	0.75	19.80**	2.35	3.37
Error	20	0.76	0.04			
TOTAL	32	8.40				

** - Highly Significant CV = 3.25 %

Appendix Table 18. Width of one-seeded pod of AVRDC soybean accessions

ACCESSION	BLOCK			TOTAL	MEAN
	I	II	III		
AGS 432	1.62	1.52	1.55	4.69	1.56
AGS 433	1.60	1.63	1.60	4.83	1.61
AGS 434	1.58	1.53	1.52	4.63	1.54
AGS 435	1.68	1.61	1.72	5.01	1.67
AGS 436	1.68	1.57	1.46	4.71	1.57
AGS 437	1.65	1.64	1.59	4.88	1.63
AGS 438	1.68	1.69	1.65	5.02	1.67
AGS 439	1.62	1.60	1.64	4.86	1.62
AGS 440	1.60	1.68	1.65	4.93	1.64
AGS 292	1.51	1.68	1.66	4.85	1.62
Ifugao	1.32	1.40	1.42	4.14	1.38

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	F VALUE	Tabular F	
					0.05	0.01
Replication	2	0.00	0.00			
Treatment	10	0.20	0.02	5.92**	2.35	3.37
Error	20	0.07	0.00			
TOTAL	32	0.27				

** - Highly Significant CV = 3.66 %

Appendix Table 19. Width of two-seeded pod of AVRDC soybean accessions

ACCESSION	BLOCK			TOTAL	MEAN
	I	II	III		
AGS 432	1.64	1.60	1.58	4.82	1.61
AGS 433	1.62	1.65	1.65	4.92	1.64
AGS 434	1.62	1.58	1.55	4.75	1.58
AGS 435	1.65	1.68	1.70	5.03	1.68
AGS 436	1.65	1.60	1.55	4.80	1.60
AGS 437	1.63	1.65	1.60	4.88	1.63
AGS 438	1.64	1.69	1.65	4.98	1.66
AGS 439	1.65	1.62	1.64	4.91	1.64
AGS 440	1.67	1.62	1.66	4.95	1.65
AGS 292	1.60	1.67	1.65	4.92	1.64
Ifugao	1.40	1.40	1.36	4.16	1.39

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	F VALUE	Tabular F	
					0.05	0.01
Replication	2	0.00	0.00			
Treatment	10	0.19	0.02	21.22**	2.35	3.37
Error	20	0.02	0.00			
TOTAL	32	0.21				

** - Highly Significant CV = 1.84 %

Appendix Table 20. Width of three-seeded pod of AVRDC soybean accessions

ACCESSION	BLOCK			TOTAL	MEAN
	I	II	III		
AGS 432	1.56	1.60	1.59	4.75	1.58
AGS 433	1.65	1.62	1.62	4.89	1.63
AGS 434	1.63	1.61	1.64	4.88	1.63
AGS 435	1.64	1.65	1.63	4.92	1.64
AGS 436	1.60	1.66	1.64	4.90	1.63
AGS 437	1.61	1.61	1.62	4.84	1.61
AGS 438	1.65	1.60	1.66	4.91	1.64
AGS 439	1.60	1.67	1.62	4.89	1.63
AGS 440	1.63	1.66	1.68	4.97	1.66
AGS 292	1.64	1.67	1.60	4.91	1.64
Ifugao	1.35	1.40	1.38	4.13	1.38

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	F VALUE	Tabular F	
					0.05	0.01
Replication	2	0.00	0.00			
Treatment	10	0.18	0.02	30.41**	2.35	3.37
Error	20	0.01	0.00			
TOTAL	32	0.19				

** - Highly Significant CV = 1.53 %

Appendix Table 21. Weight of marketable pods per plot of AVRDC soybean accessions

Accession	BLOCK			Total	Mean
	I	II	III		
AGS 432	0.24	0.26	0.18	0.68	0.23
AGS 433	0.31	0.36	0.29	0.96	0.32
AGS 434	0.29	0.33	0.22	0.84	0.28
AGS 435	0.38	0.34	0.36	1.08	0.36
AGS 436	0.53	0.80	0.50	1.83	0.61
AGS 437	0.36	0.28	0.19	0.83	0.28
AGS 438	0.45	0.53	0.44	1.42	0.47
AGS 439	0.53	0.36	0.52	1.41	0.47
AGS 440	0.43	0.44	0.50	1.37	0.46
AGS 292	0.36	0.42	0.22	1.00	0.33
Ifugao	2.56	3.58	3.31	9.45	3.15

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	F VALUE	Tabular F	
					0.05	0.01
Replication	2	0.08	0.04			
Treatment	10	21.29	2.13	69.98**	2.35	3.37
Error	20	0.61	0.03			
TOTAL	32	21.98				

** - Highly Significant CV = 27.58 %

Appendix Table 22. Weight of non-marketable pods per plot of AVRDC soybean accessions

ACCESSION	BLOCK			TOTAL	MEAN
	I	II	III		
AGS 432	0	.09	.05	0.14	0.05
AGS 433	0.06	0.05	0.03	0.14	0.05
AGS 434	0.06	0.04	0.01	0.11	0.04
AGS 435	0.01	0.01	0.03	0.05	0.02
AGS 436	0.07	0.04	0.02	0.13	0.04
AGS 437	0.02	0.03	0.01	0.06	0.02
AGS 438	0.07	0.11	0.04	0.22	0.07
AGS 439	0.05	0.03	0.04	0.12	0.04
AGS 440	0.03	0.08	0.13	0.24	0.08
AGS 292	0.03	0.05	0.02	0.10	0.03
Ifugao	0.09	0.12	0.06	0.27	0.09

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	F VALUE	Tabular F	
					0.05	0.01
Replication	2	0.00	0.00			
Treatment	10	0.02	0.00	2.21^{ns}	2.35	3.37
Error	20	0.02	0.00			
TOTAL	32	0.04				

^{ns}- Not Significant CV = 2.50 %

Appendix Table 23. Total pod yield per plot of AVRDC soybean accessions

ACCESSION	BLOCK			TOTAL	MEAN
	I	II	III		
AGS 432	0.24	0.35	0.23	0.82	0.27
AGS 433	0.37	0.41	0.32	1.10	0.37
AGS 434	0.35	0.37	0.23	0.95	0.32
AGS 435	0.39	0.35	0.39	1.13	0.38
AGS 436	0.60	0.62	0.52	1.74	0.58
AGS 437	0.38	0.31	0.20	0.89	0.30
AGS 438	0.52	0.63	0.48	1.63	0.54
AGS 439	0.58	0.39	0.56	1.53	0.51
AGS 440	0.46	0.52	0.63	1.61	0.54
AGS 292	0.39	0.47	0.24	1.10	0.37
Ifugao	2.89	3.70	3.97	10.56	3.52

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	F VALUE	Tabular F	
					0.05	0.01
Replication	2	0.04	0.02			
Treatment	10	26.62	2.66	74.63**	2.35	3.37
Error	20	0.71	0.04			
TOTAL	32	27.37				

** - Highly Significant CV = 27.03 %

Appendix Table 24. Computed pod yield per plot of AVRDC soybean accessions

ACCESSION	BLOCK			TOTAL	MEAN
	I	II	III		
AGS 432	0.48	0.70	0.46	1.64	0.55
AGS 433	0.74	0.82	0.64	2.20	0.73
AGS 434	0.70	0.74	0.46	1.90	0.63
AGS 435	0.78	0.70	0.78	2.26	0.75
AGS 436	1.20	1.24	1.04	3.48	1.16
AGS 437	0.76	0.62	0.40	1.78	0.59
AGS 438	1.04	1.26	0.96	3.26	1.09
AGS 439	1.16	0.78	1.12	3.06	1.02
AGS 440	0.92	1.04	1.26	3.22	1.07
AGS 292	0.78	0.94	0.48	2.20	0.73
Ifugao	7.30	6.36	6.74	20.40	6.80

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	F VALUE	Tabular F	
					0.05	0.01
Replication	2	0.02	0.05			
Treatment	10	98.50	9.85	235.73**	2.35	3.37
Error	20	0.84	0.04			
TOTAL	32	99.36				

** - Highly Significant CV = 14.86 %