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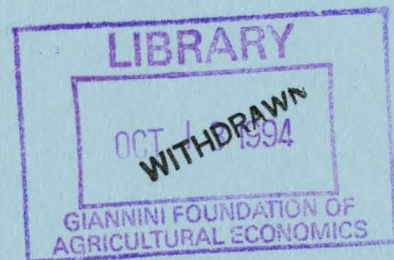
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FP 93-1
FEBRUARY 1993

U.S. GRAIN EXPORTS TO MEXICO: A QUALITY REPORT

By
Nicolas Gutierrez
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Stephen Fuller
Vinod Sutaria



Research Associate, adjunct professor, professor, and research associate, respectively, Texas Agricultural Experiment Station, Texas A&M University. This project is funded under Cooperative Agreement number 43-3AEK-1-80140 with the Economic Research Service, U.S. Department of Agriculture.

Dept. of agricultural econ. system
Faculty papers series, FP-

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U.S. GRAIN EXPORTS TO MEXICO: A QUALITY REPORT

INTRODUCTION

Central Mexico, in particular the states of Mexico, Distrito Federal, Puebla, Hidalgo, Guanajuato, Jalisco and Veracruz are important grain/soybean deficit regions and are presumably important destinations for U.S. exports. In addition, the northern states of Nuevo Leon, Coahuila, Sonora, and Chihuahua represent important deficit regions whose demand may efficiently be met by overland transportation corridors linking the U.S. and Mexico. Clearly, overland and water transportation corridors are important for U.S. agriculture to efficiently meet the grain/soybean import demands of Mexico.

In calendar year 1990 Mexico imported 7.0 million metric tons of grain and soybeans, 92.2 percent of it from the United States (USDA (a)). Corn, sorghum, and soybeans have historically dominated these imports (Figure 1) (Webb and Gudmunds). This report is an effort to document the quality of U.S. grain (corn, sorghum, wheat, and soybeans) exported to Mexico. The quality data is summarized from inspections of exports to Mexico made by the Federal Grain Inspection Service, U.S. Department of Agriculture (FGIS) during the period October 1985 to February 1992.

Competition in world grain markets has generated interest on issues related to grain quality (U.S. Congress (a), (b)). Current and frequent concerns over quality of U.S. grain exports suggests they may not match cleanliness of competitors grain exports. The 1990 farm bill enables the Federal Grain Inspection Service (FGIS) to establish or change grain grade standards to match levels of quality offered by competing countries. This same farm bill mandated the FGIS to estimate benefits and costs of cleaning grains and the distribution of economic impacts. The outcome of these studies will provide a basis for FGIS to make any needed changes in export grain standards.

FGIS collects and documents information about export grain shipments in an automated system, the Export Grain Information System (EGIS). This system contains one record for each export lot inspected. In the case of some railcar exports, each record may contain information from several lots which were aggregated to simplify internal reporting.

Generally, each EGIS record contains the quantity of the lot and the average factor results which were certificated for the lot. Our analysis weighted the factors by the quantity reported to determine annual averages of the factors. The tables in this report contain descriptive statistics which summarize these lot quantities and averages. Factor results from some export grain shipments; e.g., many railcar lots, are not available to FGIS. Where appropriate, tables provide the number of lots and the quantities used to generate the descriptive statistics.

Many of the tables summarize the factor averages by grade. A U.S. grade is determined by analyzing the physical and biological factors present in the sample. Limits for the grading factors are established for each grade.

Grades range from U.S. No.1 (highest) to U.S. Sample grade (lowest). Factors that exceed the established limits, except for test weight, lower the grade. The established limits for test weight represent minimum requirements for each grade.

Tables covering the U.S. standards for wheat, corn, sorghum, and soybeans are presented along with the quality factors reported in the FGIS data.

WHEAT

Mexico¹

Production

Wheat ranks fourth in area harvested in Mexico after corn, dry beans, and sorghum, and second in production after corn. Production in the late 1980's was 3.9 million tons. Mexico has one of the highest average wheat yields in the world due to the widespread adoption of semi-dwarf wheat varieties grown on irrigated land. Wheat yields averaged 4.14 tons per hectare during 1985-89 compared with the U.S. average of 2.37 tons per hectare.

Wheat is grown in two areas. The northwest region, Sonora, Sinaloa, Chihuahua, and northern and southern Baja California, accounts for 75 percent of output. The central region, including Guanajuato, Michoacan, and Jalisco, accounts for the remaining output. About 95 percent is harvested during April-July and the remainder during September-February.

About 80 percent of production is high-yielding soft winter varieties. Hard durum and white durum varieties make up the remaining production. Large-scale farmers account for about two-thirds of output, with the remainder produced by farmers with less access to modern inputs and credit. About 90 percent of the wheat crop is grown on irrigated land. Wheat is the second largest single user of irrigated land, taking up about 25 percent of the area under irrigation.

Consumption

Wheat accounts for about 20 percent of total Mexican grain consumption. As much as 80 percent of Mexican wheat has gone to food uses in recent years, with the remainder used for seed and feed. Feed use varies annually according to the price of wheat relative to sorghum and other feeds and supplies of durum wheat which is often produced in excess of domestic food demand.

Policies

The principal policies affecting Mexican wheat producers have included (1) a price support program guaranteeing the purchase of the domestic crop at a

1. Information in this section summarized from USDA (a) and CONASUPO (c).

fixed minimum price; (2) import license controls; (3) input subsidies provided by several government agencies for credit, fertilizer, crop insurance, pesticides, irrigation water, and electricity; (4) fiscal support; and (5) general marketing subsidies. As part of the economic austerity and reform programs initiated in 1988, the government has moved toward more market-oriented price policies and reduction of input subsidies. Mexico requires a phytosanitary certificate and a certificate of origin on imported wheat.

Imports

Mexico's wheat imports, consisting primarily of No. 2 hard red wheat, have been erratic over the past decade, ranging from 50,000 tons in 1982 to 1.2 million tons in 1988. Average annual imports are about 0.6 million tons. Mexico's wheat imports average about 12 percent of total supply during 1985-90. The United States typically maintains a dominant share of Mexican wheat imports, and U.S. sales have tended to increase erratically in recent years. Over 65 percent of Mexico's wheat imports were from the United States during 1985-90. U.S. export credit programs have been instrumental in U.S. wheat sales to Mexico, annual wheat exports under the GSM-102 program averaged 0.4 million tons during 1985-90.

Standards

Mexico's wheat standard is related to the government support programs administered by Compania Nacional De Subsistencias Populares (CONASUPO). With the shift in Mexico farm support policy towards a market concept, the grain industries have adopted CONASUPO'S standards for internal grain trading. CONASUPO uses a fixed price based on a given standard and then adjusts the quantity based on the quality factor deviations from the standard (Table 1). For example, CONASUPO will purchase wheat with 12 to 13 percent moisture with no adjustment in weight. However, if moisture is less than 12 percent, CONASUPO adds 1.15 kilograms per metric ton for each 0.1 percent moisture below 12 percent. If moisture is above 13 percent then weight is reduced by 1.15 kilograms per metric ton for each 0.1 percent moisture above 13 percent. Wheat is classified as trigos fuertes grupo 1 (hard wheat), trigo medio fuerte grupo 2 (medium hard wheat-bread), trigos suaves grupo 3 (soft wheat-cookies), trigos suaves grupo 4 (soft wheat-pastry), and trigos cristalinos grupo 5 (transparent wheat-pasta) (CONASUPO (c)).

United States²

Grades and Grade Requirements

Wheat is divided into seven classes: Hard Red Spring, Hard Red Winter, Soft Red Winter, Durum, White, Unclassified, and Mixed (USDA (b)). The classes, Hard Red Spring, Durum, and White, are further divided into subclasses. Each class and subclass is divided into five U.S. numerical grades and U.S. Sample

2. Information in this section summarized from USDA (b).

grade (Table 2). Special grades are provided to emphasize special qualities or conditions affecting the value of wheat. Special grades are added to and made a part of the grade designation. They do not affect the numerical or Sample grade designation.

Definitions

Test weight (lb/bu) is pounds of grain per Winchester bushel.

Moisture is the water content of grain as determined by an approved electronic moisture meter. The percentage of moisture in a sample does not affect the grade.

Shrunken and broken kernels are kernels, kernel pieces, and other matter which pass through a 0.064 by 3/8-inch oblong-hole sieve.

Foreign material is all matter, except wheat, which remains in a sample after removal of dockage and shrunken and broken kernels.

Damaged kernels (total) are kernels, pieces of wheat kernels, and other grains that are badly ground-damaged, badly weathered-damage, diseased, frost-damaged, heat-damaged, insect-bored, mold-damaged, sprout-damaged, or otherwise materially damaged.

Heat-damaged kernels are defined as kernels, pieces of wheat kernels, and other grains which are materially discolored and damaged by heat.

Total defects are the sum of three factors: damaged kernels (total), shrunken and broken kernels, and foreign material. In the factor summary tables, the average values listed for total defects may not equal the sum of the component factor averages due to rounding.

Dockage includes chaff, dust, and items removed from a sample by an initial screening with a dockage tester. The percentage of dockage in a sample does not affect the numerical grade.

Wheat of other classes is any class that is mixed with the predominant class.

Protein is the protein content of grain as determined by an approved near infrared reflectance (NIR) instrument calibrated against a Kjeldahl method (percent nitrogen multiplied by 5.7). The percentage of nitrogen in a sample does not affect the numerical grade.

Contrasting classes include:

Durum, White, and Unclassed wheats in the classes Hard Red Spring and Hard Red Winter.

Hard Red Spring, Hard Red Winter, Soft Red Winter, White, and Unclassed wheats in the class Durum.

Durum and Unclassed wheats in the class Soft Red Winter.

Hard Red Spring, Hard Red Winter, Durum, and Unclassed wheats in the class White. Effective May 1, 1990, contrasting classes for

Hard White and Soft White include Soft Red Winter.

Overview

Mexico imported 550 thousand metric tons of wheat in 1990, with 300 thousand metric tons from the United States (USDA (a)). FGIS inspections of U.S. wheat exported to Mexico during 1987-92 indicates a preponderance of Hard Red Winter during 1987-89 (Table 3). A shift to Soft White occurred during 1990-91. Exports to Mexico graded U.S. No. 2 or better every year analyzed except 1988, where 3.5 percent of the volume graded was lower in quality than U.S. No. 2. Individual yearly average quality factors show no trend during 1987-92 except for broken kernels and protein content. Annual average broken kernels in wheat exported to Mexico trended downward from 2.5 percent in 1987 and 1989 to 1.7 percent in 1991. Annual average protein content increased from 11.5 percent in 1988 to 13.8 percent in 1991. Over 80 percent of the wheat exported to Mexico had test weights of 60 pounds or over per bushel (Figure 2). Almost 90 percent of the FGIS samples had a moisture content of 12 percent or less, damaged kernels of 1.5 percent or less, and a protein content greater than 11 percent. Less than 10 percent had greater than 0.4 percent foreign material and less than 20 percent had greater than 2.5 percent broken wheat.

CORN

Mexico³

Production

Corn, Mexico's major crop, is grown on over 50 percent of the total cropland. It is produced throughout the country on farms that range in size from small subsistence plots in the southeast to large commercial farms in the central and Pacific central regions. About 90 percent of the acreage is harvested during September-March and is concentrated in the States, Jalisco, Chiapas, Puebla, Michoacan, and Guerrero. Dependence upon rainfall, about 86 percent nonirrigated, makes corn production highly variable. Corn yields in Mexico are low, less than 2 tons per hectare, when contrasted with the over 7 tons per hectare in the United States. White corn, the type most preferred by Mexican consumers, dominates production.

Consumption

Corn is the staple of the Mexican diet. During the 1980's, continued growth in total corn consumption was stimulated by the continual decline in the relative price of tortillas and continued population growth. Per capita consumption of corn is about 120 kilograms per year. About 75 percent of the corn is used for food, 12 percent for feed, 6 percent for industrial use, and 1 percent for seed. The balance is lost.

3. Information in this section summarized from USDA (a) and CONASUPO (d).

Policies

Producer and consumer subsidies for corn absorb the largest share of the governments agricultural subsidy budget. The principal policies affecting Mexican corn producers and consumers have included (1) a price support program guaranteeing the purchase of the domestic crop at a fixed minimum price; (2) import license controls; (3) input subsidies provided by several government agencies for credit, fertilizer, crop insurance, pesticides, irrigation water, and electricity; (4) fiscal support; (5) marketing subsidies; and (6) direct consumption subsidies for corn products. The import license requirement and marketing subsidies aid the operation of the guaranteed price program. For imported corn, Mexico requires a certificate of origin and an official certification that the corn does not have aflatoxin levels above 20 parts per billion.

Imports

Mexican corn imports represented about one-fourth of domestic supply during 1985-90. Annual imports during the 1980's averaged 2.9 million tons. The United States supplies most of Mexico's corn imports, over 80 percent during 1985-90. The availability of U.S. credit helped maintain and increase the U.S. market share.

Standards

Mexico's corn standards, as with wheat, are related to the government support programs administered by CONASUPO. Shifts in quality factors result in quantity premiums or discounts (Table 1). A premium of 1 kilogram per metric ton is given for each 0.1 percent moisture below 14 percent. A discount of 1 kilogram per metric ton is taken for each 0.1 percent moisture above 14 percent. In addition to the quantity discount on moisture, an increasing charge for aeration is made for corn with moisture above 14 percent. Corn is classified as blanco (85 percent or more white) and no blanco (all other). No blanco is further divided into amarillo (greater than 50 percent yellow and less than 15 percent other colors), pintos (greater than 15 percent maroon, red, purple, and blue), and mezllados (mixed).

United States²

Grades and Grade Requirements

Corn is separated into three classes; yellow, white, and mixed. There are no subclasses of corn. Each class is divided into five numerical grades and a sample grade (Table 4). Special grades are provided to emphasize special qualities or conditions affecting the value of the corn. These special grades are made part of the grade designation but do not affect the numerical or Sample grade designation.

Definitions

Test weight (lb/bu) is pounds of grain per Winchester bushel.

Moisture is the water content of grain as determined by an approved electronic moisture meter. The percentage of moisture in a sample does not affect the grade.

Broken corn is all pieces of corn that pass through a 12/64-inch round-hole sieve and over a 6/64-inch round hole sieve. The percentage of broken corn by itself does not affect the grade.

Foreign material is all matter that passes readily through a 6/64-inch round-hole sieve and all matter other than corn that remains on top of the 12/64-inch round-hole sieve. The percentage of foreign material by itself does not affect the grade.

Broken corn and foreign material (BCFM) is composed of kernels and pieces of kernels of corn and all matter other than corn which will pass readily through a 12/64-inch sieve, and all matter other than corn which remains in the sieved sample.

Damaged kernels (total) are kernels and pieces of corn kernels that are badly ground-damaged, badly weathered-damaged, diseased, frost-damaged, germ-damaged, heat-damaged, insect-bored, mold-damaged, sprout-damaged, or otherwise materially damaged.

Heat-damaged kernels are defined as kernels and pieces of kernels which are materially discolored by excessive respiration, with dark discoloration extending out of the germ through the sides and into the back of the kernel.

Overview

Corn is the predominant grain exported from the United States to Mexico (Webb and Gudmunds). Yellow corn made up from 96.8 to 100 percent of the corn export inspections to Mexico during 1985-91 (Table 5). U.S. No. 2 corn is the dominant grade shipped to Mexico from the United States, although U.S. No. 3 is increasing in importance. No trends in the quality factors were detected during 1985-92. U.S. corn standards were amended on June 30, 1987 to include separate definitions for broken corn (BC) and foreign material (FM). FGIS began collecting data on the components BC and FM in September 1988. Since the BC and FM data were available only for 4 months, the 1988 summaries of those two factors do not include all samples graded. The individual components, broken corn and foreign material are not grading factors. However, they are combined in the grading standards. Over 90 percent of the corn export samples graded had test weights of 56 pounds or greater (Figure 3). About 75 percent of the corn exported to Mexico had a moisture range of 13 to 14.5 percent. About 90 percent of the corn had less than 4.5 percent damaged kernels. Over 70 percent of the corn exports had less than 3 percent broken corn and foreign material.

SORGHUM

Mexico⁴

Production

Sorghum ranked third in area harvested (1.3 million hectares) and production (3.7 million tons) in Mexico in 1990. Production is spread throughout the country, with the Bajio region accounting for 47 percent, the Tamaulipas accounting for 40 percent, and Sinaloa accounting for 11 percent. About 70 percent of the crop is harvested during September-February. With two-thirds of the crop grown on nonirrigated land, annual production is subject to large variation. Sorghum yields averaged 2.9 metric tons per hectare during 1985-89, lower than the U.S. average of 4.1 metric tons.

Consumption

Sorghum is Mexico's principal feed grain. The bulk of the supply is used for pork and poultry feed. Over 60 percent of the sorghum supply is consumed in the Bajio region where the commercial pork industry is located. Since the mid-1980's, reduced demands for poultry and pork have slowed growth in sorghum consumption. In recent years, the availability of surplus domestic wheat and lower priced corn imports has unfavorably affected sorghum demand.

Policies

The principal policies affecting Mexican sorghum producers have included (1) a price support program guaranteeing the purchase of the domestic crop at a fixed minimum price; (2) import licenses and tariffs; (3) input subsidies provided by several government agencies for credit, fertilizer, crop insurance, pesticides, irrigation water, and electricity; (4) fiscal support; and (5) marketing subsidies. The import license requirement and price supports have accounted for the bulk of support. For imported sorghum, Mexico requires a certificate of origin. The official certification that the sorghum does not have aflatoxin levels above 20 parts per billion has been eliminated.

Imports

Sorghum imports accounted for over 30 percent of total supply between 1985 and 1990. Annual imports averaged about 2.1 million metric tons throughout the 1980's. In fiscal year 1989, the elimination of sorghum import permit requirements, together with high domestic corn and sorghum prices relative to international prices, led to a sharp increase in sorghum imports. Mexico has traditionally imported most of its sorghum imports from the United States, about 88 percent during 1985-90. About 61 percent of U.S. sorghum sales to Mexico during 1985-90 were under the U.S. credit guarantee program, GSM-102.

4. Information in this section summarized from USDA (a) and CONASUPO (a).

Standards

CONASUPO's standards for sorghum, as with wheat and corn, offer quantity premiums/discounts for quality factor deviations from a standard level (Table 1). For example, a 1 kilogram per metric ton reduction in weight is made for each 0.1 percent moisture above 13.5 percent. Grain is rejected if the moisture is above 14 percent. There is a charge for fumigation if insects are found present. All sorghum was classified the same.

United States²

Grades and Grade Requirements

Sorghum is divided into four classes: yellow, white, brown, and mixed. Yellow sorghum has yellow, salmon-pink, red, or white but spotted pericarps, containing not more than 10 percent of sorghum with brown pericarps or subcoats, and does not meet the requirements for the white class. White sorghum has white pericarps and contains not more than 2 percent of sorghum with pericarps or subcoats of other colors. Brown sorghum has brown pericarps or brown subcoats and contains not more than 10 percent of sorghum of other colors. Mixed sorghum is that which does not meet the standards for the yellow, white, or brown classes. Sorghum grades are U.S. numerical grades (U.S. No. 1 through U.S. No. 4), U.S. sample grade, and special grades (Table 6). Special grades include smutty and weevily.

Definitions

Test weight (lb/bu) is pounds of grain per Winchester bushel.

Moisture is the water content of grain as determined by an approved electronic moisture meter. The percentage of moisture in a sample does not affect the grade.

Broken kernels consists of all matter which passes through a 5/64-inch triangular-hole sieve and over a 2.5/64-inch round-hole sieve according to procedures prescribed in FGIS instructions.

Foreign material is all matter, except sorghum, which passes over the number 6 riddle and all matter other than sorghum that remains on top of the 5/64-inch triangular-hole sieve according to procedures prescribed in FGIS instructions.

Broken kernels, foreign material, and other grains is composed of all matter, other than dockage, that passes through a 5/64-inch triangular-hole sieve after sieving according to procedures prescribed in FGIS instructions and all matter other than sorghum which remains in the sieved sample.

Damaged kernels (total) are kernels, pieces of sorghum kernels, and other grains that are badly ground-damaged, badly weathered-damage, diseased, frost-damaged, germ-damaged, heat-damaged, insect-bored, mold-damaged, sprout-damaged, or otherwise materially damaged.

Heat-damaged kernels are defined as kernels, pieces of sorghum kernels, and

other grains which are materially discolored and damaged by heat.

Overview

During 1986 through the first quarter of 1992, 98.4 to 100 percent of U.S. sorghum exported to Mexico graded U.S. No. 2 or better (Table 7). Total sorghum inspected for export to Mexico has increased sharply from 0.4 million ton in 1986 to 4.6 million ton in 1991. Average test weight has remained slightly over 58 pounds per bushel since 57.2 pounds average in 1986. Moisture has gradually trended downward from 13.5 percent in 1986 to 13.0 percent in 1992. Both damaged kernels and broken kernels also indicate a downward trend across time. Sorghum had a test weight distribution with about 98 percent above the standard 56 pounds per bushel (Figure 4). Over 80 percent of the observations tested between 12.5 and 13.75 percent moisture. None of the samples showed broken sorghum plus foreign material greater than 8 percent.

SOYBEANS

Mexico⁵

Production

Soybeans, Mexico's major oilseed crop, ranks fifth in area and fourth in production among all field crops. They account for more than half of the oilseed production. Soybeans, primarily harvested in September, are grown on large commercial farms in Sonora, Sinaloa, and Tamaulipas. About 85 percent of the crop is grown on irrigated land with yields averaging slightly less than in the United States.

Consumption

Demand for soybean products has grown faster than domestic production during the 1980's. Human consumption accounts for about 3 percent of total use. The bulk of demand is derived from the demand for meal and oil. Soybean meal accounts for about 70 percent of all oilseed meals consumed in Mexico. Expansion of the pork and poultry sectors during the 1970-85 period increased demand for soybean meal. Soybean oil accounts for about 40 percent of total edible vegetable oil consumption. The share held by soybean oil has remained relatively stable.

Policies

The principal policies affecting Mexican soybean producers have included (1) a price support program guaranteeing the purchase of the domestic crop at a fixed minimum price; (2) import license controls and tariffs; (3) input subsidies provided by several government agencies for credit, fertilizer, crop

5. Information in this section summarized from USDA (a) and CONASUPO (b).

insurance, pesticides, irrigation water, and electricity; (4) fiscal support; and (5) marketing subsidies. The import license requirement and price supports have accounted for the bulk of support. For sorghum imported, Mexico requires a phytosanitary certificate and a certificate of origin.

Imports

Mexico has traditionally imported more oilseeds than finished products. Oilseed imports are typically less costly than imports of oils and meal. Excess soybean processing capacity exists in Mexico. The average annual Mexican imports of soybeans was about 1.1 million tons throughout the 1980's. The United States is Mexico's major supplier of soybeans, meal, and oil. The U.S. market share is slightly over three-fourths for soybeans. U.S export programs have been instrumental in maintaining the U.S. share of this market.

Standard

Mexico's standard for soybeans, similiar to the other grains, offer quantity premiums/discounts for quality factor deviations from a standard level (Table 1). The weight adjustments are 1 kilogram per metric ton for each 0.1 percent difference in the quality factor from the base standard. The moisture standard for the state of Tamaulipas is slightly different from the rest of Mexico.

United States²

Grades and Grade Requirements

There are two classes of soybeans: yellow and mixed soybeans. There are no subclasses. The yellow soybean class is most commonly exported by the U.S. market. Each class is divided into four U.S. numerical grades and U.S. Sample grade (Table 8). Special grades are provided to emphasize special qualities or conditions affecting the value of soybeans. These special grades are part of the grade designation but do not affect the numerical or Sample grade designation.

Definitions

Test weight (lb/bu) is pounds of grain per Winchester bushel.

Moisture is the water content of grain as determined by an approved electronic moisture meter. The percentage of moisture in a sample does not affect the grade.

Splits are soybeans with more than one-fourth of the bean removed and which are not damaged. The averages for splits represent the average of certificated values which were truncated to whole percents. The actual averages for the factor splits could be as much as 1.0 percent higher than the averages shown in this report.

Foreign material is all matter, including soybeans and pieces of soybeans, which pass through an 8/64-inch sieve and all matter other than soybeans remaining on the sieve after sieving.

Damaged kernels (total) are soybeans and pieces of soybeans which are badly ground-damaged, badly weathered-damaged, diseased, frost-damaged, heat-damaged, insect-bored, mold-damaged, sprout-damaged, stinkbug stung, or otherwise materially damaged.

Heat-damaged kernels are soybeans and pieces of soybeans which are materially discolored and damaged by heat.

Soybeans of other colors are soybeans which have green, black, brown, or bicolored seed coats.

Overview

All soybeans exported to Mexico during the 1985-92 period were of the yellow soybean class (Table 9). The United States exported U.S. Nos. 1-3 grades to Mexico during the period FGIS grade data was analyzed. U.S. No. 2 grade dominates the proportion exported, followed by No.1 and then No. 3. Average annual test weight varied from 55.5 pounds per bushel in the first quarter of 1992 to 56.6 pounds per bushel in 1988. Moisture content shifted downward about 1 percentage point during the 1988-92 period from the 1985-87 period. The other quality factors show no appreciable changes across the period data were analyzed. All but one of the 497 soybean lots graded showed test weights below 60 pounds per bushel (Figure 5). Damaged kernels ranged from 0 to 3 percent in the 496 observations.

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Table 1. Mexico Standards for Grain

Factor	Sorghum	Soybeans	Corn d/	Wheat
Moisture:				
No Penalty	13.5% or less	12% or less b/	14%	12 to 13%
Premium/MT	None	None	1 Kg/0.1% decrease below 14 to 8%	1.15 Kg/0.1% decrease below 12 to 6%
Discount/MT	1 Kg/0.1% increase above 13 to 14%	1 Kg/0.1% increase above 12 to 14%	1 Kg/0.1% increase above 14 to 18% e/	1.15 Kg/0.1% increase above 13 to 14%
Reject	Greater than 14%	Greater than 14%	Greater than 18%	Greater than 14%
Damaged Kernels:				
No Penalty	2.5% or less	2% or less c/	10% or less f/	1 to 1.5%
Premium/MT	None	None	None	0.5 Kg/0.1% decrease below 1 to 0%
Discount/MT	None	1 Kg/0.1% Increase above 2 to 5%	None	0.5 Kg/0.1% increase above 1.5 to 3%
Reject	Greater than 2.5%	Greater than 5%	Greater than 10%	Greater than 3%
Foreign Material:				
No Penalty	1.5% or less	1% or less	2% or less g/	2% or less
Premium/MT	None	None	None	1.03 Kg/0.1% decrease below 2 to 0%
Discount/MT	None	1 Kg/0.1% increase above 1 to 5%	None	1.03 Kg/0.1% increase above 2 to 5%
Reject	Greater than 1.5%	Greater than 5%	Greater than 2%	Greater than 5%
Broken Kernels:				
No Penalty	10% or less	10% or less	N/A	N/A
Premium/MT	None	None		
Discount/MT	1 Kg/0.1% increase above 10 to 15%	1 Kg/0.1% increase above 10 to 20%		
Reject	Greater than 15%	Greater than 20%		
Insects:				
If Present	Fumigation Charge	N/A	Fumigation Charge	N/A
Smut, Tilletia Caries and Controversa:				
No Penalty	N/A	N/A	N/A	Up to 13 pieces/0.25 Kg
Premium/MT				None
Discount/MT				0.5 Kg/each piece above 13 to 30
Reject				Greater than 30 pieces
Smut, Tilletia Indica:				
No Penalty	N/A	N/A	N/A	0%
Premium/MT				None
Discount/MT				1 Kg/0.1% increase above 0 to 3%
Reject				Greater than 3%
Test Weight:				
No Penalty a/	N/A	N/A	N/A	70 to 77 Kg/Hectolitro
Premium/MT				3 Kg/1 Kg increase above 77 to 85 Kg/Hl
Discount/MT				3 Kg/1 Kg decrease below 70 to 65 Kg/Hl
Reject				Less than 65 Kg/Hl

a/ The acceptance level varies by wheat group and moisture content. Numbers shown are for Grupo 2 at 14 percent moisture.

b/ The moisture content varies in the state of Tamaulipas from these standards, accept at 14 percent and reject if greater than 18 percent.

c/ Cannot have greater than 0.5 percent heat damage.

d/ Corn classified as white or non-white. White if 85 percent or more white corn. Non-white is subdivided into pintos, mixed, and yellow.

e/ An increasing aeration fee, in addition to the quantity discount, is charged for corn above 14 percent moisture. The state of Tamaulipas has a slightly different fee schedule than the rest of Mexico.

f/ Cannot have greater than 4 percent heat damage or 2 percent fungus damage.

g/ Foreign material is non-corn material that passes through a 12/64 inch sieve.

SOURCE: CONASUPO (a,b,c,d)

Table 2. U.S. Standards for Wheat

Grade	Minimum limits of-		Minimum limits of-						
	Test weight per bushel		Damaged Kernels		Foreign material	Shrunken and broken kernels (percent)	Defects (total) ³	Wheat of other classes ⁴	
	Hard Red Spring wheat or White Club wheat (pounds) ¹	All other classes and subclasses (pounds)	Heat damaged kernels (percent)	Total ²				contrast-ing classes	Total ⁵
U.S. No. 1	58.0	60.0	0.2	2.0	0.5	3.0	3.0	1.0	3.0
U.S. No. 2	57.0	58.0	0.2	4.0	1.0	5.0	5.0	2.0	5.0
U.S. No. 3	55.0	56.0	0.5	7.0	2.0	8.0	8.0	3.0	10.0
U.S. No. 4	53.0	54.0	1.0	10.0	3.0	12.0	12.0	10.0	10.0
U.S. No. 5	50.0	51.0	3.0	15.0	5.0	20.0	20.0	10.0	10.0
U.S. Sample grade									

U.S. Sample grade is wheat that:

- (a) Does not meet the requirements for the grades U.S. Nos. 1, 2, 3, 4, or 5; or
- (b) Contains 32 or more insect-damaged kernels per 100 grams of wheat, or contains 8 or more stones or any number of stones which have an aggregate weight in excess of 0.2 percent of the sample weight, 2 or more pieces of glass, 3 or more crotalaria seeds (*Crotalaria* spp.), 2 or more beans (*Ricinus communis* L.), 4 or more particles of an unknown foreign substance(s) or a commonly recognized harmful or toxic substance(s), 2 or more rodent pellets, bird droppings, or an equivalent quantity of other animal filth per 1,000 grams of wheat; or
- (c) Has a musty, sour, or commercially objectionable foreign odor (except smut or odor); or
- (d) Is heating or otherwise of distinctly low quality.

¹ These requirements also apply when Hard Red Spring or White Club wheat predominates in a sample of Mixed wheat.

² Includes heat-damaged kernels.

³ Defects includes damaged kernels (total), foreign material, and shrunken and broken kernels. The sum of these three factors may not exceed the limit for defects for each numerical grade.

⁴ Unclassified wheat of any grade may contain not more than 10.0 percent of wheat of other classes.

⁵ Includes contrasting classes.

Source: USDA (b)

Table 3. Average Factor Results: U.S. Wheat Exports To Mexico

Factor	Unit	Calendar Year						
		1986	1987	1988	1989	1990	1991	1992 a/
Quantity	Mil MT		0.2	2.0	0.6	0.4	0.6	0.01
Observations	No		31	117	38	17	50	1
Test Weight	Lbs/Bu		60.9	61.6	61.0	60.9	60.6	59.1
Dockage	Percent		6.3	7.1	7.0	6.9	7.4	8.8
Moisture	Percent		11.4	10.9	10.7	11.2	12.0	12.1
Damaged Kernels	Percent		0.8	1.0	1.0	1.2	1.1	0.9
Foreign Matter	Percent		0.3	0.3	0.3	0.3	0.3	0.4
Broken Kernels	Percent		2.5	2.1	2.5	2.0	1.7	1.6
Protein	Percent		11.8	11.5	12.0	12.1	13.8	14.4
Grade:								
1	Percent		6.5	16.2	7.9	0.0	2.0	0.0
2	Percent		93.5	80.3	92.1	100.0	98.0	100.0
3	Percent		0.0	1.7	0.0	0.0	0.0	0.0
4	Percent		0.0	0.9	0.0	0.0	0.0	0.0
5	Percent		0.0	0.9	0.0	0.0	0.0	0.0
Class Wheat:								
HRS	Percent		0.0	1.7	0.0	5.9	12.0	100.0
HRW	Percent		90.3	97.4	97.4	64.7	26.0	0.0
WW	Percent		9.7	0.9	2.6	0.0	0.0	0.0
SWH	Percent		0.0	0.0	0.0	29.4	60.0	0.0
SRW	Percent		0	0.0	0.0	0.0	2.0	0.0

a/ Factor results are for part of year only.

Source: FGIS

Table 4. U.S. Standards for Corn

Grade	Minimum test weight per bushel (pounds)	Maximum limits of-		
		Damaged kernels		Broken corn and foreign material (BCFM) (percent)
		Heat damaged kernels (percent)	Total (percent)	
U.S. No. 1	56.0	0.1	3.0	2.0
U.S. No. 2	54.0	0.2	5.0	3.0
U.S. No. 3	52.0	0.5	7.0	4.0
U.S. No. 4	49.0	1.0	10.0	5.0
U.S. No. 5	46.0	3.0	15.0	7.0
U.S. Sample grade				

U.S. Sample grade is corn that:

- (a) Does not meet the requirements for the grades U.S. Nos. 1,2,3,4, or 5; or
- (b) In a 1,000-gram sample, contains 8 or more stones which have an aggregate weight in excess of 0.20 percent of the sample weight, 2 or more pieces of glass, 3 or more crotalaria seeds (*Crotalaria* spp.), 2 or more castor beans, 8 or more cockleburrs, 4 or more particles of an unknown foreign substance(s) or a commonly recognized harmful or toxic substance(s), or animal filth in excess of 0.20 percent; or
- (c) Has a musty, sour, or commercially objectionable foreign odor; or
- (d) Is heating or otherwise of distinctly low quality.

Source: USDA(b)

Table 5. Average Factor Results: U.S. Corn Exports To Mexico

Factor	Unit	Calendar Year							
		1985a/	1986	1987	1988	1989	1990	1991	1992a/
Quantity	Mil MT	1.4	2.5	7.3	9.3	5.1	3.5	2.2	0.0
Observations	No	123	158	439	580	258	162	126	2
Test Weight	Lbs/Bu	56.9	56.7	57.0	57.0	57.0	57.0	56.6	
Moisture	Percent	15.3	14.6	14.0	13.7	13.8	14.2	14.4	
Damaged Kernels	Percent	2.3	3.9	3.8	3.7	3.8	2.7	2.8	
Foreign Matter	Percent				0.6	0.7	0.7	0.8	
Broken Kernels	Percent				2.0	2.2	2.2	2.3	
Brok & For Mat	Percent	2.7	2.8	2.9	2.7	2.9	2.9	3.1	
Grade:									
1	Percent	16.3	7.0	8.9	7.8	10.1	7.5	11.9	50.0
2	Percent	82.1	84.2	64.2	74.6	69.4	75.8	66.7	50.0
3	Percent	1.6	7.6	26.9	17.3	19.4	16.1	19.0	0.0
4	Percent	0.0	1.3	0.0	0.2	0.8	0.0	2.4	0.0
5	Percent	0.0	0.0	0.0	0.2	0.4	0.6	0.0	0.0
Class of Corn:									
Yellow	Percent	100.0	98.7	100.0	99.8	98.8	100.0	96.8	100.0
White	Percent	0.0	1.3	0.0	0.2	1.2	0.0	3.2	0.0

a/ Factor results are only for part of a year.

Source: FGIS

Table 6. U.S. Standards for Sorghum

Grade	Minimum Test weight per bushel (pounds)	Maximum limits of..		
		Damaged Kernels		Broken Kernels, foreign material, and other grains (percent)
		Heat damaged (percent)	Total (percent)	
U.S. No. 1	57.0	0.2	2.0	4.0
U.S. No. 2 ¹	55.0	0.5	5.0	8.0
U.S. No. 3	53.0	1.0	10.0	12.0
U.S. No. 4	51.0	3.0	15.0	15.0

U.S. Sample grade is sorghum that :

- (a) Does not meet the requirements for the grades U.S. Nos. 1, 2, 3, or 4; or
- (b) Contains 8 or more stones which have an aggregate weight in excess of 0.2 percent of the sample weight, 2 or more pieces of glass, 3 or more crotalaria seeds (*Crotalaria* spp.), 2 or more castor beans (*Ricinus communis* L.), 4 or more particles of an unknown foreign substances(s) or a commonly recognized harmful or toxic substance(s), 8 or more cockleburrs (*Xanthium* spp.) or similar seeds singly or in combination, 10 or more rodent pellets, bird droppings, or equivalent quantity of other animal filth per 1,000 grams of sorghum; or
- (c) Has a musty, sour, or commercially objectionable foreign odor (except smut odor); or
- (d) Is badly weathered, heating, or distinctly low quality.

¹ Sorghum which is distinctly discolored shall be graded not higher than U.S. No.3.

Source: USDA (b)

Table 7. Average Factor Results: U.S. Sorghum Exports To Mexico

Factor	Unit	Calendar Year							
		1985	1986	1987	1988	1989	1990	1991	1992a/
Quantity	Mil MT		0.4	0.6	2.2	2.8	3.2	4.6	2.1
Observations	No		62	62	230	213	224	241	104
Test Weight	Lbs/Bu		57.2	58.1	58.2	58.3	58.0	58.3	58.6
Dockage	Percent		3.2	5.3	3.8	3.5	3.4	3.1	2.8
Moisture	Percent		13.5	13.4	13.3	13.1	13.1	13.2	13.0
Damaged Kernels	Percent		2.3	2.4	2.6	2.3	2.2	1.6	1.7
Foreign Matter	Percent			1.6	1.5	1.3	1.5	1.5	1.6
Broken Kernels	Percent			5.7	4.4	4.0	3.9	3.8	3.6
Brok & For Mat	Percent		5.8	7.1	5.9	5.3	5.4	5.2	5.2
Grade:									
1	Percent		3.2	6.5	5.2	9.9	7.6	4.1	3.8
2	Percent		95.2	93.5	93.5	88.7	92.4	95.9	96.2
3	Percent		1.6	0.0	1.3	1.4	0.0	0.0	0.0
Class:									
Yellow	Percent		100.0	100.0	100.0	99.5	100.0	100.0	100.0
White	Percent		0.0	0.0	0.0	0.5	0.0	0.0	0.0

a/ Factor results are for part of year only.

Source: FGIS

Table 8. U.S. Standards for Soybeans

Grade	Minimum test weight per bushel (pounds)	Maximum limits of-				
		Damaged kernels		Foreign material (percent)	Splits (percent)	Soybeans of other colors (percent)
		Heat damaged kernels (percent)	Total (percent)			
U.S. No. 1	56.0	0.2	2.0	1.0	10.0	1.0
U.S. No. 2	54.0	0.5	3.0	2.0	20.0	2.0
U.S. No. 3 ¹	52.0	1.0	5.0	3.0	30.0	5.0
U.S. No. 4 ²	49.0	3.0	8.0	5.0	40.0	10.0
U.S. Sample grade:						

U.S. Sample grade is Soybeans that:

- (a) Does not meet the requirements for the grades U.S. Nos. 1,2,3, or 4; or
- (b) Contains 8 or more stones which have an aggregate weight in excess of 0.2 percent of the sample weight, 2 or more pieces of glass, 3 or more crotalaria seeds (*Crotalaria* spp.), 2 or more castor beans (*Ricinus communis* L.), 4 or more particles of an unknown foreign substance(s) or a commonly recognized harmful or toxic substance(s), 10 or more rodent pellets, bird droppings, or equivalent quality of other animal filth per 1,000 grams of soybeans; or
- (c) Have a musty, sour, or commercially objectionable foreign odor (except garlic odor); or
- (d) Are heating or otherwise of distinctly low quality.

¹ Soybeans that are purple mottled or stained are graded not higher than U.S. No. 3.

² Soybeans that are materially weathered are graded not higher than U.S. No. 4.

Source: USDA (b)

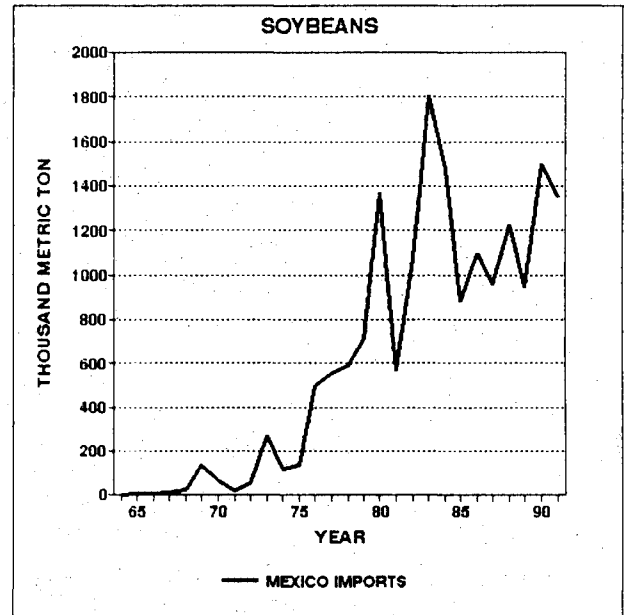
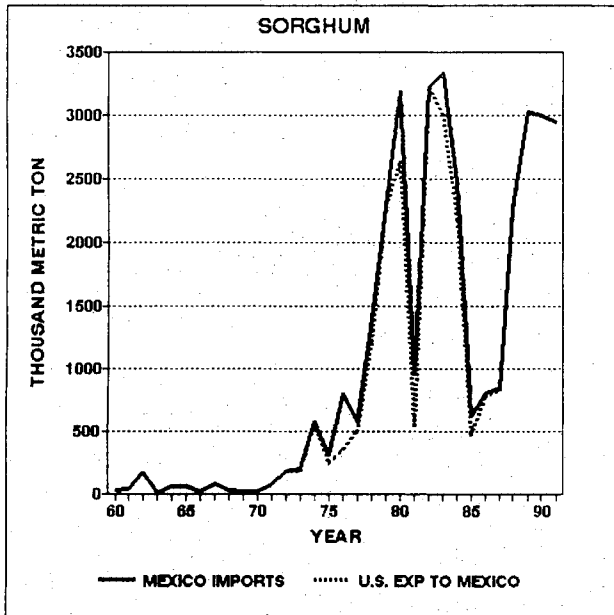
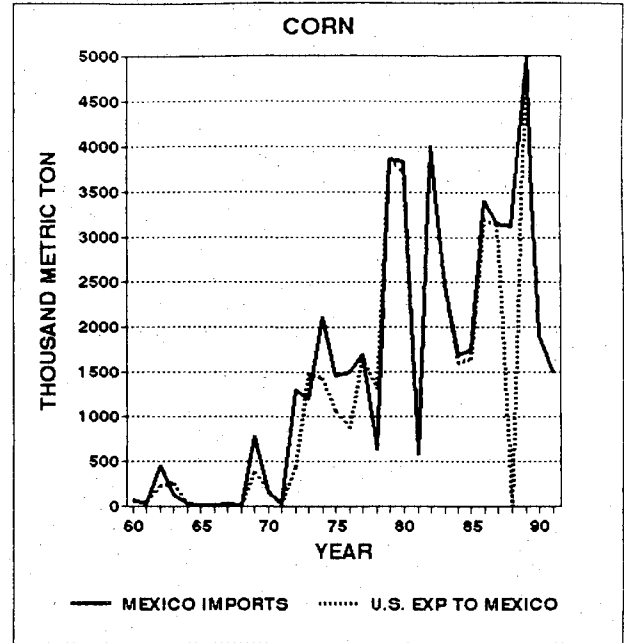
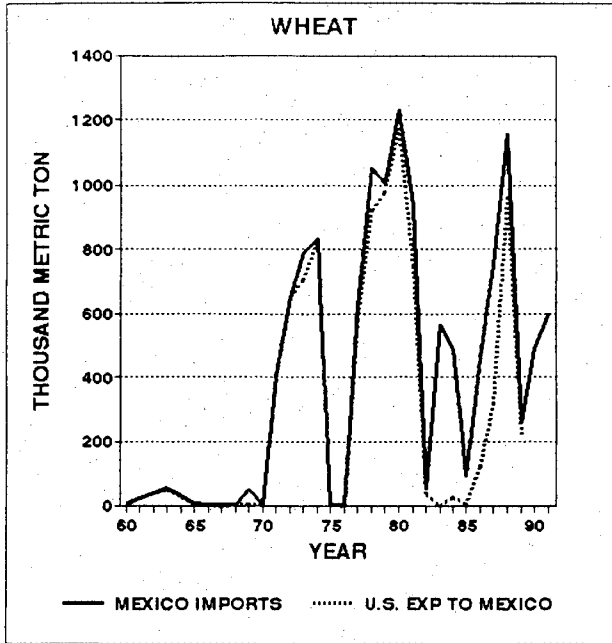
Table 9. Average Factor Results: U.S. Soybeans Exports To Mexico

Factor	Unit	Calendar Year							
		1985a/	1986	1987	1988	1989	1990	1991	1992a/
Quantity	Mil MT	0.1	1.0	1.5	2.7	1.6	0.8	1.7	0.8
Observations	No	23	143	186	344	158	84	141	40
Test Weight	Lbs/Bu	55.7	55.9	56.4	56.6	56.0	56.0	55.8	55.5
Moisture	Percent	12.8	12.3	12.6	11.0	11.5	11.3	11.6	11.3
Heat Damage	Percent	1.0	1.3	2.0	1.9	1.4	1.6	1.7	1.7
Damaged Kernels	Percent	1.4	1.5	1.6	1.1	1.3	1.3	1.3	1.4
Foreign Matter	Percent	1.6	1.7	1.7	1.8	1.8	1.8	1.8	1.8
Protein	Percent						34.9	35.9	
Other Color	Percent		5.2	2.7	2.5	2.4	1.6	1.2	5.0
Splits	Percent	5.3	6.4	6.9	5.6	5.9	6.0	4.8	6.6
Oil	Percent						18.4	18.9	
Grade:									
1	Percent	4.3	7.7	3.2	0.6	1.3	0.0	0.0	2.5
2	Percent	91.3	92.3	93.5	98.8	98.7	94.0	94.3	97.5
3	Percent	4.3	0.0	3.2	0.6	0.0	6.0	5.7	0.0
Class:									
Yellow	Percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

a/ Factor results are for part of year only.

Source: FGIS

Figure 1. U.S. Share of Mexico Grain Imports



Source: Webb and Gudmunds.

Figure 2. Wheat: Cumulative Percent of Quality Factors in Graded Exports to Mexico

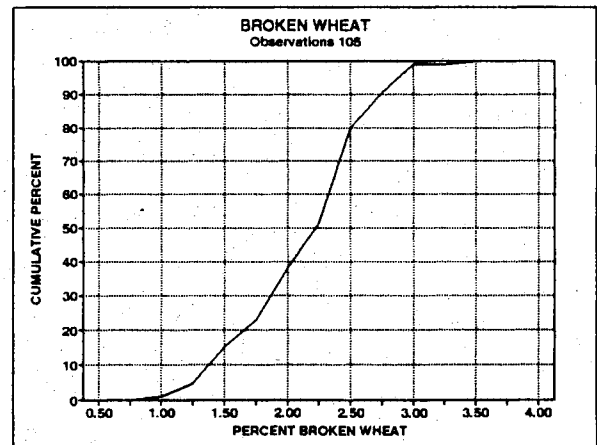
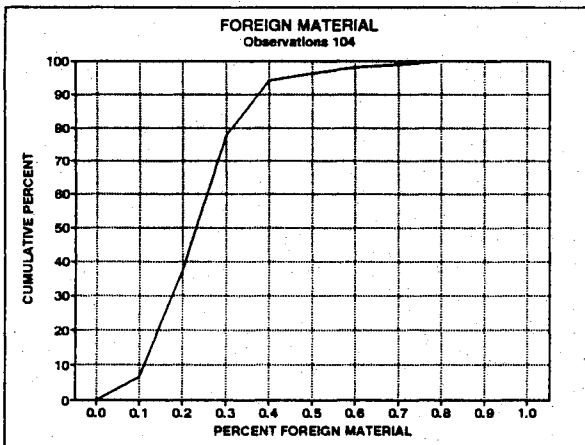
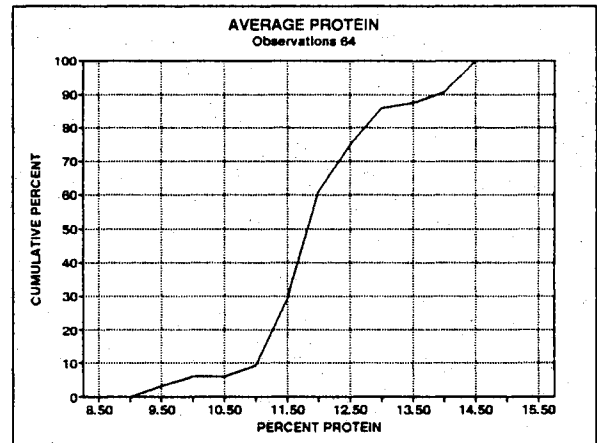
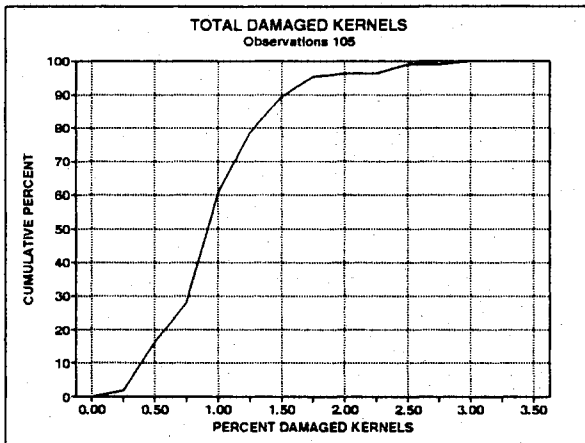
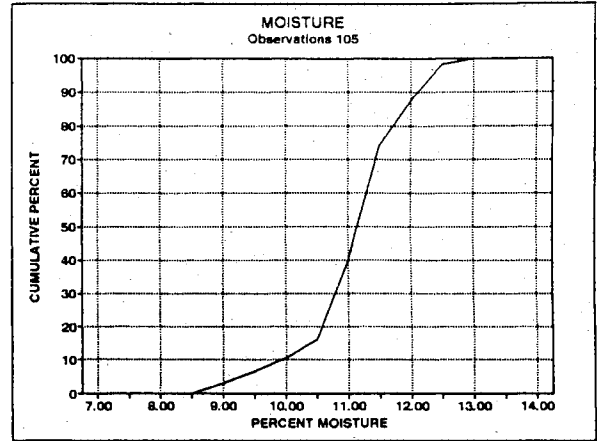
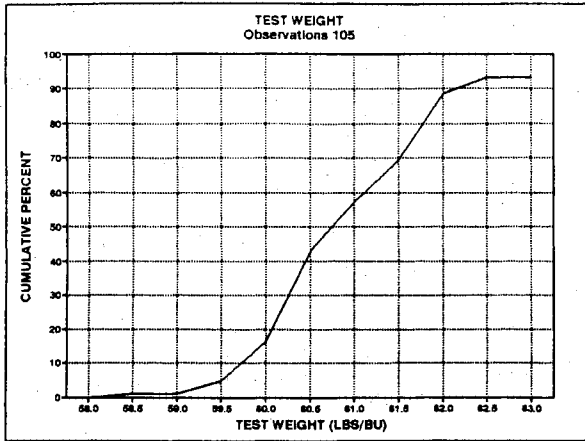


Figure 3. Corn: Cumulative Percent of Quality Factors in Graded Exports to Mexico

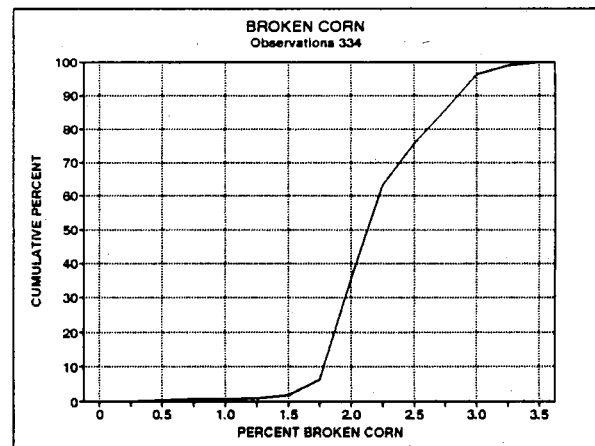
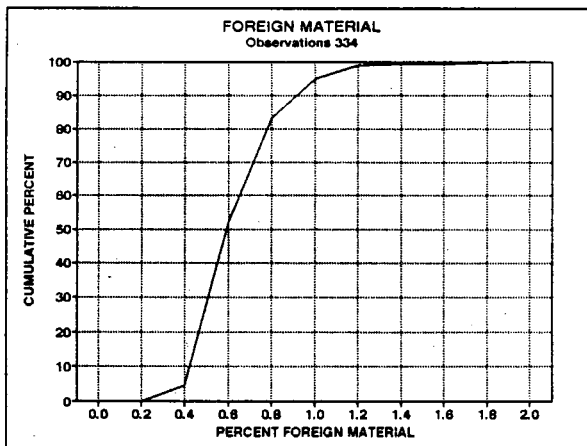
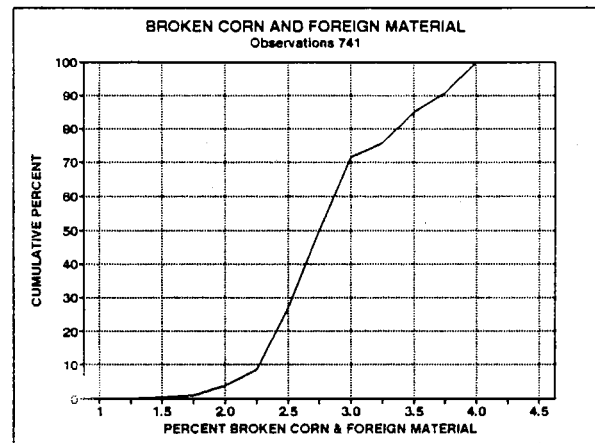
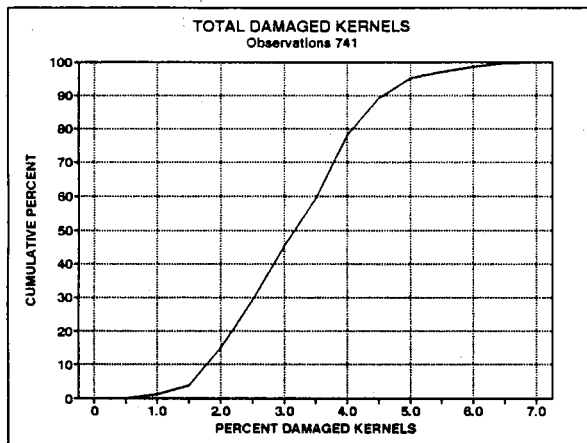
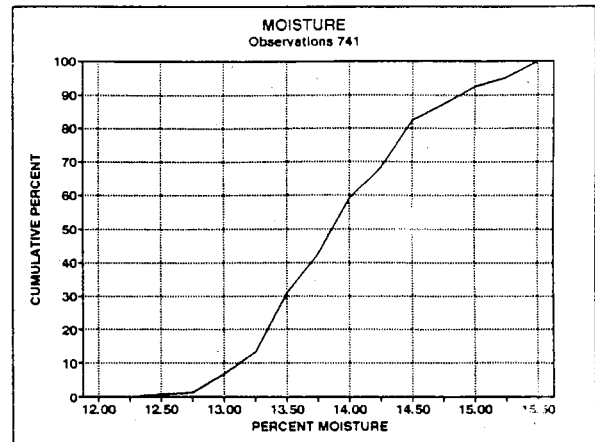
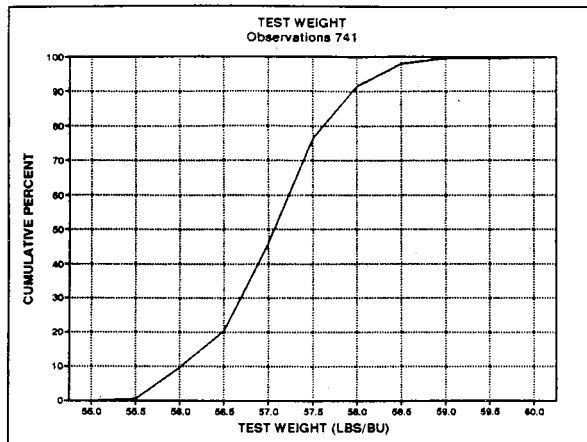


Figure 4. Sorghum: Cumulative Percent of Quality Factors in Graded Exports to Mexico

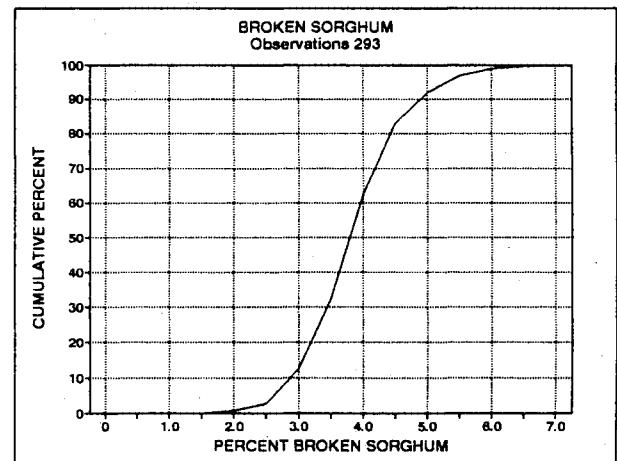
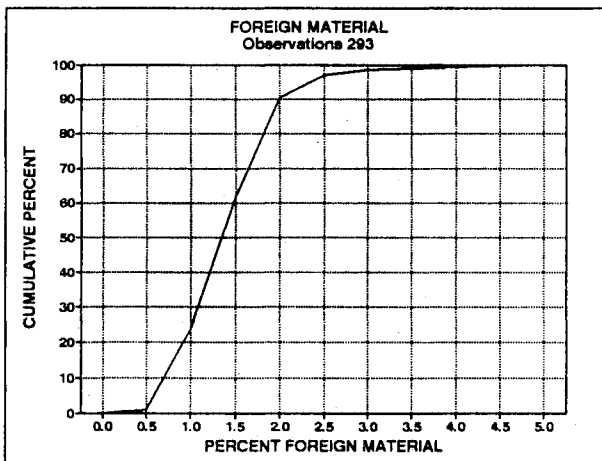
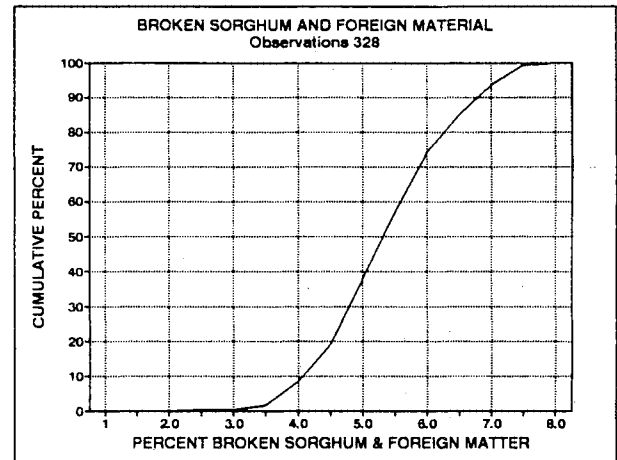
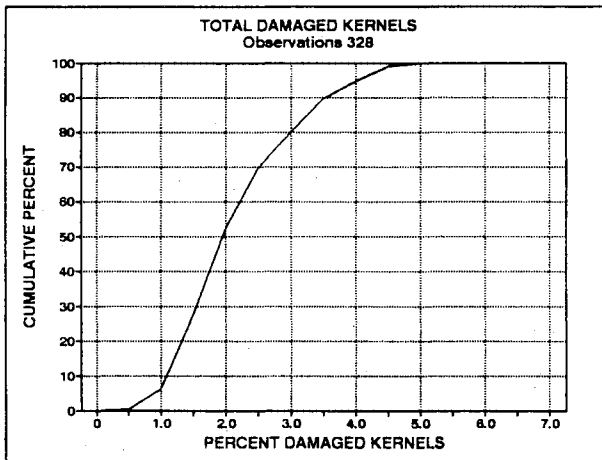
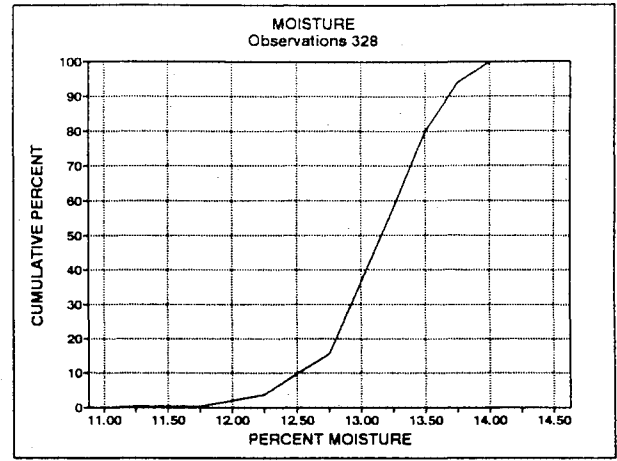
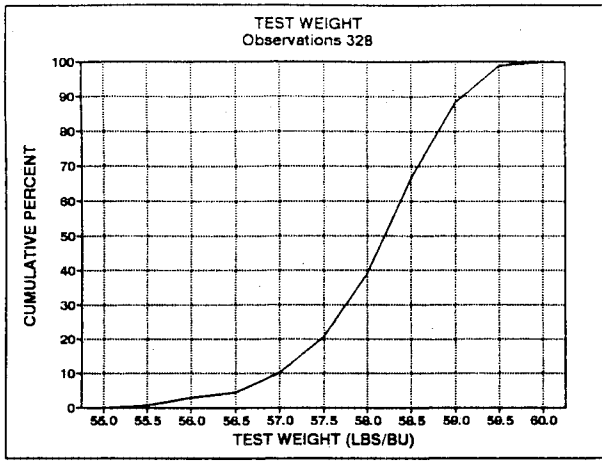


Figure 5. Soybeans: Cumulative Percent of Quality Factors in Graded Exports to Mexico

