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The U.S. Department of Agriculture revised the estimates for the 2009/10 soybean crop on June 10th. While these projections are still preliminary and subject to change due to weather, disease and other stresses during the growing season, the values provide some indication of soybean and soybean meal production and use values for the coming season.

The USDA estimates soybean growers will plant 76 million acres this spring, which is slightly more than last year. Assuming a "normal" crop year, USDA is predicting an average 42.6-bushel yield, which will produce a 3.2 billion bushel soybean crop. Therefore, the total supply of soybeans for crush and export is about four percent greater than for the 2008/09 crop year. Some of this season's production gains are offset by lower soybean stocks at the beginning of the crop year. The take home message is that the soybean crush is projected to increase by about two percent, soybean exports will be at record levels and domestic meal use will be greater than last year.

USDA is also projecting the price of soybean meal in the 2009/10 crop year will be in the range of $275-335 per short ton compared to an estimated price of $320 for 2008/09.

Soybean Production Data

Crop Year (*)	2007/08	2008/09 (**)	2009/10 (***)	% Change
Acres Planted (million acres)	64.7	75.7	76.0	+0.4
Acres Harvested (million acres)	64.1	74.6	75.0	+0.5
Yield (bushels/acre)	41.7	39.6	42.6	+7.6
Soybean Supply and Use (Million of bushels)				
Beginning Stocks	574	205	110	-46.3
Production	2,677	2,959	3,195	+8.0
Imports	10	12	12	+0.0
Total Supply	3,261	3,176	3,317	+4.4
Crush	1,801	1,650	1,675	+1.5
Exports	1,161	1,250	1,260	+0.8
Seed and Residue	93	167	171	+2.4
Total Use	3,056	3,066	3,107	+1.3
Soybean Meal Production and Use (Million short tons)				
Beginning Stocks	0.346	0.294	0.300	+2.0
Production	42.242	39.166	39.835	+1.7
Imports	0.141	0.140	0.165	+17.9
Total Supply	42.729	39.600	40,300	+1.8
Domestic Use	33.155	30.500	30.800	+1.0
Exports	9.280	8.800	9.200	+4.5
Total Use	42.435	39.300	40.000	+1.8
Average price ($/ton)	$336	$320	$275-335.	

(*) Marketing year beginning September 1 for soybeans and October 1 for meal; (**) Estimate and (***) Projection

***Reference**: U.S.D.A. Economic Research Service, World Agricultural Supply and Demand Estimates; WASDE-471, June 10, 2009*

World Soybean Meal Consumption (Million Metric Tons)*

	2007/08	2008/09(**)	2009/10(***)	% Change
United States	30.08	27.67	27.94	+1.0
Argentina	0.62	0.63	0.68	+7.9
Brazil	12.25	12.44	12.74	+2.4
China	30.85	31.91	33.80	+5.9
EU-27	35.17	32.72	32.74	+0.1
India	2.06	2.48	2.27	-8.5
Other	46.35	44.62	47.44	+6.3
World Total	157.38	152.47	157.61	+3.4

(*)Data based on local marketing years except Argentina and Brazil which are adjusted to an October-September year; (**) Estimated and (***) Projected.

***Reference:** U.S.D.A. Economic Research Service, World Agricultural Supply and Demand Estimates; WASDE-471, June 10, 2009*

USDA estimates that world soybean meal consumption will increase by three percent in the coming crop year. The largest increase in soybean meal use is in China which accounts for over forty percent of the projected increase in soybean meal use. Soybean meal use in the United States is predicted to increase over one percent and about 270,000 metric tons (300,000 short tons).

Soybean Meal- Dairy
An incomplete 8 x 8 Latin square trial (4-wk periods; 12 wk total) using 48 Holstein cows was conducted to assess the production response to crude protein (CP), digestible rumen-undegraded protein (RUP), and rumen-protected methionine (RPM). Diets contained 21% alfalfa silage, 34% corn silage, 22 to 26% high-moisture corn, 10 to 14% soybean meal, 4% soyhulls, 2% added fat, 1.3% minerals and vitamins, and 27 to 28% neutral detergent fiber on a dry matter (DM) basis. Treatments were a 2 x 2 x 2 factorial arrangement of the following main effects: 15.8 or 17.1% dietary CP, with or without supplemental rumen-undegraded protein (RUP) from expeller soybean meal, and 0 or 9 g of RPM/d. None of the 2- or 3-way interactions was significant. Higher dietary CP increased DM intake (1.1 kg/d), yield of 3.5% fat-corrected milk (2.2 kg/d), fat (0.10 kg/d), true protein (0.05 kg/d), improved apparent N balance and digestibility of DM and fiber. However, milk urea N and estimated urinary excretion of urea-N and total-N also increased, and apparent N efficiency (milk-N/N-intake) fell from 33 to 30% when cows consumed higher dietary CP. The positive effects of feeding more RUP were increased feed efficiency and milk fat content plus 1.8 kg/d greater fat-corrected milk and 0.08 kg/d greater fat, but milk protein content was lower and milk urea N and urinary urea excretion were elevated. Supplementation with RPM increased DM intake (0.7 kg/d), fat-corrected milk (1.4 kg/d), fat yield (0.06 kg/d) and tended to increase milk fat content and yield of milk and protein.

Broderick GA, Stevenson MJ, Patton RA. 2009. Effect of dietary protein concentration and degradability on response to rumen-protected methionine in lactating dairy cows. J Dairy Sci. 92(6):2719-28.

Twenty-eight (8 with ruminal cannulas) lactating Holstein cows were assigned to seven 4 x 4 Latin squares in a 16-wk trial to study the effects on production and ruminal metabolism of feeding differing proportions of rumen-degraded protein (RDP) from soybean meal and urea. Diets contained [dry matter (DM) basis] 40% corn silage, 15% alfalfa silage, 28 to 30% high-moisture corn, plus varying levels of ground dry shelled corn, solvent- and lignosulfonate-treated soybean meal, and urea. Proportions of the soybean meals, urea, and dry corn were adjusted such that all diets contained 16.1% crude protein and 10.5% RDP. Urea providing 0, 1.2, 2.4, and 3.7% RDP (DM basis). As urea supplied greater proportions of RDP, there were linear decreases in DM intake, yield of 3.5% fat-corrected milk, fat, protein, and solids-not-fat, and weight gain. Milk contents of fat, protein, and solids-not-fat were not affected by source of RDP. Replacing soybean meal RDP with urea RDP resulted in several linear responses: increased excretion of urinary urea-N and concentration of milk urea-N, blood urea-N, and ruminal ammonia-N and decreased excretion of fecal N; there was also a trend for increased excretion of total urinary N. A linear increase in neutral detergent fiber (NDF) digestibility, probably due to digestion of NDF-N from lignosulfonate-treated soybean meal, was observed with greater urea intake. Omasal sampling revealed small but significant effects of N source on measured RDP supply, which averaged 11.0% (DM basis) across diets. Increasing the proportion of RDP from urea resulted in linear decrease in omasal flow of dietary nonammonia N (NAN) and microbial NAN and in microbial growth efficiency (microbial NAN/unit of organic matter truly digested in the rumen). These changes were paralleled by large linear reductions in omasal flows of essential, nonessential, and total amino acids. Overall, these results indicated that replacing soybean meal RDP with urea reduced yield of milk and milk components, largely because of depressed microbial protein formation in the rumen and RDP from nonprotein-N sources was not as effective as RDP provided by true protein.

Broderick, G.A, and S.M. Reyna. 2009. Effect of source of rumen-degraded protein on production and ruminal metabolism in lactating dairy cows. J. Dairy Sci. 92(6):2822-34.

Soybean Meal Analysis
Research conducted by engineers at the China Agricultural University in Beijing China investigated the feasibility of visible and a near infrared reflectance spectroscopy (NIRS) method for detecting vegetable meals in adulterated fish meal. Sources of fish meal and soybean meal (representative vegetable meal) which were commonly used in China were collected. Fish meal samples adulterated with different proportions of soybean meal were subjected to qualitative analysis and quantitative analysis. A series of studies was conducted to develop NIRS calibrations. Results indicated the coefficient of determination (R2) and the standard errors of calibration (SEC) were 0.989 and 1.539, respectively, between the predictive value and the actual value. To demonstrate the value of the calibration, sixty five fish meal samples adulterated with soybean meal were used as an independent validation set. The coefficient of determination (R2) and the standard errors of prediction (SEP) were 0.988 and 1.786, respectively, and the ratio of standard deviation of reference data in the prediction sample set to the standard errors of prediction (RPD) was 8.61. The researchers concluded that results of these studies demonstrate that the NIRS techniques can be used to detect the existence and the content of soybean meal in fish meal. (Comment: The relative high fish meal prices are encouraging its adulteration with other protein meal sources. This research will help reduce the practice).

Shi G.T. and co-workers. 2009. Methods of analyzing soybean meal adulteration in fish meal based on visible and near infrared reflectance spectroscopy. Guang Pu Xue Yu Guang Pu Fen Xi.: 29(2):362-366.

Limiting Amino Acids in Low Crude Protein Broiler Diets
Research was conducted to determine the level of l-Lysine that can be included in corn-soybean meal (C-SBM) diets for broilers before an amino acid other than methionine, lysine, threonine or glycine becomes limiting and to determine the order of limiting amino acids in low crude protein C-SBM diets. All experiments were conducted with Ross 708 broilers (0 to 18 d of age) in brooder batteries. Treatments contained 7 or 8 replicates with 6 birds per replicate. In all experiments, a control C-SBM diet containing no l-Lys.HCl and a positive control diet with supplemental glycine to provide 2.32% total dietary glycine plus serine were fed. All diets were formulated to contain 1.26% total lysine. All diets with added l-Lys.HCl contained supplemental glycine to provide 2.32% total dietary glycine plus serine.

In a series of five studies, the researchers systematically determined the limiting amino acids in a C-SBM based broiler diet. They found that up to 0.25% l-Lys.HCl could be added to C-SBM diets supplemented with methionine, threonine and glycine with no negative effects on average daily gain, average daily feed intake or feed utilization efficiency. They further found that arginine and valine are equally limiting after the bird's lysine, methionine, threonine and glycine needs are met. *(Comment- Bottom line is that reducing crude protein levels in broiler diets requires greater attention to amino acid levels and balance).*

Waguespack, A.M. and co-workers. 2009. Effect of incremental levels of L-lysine and determination of the limiting amino acids in low crude protein corn-soybean meal diets for broilers. Poultry Sci. 88(6):1216-1226.

Genetic Improvement of Soybeans
Researchers at the Institute of Crop Science and Nuclear Technology Utilization, Zhejiang Academy of Agricultural Sciences in Hangzhou, China reported on the effect of two new low phytic acid (LPA) mutations on seed quality and nutritional traits. Studies conducted at different locations and different seasons showed that the two mutations did not affect the concentration of crude protein, any of the individual amino acids, crude oil, and individual saturated fatty acids. One mutant (Gm-lpa-TW75-1) had consistently higher sucrose contents (+47.4 to +86.1%) and lower raffinose contents (-74.2 to -84.3%) than those of wild type parent (Taiwan 75). The other mutant (Gm-lpa-ZC-2) had higher total isoflavone contents (3038.8 to 4305.4 microg/g) than its parent (1583.6 to 2644.9 microg/g) in all environments. Tests of homozygous F(3) progenies of the cross Gm-lpa-ZC-2 x Wuxing # 4 (WT variety) showed that LPA lines had a mean content of total isoflavone significantly higher than wild type lines. The research group indicated that this study demonstrated that two LPA mutant genes have no negative effects on seed quality and nutritional traits and the mutant genes may have the potential to improve a few other soybean seed properties. They also postulated that these two mutant genes could be valuable genetic resources for breeding soybean varieties with reduced phytic acid seed levels and may have the potential to improve the nutritional value of soybean meal and lessen phosphorus pollution in large scale animal farming.

Yuan, F.J., and co-workers. 2009. Effects of two low phytic acid mutations on seed quality and nutritional traits in soybean (Glycine max L. Merr). J. Agric. Feed Chem. 57(9): 3632-3638.

Soybean Hulls Use-Dairy
Two experiments were conducted to evaluate the fermentation characteristics of ensiled wet corn distillers grains with solubles (WDG) alone or mixed with soybean hulls (SH) and the ability of the mixture to maintain growth performance in dairy heifers. The first experiment was an ensiling study using laboratory silos. Ensiled blends were 100% WDG, 85% WDG with 15% SH, and 70% WDG with 30% SH on an as-fed basis. Silos were opened for analysis on days 0, 3, 7, and 21. The pH was less in the 100% WDG compared with other treatments ($P < 0.01$), but all treatments had a pH near 4. Lactic acid concentration was greater in 100% WDG compared with the blends of WDG and SH ($P < 0.01$). Acetic acid was not found in 100% WDG and increased over time in the 2 blends ($P < 0.01$). Other differences between blends, such as DM, CP, ammonia N, fiber, and fat, were reflective of the different concentrations of WDG and SH in the blends. In the second experiment, the 70% WDG and 30% SH (as-fed) blend was ensiled in a silo bag and then evaluated as a feed for growing dairy heifer diets. Twenty-four heifers were used in a randomized complete block design and assigned to be fed 1 of 3 diets: 1) control, 2) low inclusion of WDGSH, and 3) a high inclusion of WDGSH. All treatment diets consisted of 50% brome grass hay on a DM basis. The control diet had 50% of the diet (DM basis) as a grain mix, which was composed of corn, soybean meal, and minerals. The low WDGSH diet contained 24.4% of the blend and 25.6% grain mix. The high WDGSH diet contained 48.7% of the blend and 1.3% mineral mix. Average daily gain and most of the body growth measures were similar among treatments. However, dry matter intake decreased linearly ($P < 0.01$) as the WDGSH blends were fed, resulting in improved G:E ($P = 0.02$). Results from these experiments indicated that WDG can be effectively ensiled with SH and sustain adequate growth rate when fed to growing dairy heifers.

Anderson, J.L., and co-workers. 2009. Ensiling characteristics of wet distillers grains mixed with soybean hulls and evaluation of the feeding value for growing Holstein heifers. J. Animal Sci. 87(6):2113-2123.

High-protein Distillers Dried Grains Replacement
Two experiments were conducted with a co-product of corn endosperm fermentation. The first experiment determined nutrient digestibility of high-protein corn distillers dried grains (HP-DDG; 54% CP) after feeding semi purified diets from 15 to 22 d of age. The AMEn of HP-DDG was 2,526 kcal/kg, whereas standardized ileal lysine, methionine and threonine digestibilities were 73.0, 84.9, and 73.0%, respectively. In a second experiment, an industry control diet regimen was compared with that of either an approximate 25 or 50% replacement for the level of 48% CP soybean meal (SBM) inclusion in the diet utilizing the amino acid digestibility and AMEn determined from the first experiment. From 0 to 14, 14 to 28, and 28 to 42 d of age, the HP-DDG in the 50% SBM replacement diet was added at 25, 23.5, and 21% of the diet, respectively. To meet digestible amino acid needs in the diet containing 50% SBM replacement it was necessary to increase the CP in the diet. Thus, the HP-DDG contained 3.2, 3.6, and 4.4% units more CP than the control diet regimen from 1 to 14, 14 to 28, and 28 to 42 d of age, respectively. Results indicated that dietary replacement of up to 50% of SBM with HP-DDG had no effect on bird performance at 14 or 42 d of age or breast fillet yield at 42 d of age; however, the addition of HP-DDG decreased body weight gains and increased the feed:gain ratio from 14 to 28 d of age. Birds consuming a diet with 50% replacement of SBM with HP-DDG consumed 17.1% more N compared with those consuming control diets. This additional N and fiber that was consumed resulted in birds being fed the 50% replacement for SBM diet excreting 21.9 and 31.8% more manure DM and N, respectively. Due in large part to the amino acid profile and lower digestibility of HP-DDG, the research group concluded that the use of this HP-DDG protein ingredient as a proportion of the diet is feasible, but results in more manure and manure N from broilers.

Applegate, T.J., and co-workers. 2009. The nutritional value of high-protein corn distillers dried grains for broiler chickens and its effect on nutrient excretion. Poultry Sci. 88(2):354-359.

Feeding a Low Nutrient Excretion Diet to Swine
Two experiments were conducted to determine the effects of feeding a corn- and soybean meal-based diet (control) or a low nutrient excretion (LNE) diet, formulated with reduced dietary crude protein and additional synthetic amino acids, low phytic acid corn, and phytase, on pig growth performance during the grower (BW=32 to 77 kg) and finisher (BW=78 to 126 kg) periods and on carcass and bone characteristics at slaughter. Pigs were blocked by sex and body weight and randomly allotted to a control or LNE diet. Individual BW and pen feed disappearance were recorded weekly in the nursery period and every 2 weeks in the grower-finisher period. Pigs were scanned ultrasonically at day 34 of the nursery period and week 8 and 16 of the grower-finisher period to determine back fat depths and LM area. Ten pigs per treatment of each sex were slaughtered to determine carcass characteristics. Overall growth performance was not different during each experiment. However, nursery G:F (Exp. 1), grower ADG (Exp. 1 and 2), and grower G:F (Exp. 2) were reduced ($P<0.05$) when the LNE diets were fed. Diet had no effect on 10th-rib carcass data in either experiment. Metatarsal bone ash percentage was reduced ($P<0.05$) when the LNE diets were consumed in both experiments. Feeding LNE diets resulted in the maintenance of overall growth performance, bone variables, and carcass characteristics. The researchers concluded that further refinements are still required in the nursery and grower phases of pig production to optimize LNE diet use by the swine industry.

Hinson, R.B. , and co-workers. 2009. Effect of feeding reduced crude protein and phosphorus diets on weaning-finishing pig growth performance, carcass characteristics, and bone characteristics. J. Animal Sci. 87(4): 1502-1517.

Results of Glycerin Feeding Studies
Researchers with the U.S. Department of Agriculture have investigated the feeding value of coproducts from biodiesel production. Scientists at Iowa State and Mississippi State conducted studies to evaluate crude glycerin as a livestock feed ingredient. Their studies found:

• In swine diets, crude glycerin contained apparent metabolizable energy (AME) levels of 3,207 calories per kilogram (kcal/kg). Pigs fed diets containing 5 or 10% crude glycerin had no effect on weight gain, carcass composition or meat quality. Crude glycerin was essentially equal to corn as an energy source.

• Crude glycerin had an AME value of 3,805 kcal/kg in layer diets. Feeding four levels of crude glycerin to layers produced no significant differences in feed consumption, egg production, egg weight or egg mass. Their conclusion was that crude glycerin was well utilized for egg production by hens.

• Feeding broilers 6% glycerin produced AME values ranging from 3,331 to 3,621 kcal/kg indicating that broiler age may affect energy values.

• The researchers indicated that crude glycerol contains small amounts of methanol and salt, which could potentially limit its use as a feed supplement. They suggested that additional studies are needed to assess how much methanol could be ingested safely.

The researchers concluded from their studies that crude glycerin is an excellent source of energy in swine and poultry rations and can be used without harming animal performance, carcass composition or meat quality.

Flores, Alfredo and Ann Perry. 2009. Biodiesel with benefits: Fuel for cars and leftovers for livestock. Agricultural Research 57(4): 20-21.