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Oral Communication Abstract – 3.01

A MULTIFACETED APPROACH TO IMPROVE THE NUTRITIONAL QUALITY OF SOYBEAN PROTEIN

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Soybean meal is the world's largest source of animal protein feed because of its high protein content, balanced amino acid profile, ready availability, and relatively low cost; however, its nutritional value could be further improved by enhancing the content of sulfur-containing amino acids (cysteine and methionine) and eliminating major proteinaceous anti-nutritional factors. A multifaceted approach is being employed in our laboratory to improve the nutritive value of soybean protein. These approaches include (1) the incorporation and expression of heterologous seed proteins rich in sulfur-containing amino acids, (2) genetic manipulation of enzymes involved in the sulfur assimilatory pathway, and (3) developing soybean germplasm that has drastically reduced major proteinaceous anti-nutritional factors Kunitz-trypsin inhibitors (KTi) and Bowman-Birk inhibitors (BBi). These approaches have produced encouraging results. We have generated transgenic soybean plants that show a significant increase in overall sulfur amino acid content sufficient to meet the recommended levels required for monogastric animals. Additionally, we have developed soybean experimental lines that contain a combination of two mutant genes that results in significantly lower trypsin inhibitor activity than has previously been reported. These results bode well for the development of soybean cultivars that have superior protein quality and nutritive value.