Western diets commonly have high ratios of omega-6 to omega-3 fatty acids. These high ratios are linked to many chronic diseases such as cardiovascular disease, cancer, inflammatory and autoimmune diseases. Likewise, lower omega-6 to omega-3 ratios have been shown to reduce inflammation in the body and have been associated with a decreased risk of certain cancers (Simopoulos AP, 2008; Simopoulos AP, 2002). Grass-fed cows produce milk that has higher levels of omega-3 fatty acids (as well as conjugated linoleic acid and vitamin E levels) than grain-fed cows (Dhiman et al, 1999; Hebeisen DF et al., 1993). Conjugated linoleic Acid (CLA) has been associated with anticarcinogenic activity against several carcinoma models including epidermal, mammary, and gastrointestinal (Belury, 2002a; Belury, 2002b; Bessa et al., 2000). As such, organic dairy farmers have a unique marketing opportunity from the potentially production-limiting grazing requirement necessary for organic certification. By optimizing the ratio of omega-6 to omega-3 fatty acids in their cows' feed, organic farmers and dairy co-operatives can produce milk that has higher levels of polyunsaturated fatty acids (particularly omega-3 fatty acids), conjugated linoleic acid and vitamin E levels than conventional maize silage feeding operations (Benbrook et al., 2013). One hindrance to increasing grass-feeding in our increasingly uncertain climate is a “summer slump” of perennial pasture productivity during hot, dry years. A proposed strategy for dealing with the “summer slump” is to grow warm-season (C4) annual grasses. Four levels of nitrogen fertility (35, 70, 105, & 140 Lb./Acre) on two C4 grass species (pearl millet and sudangrass) were investigated at two locations, with two management regimes (simulated grazing and simulated haylage). Measures of yield, forage quality, leafiness, chlorophyll content, and weed competition were taken.