

**Subjek : Tanaman Pangan
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John M. Baker, Timothy J. Griffis, Evaluating the potential use of winter cover crops in corn-soybean systems for sustainable co-production of food and fuel, *Agricultural and Forest Meteorology*, In Press, Corrected Proof, Available online 2 July 2009, ISSN 0168-1923, DOI: 10.1016/j.agrformet.2009.05.017.

(<http://www.sciencedirect.com/science/article/B6V8W-4WNGD5K-1/2/0ccc03cb8c9015520ddba6894a057a07>)

Abstract:

Climate change and economic concerns have motivated intense interest in the development of renewable energy sources, including fuels derived from plant biomass. However, the specter of massive biofuel production has raised other worries, specifically that by displacing food production it will lead to higher food prices, increased incidence of famine, and acceleration of undesirable land use change. One proposed solution is to increase the annual net primary productivity of the existing agricultural land base, so that it can sustainably produce both food and biofuel feedstocks. This might be possible in corn and soybean production regions through the use of winter cover crops, but the biophysical feasibility of this has not been systematically explored. We developed a model for this purpose that simulates the potential biomass production and water use of winter rye in continuous corn and corn-soybean rotations. The input data requirements represent an attempt to balance the demands of a physically and physiologically defensible simulation with the need for broad applicability in space and time. The necessary meteorological data are obtainable from standard agricultural weather stations, and the required management data are simply planting dates and harvest dates for corn and soybeans. Physiological parameters for rye were taken from the literature, supplemented by experimental data specifically collected for this project. The model was run for a number of growing seasons for 8 locations across the Midwestern USA. Results indicate potential rye biomass production of 1-8 Mg ha⁻¹, with the lowest yields at the more northern sites, where both PAR and degree-days are limited in the interval between fall corn harvest and spring corn or soybean planting. At all sites rye yields are substantially greater when the following crop is soybean rather than corn, since soybean is planted later. Not surprisingly, soil moisture depletion is most likely in years and sites where rye biomass production is greatest. Consistent production of both food and biomass from corn/winter rye/soybean systems will probably require irrigation in many areas and additional N fertilizer, creating possible environmental concerns. Rye growth limitations in the northern portion of the corn belt may be partially mitigated with aerial seeding of rye into standing corn.

Keywords: Cover crops; Rye; Biofuel; Biomass

S. Sanchez-Moreno, L. Jimenez, J.L. Alonso-Prados, J.M. Garcia-Baudin, Nematodes as indicators of fumigant effects on soil food webs in strawberry crops in Southern Spain, *Ecological Indicators*, In Press, Corrected Proof, Available online 3 June 2009, ISSN 1470-160X, DOI: 10.1016/j.ecolind.2009.04.010.

(<http://www.sciencedirect.com/science/article/B6W87-4WF8S9K-1/2/964ce8ea381fc048b3ede5c1bcd9d6a7>)

Abstract:

The phase-out of methyl bromide due to concerns regarding ozone depletion in the stratosphere has imposed the need of developing alternatives less aggressive to the environment. The use of 1,3-dichloropropene (1,3-D) and chloropicrin (Pic) has extended in the last years, and has become essential to maintain strawberry production in Southern Spain, the main producer within the EU. However, their uncertain effects on the environment have become a new obstacle for their future

use, and scientific evaluation of their toxicity is necessary to assess their impact on the environment. In this paper, we use the nematode assemblage as indicator of the effects of 1,3-D, Pic and 1,3-D + Pic on non-target soil fauna, and to infer their effects on soil food web functioning in two commercial strawberry farms in Southern Spain. Although affected, the abundance of bacterial-feeding nematodes did not differ among treatments due to compensatory growth of opportunistic nematodes. Fungal-feeding nematodes were strongly reduced by the fumigants, probably due to direct fumigants toxicity and to alterations on the fungal decomposition channel. Taxa richness and soil food web indices were also affected by the treatments. The ratio fungal to bacterial-feeding nematode abundances is proposed as the best indicator of the short and medium term effects of fumigants on non-target soil organisms. Implications of such findings on soil food web functioning and recovery are discussed.

Keywords: 1,3-Dichloropropene; Chloropicrin; Non-target fauna; Soil food web; Bioindicators

Yang Cao, Toshiyoshi Takahashi, Ken-ich Horiguchi, Effects of addition of food by-products on the fermentation quality of a total mixed ration with whole crop rice and its digestibility, preference, and rumen fermentation in sheep, *Animal Feed Science and Technology*, Volume 151, Issues 1-2, 12 May 2009, Pages 1-11, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2008.10.010.

(<http://www.sciencedirect.com/science/article/B6T42-4V28SX9-1/2/1ad56e004ecb203c19d6d43fb9d128d9>)

Abstract:

Four sheep were used in a 4 x 4 Latin square design experiment to study fermentation quality, digestibility, and preference of a whole crop rice (WCR) total mixed ration (TMR) silage with food by-products. Experimental treatments included control silage (i.e., no food by-product) and 300 g/kg each of TMR dry matter (DM) as dry tofu cake (DTC), rice bran (RB) or wet green tea waste (WGTW). Silages ensiled for 60 days were well preserved with low pH (<4.06) and NH₃-N contents, and high lactic acid content. A higher (P<0.05) content of lactic acid was observed in the DTC silage. In addition, compared to the control, the DTC and RB treatments increased the CP, EE and GE contents of the silages, and WGTW treatments increased the CP and ADFom contents of the silages. Preference was affected by inclusion of food by-products. The mean relative intake of TMR for the control, DTC, RB and WGTW silages were 0.485, 0.671, 0.397 and 0.447, respectively. Compared to the control, the DTC treatment increased silage preference, while RB and WGTW treatments decreased silage preference. No differences were observed among treatments in ruminal pH or total volatile fatty acid concentrations, but ruminal NH₃-N content was highest in the DTC silage (P=0.0191) 2 h after feeding. The molar proportion of acetic acid in ruminal fluid was highest for the WGTW silage (P=0.0004) 4 h after feeding. Molar proportions of propionic acid and isobutyric acid in ruminal fluid were higher for the RB silage (P=0.0277 and P=0.0368, respectively) than for the WGTW silage before feeding, and the molar proportions of isovaleric acid and valeric acid in ruminal fluid were higher for the RB silage (P=0.0183 and P=0.0113, respectively) than for either the WGTW or control silage before feeding. Among the three food by-products, the digestibility of DTC was highest. Findings suggest that food by-products can be used in WCR TMR silage, that the silages can be of good quality, and that silage with added DTC has high digestibility and good preference.

Keywords: Dry tofu cake; Rice bran; Total mixed ration silage; Wet green tea waste; Whole crop rice

Tarit Roychowdhury, Corrigendum to: 'Impact of sedimentary arsenic through irrigated groundwater on soil, plant, crops and human continuum from Bengal delta: Special reference to raw and cooked rice' [*Food and Chemical Toxicology* 46 (2008) 2856-2864], *Food and Chemical Toxicology*, Volume 47, Issue 4, April 2009, Pages 906-907, ISSN 0278-6915, DOI: 10.1016/j.fct.2009.01.027.

(<http://www.sciencedirect.com/science/article/B6T6P-4VFK815-2/2/7655bc89c66eebd9d05cc5e0026c78e1>)

Shahbaz Khan, Munir A. Hanjra, Jianxin Mu, Water management and crop production for food security in China: A review, *Agricultural Water Management*, Volume 96, Issue 3, March 2009, Pages 349-360, ISSN 0378-3774, DOI: 10.1016/j.agwat.2008.09.022.

(<http://www.sciencedirect.com/science/article/B6T3X-4TVR28F-1/2/6f37b5f562b08ca20072a941126c9441>)

Abstract:

Food security is a high priority issue on the Chinese political agenda. China's food security is challenged by several anthropogenic, sociopolitical and policy factors, including: population growth; urbanization and industrialization; land use changes and water scarcity; income growth and nutritional transition; and turbulence in global energy and food markets. Sustained growth in agricultural productivity and stable relations with global food suppliers are the twin anchors of food security. Shortfalls in domestic food production can take their toll on international food markets. Turbulence in global energy markets can affect food prices and supply costs, affecting food security and poverty. Policy safeguards are needed to shield food supply against such forces. China must make unremitting policy responses to address the loss of its fertile land for true progress towards the goal of national food security, by investing in infrastructure such as irrigation, drainage, storage, transport, and agricultural research and institutional reforms such as tenure security and land market liberalization. The links between water and other development-related sectors such as population, energy, food, and environment, and the interactions among them require reckoning, as they together will determine future food security and poverty reduction in China. Climate change is creating a new level of uncertainty in water governance, requiring accelerated research to avoid water-related stresses.

Keywords: Economic reform; Poverty reduction; Dietary changes; Biofuels; GM crops; Investment

S. Tianna DuPont, Howard Ferris, Mark Van Horn, Effects of cover crop quality and quantity on nematode-based soil food webs and nutrient cycling, *Applied Soil Ecology*, Volume 41, Issue 2, February 2009, Pages 157-167, ISSN 0929-1393, DOI: 10.1016/j.apsoil.2008.10.004.

(<http://www.sciencedirect.com/science/article/B6T4B-4V11JCB-1/2/c5d20bb685038b3bf0adad9d1ede7ead>)

Abstract:

Soil food webs cycle nutrients and regulate parasites and pathogens, services essential for both agricultural productivity and ecosystem health. Nematodes provide useful indicators of soil food web dynamics. This study was conducted to determine if nematode soil food web indicators and crop yield can be enhanced by combinations of cover crops in a conservation tillage system. The effects of three cover crop treatments (vetch/pea, oat/wheat and oat/wheat/pea/vetch) with low, medium and high C:N and a bare fallow control were investigated in Davis, CA. Nematode fauna, soil properties and plant productivity were measured. Soil food web indices, including the Enrichment Index (EI), Structure Index (SI), Basal Index (BI), and Channel Index (CI), based on the composition of nematode assemblages, were calculated to infer soil food web condition. Cover cropped tomato/corn rotations had twice the number of enrichment opportunist bacterial feeding nematodes, active participants in nitrogen mineralization, than fallowed tomato/corn rotations (opportunist bacterial feeders = 163 versus 98). In winter fallowed plots food webs were basal, common in disturbed, nutrient-poor conditions (BI = 37). Total number of enrichment opportunist nematodes, soil NH₄-N levels, and inferred nitrogen mineralization, were higher in cover crop treatments with low to mid C:N ratios. Omnivore and predator nematodes were scarce, averaging less than 6 nematodes 100 g⁻¹ in all treatments. In year one, plant productivity was highest after fallow. In contrast, in year two productivity was highest after cover crops with high nitrogen content and productivity significantly correlated with the structure of the soil fauna. Monitoring the

abundance of enrichment opportunists may provide managers with a new tool to evaluate soil food web nitrogen mineralization and plant productivity.

Keywords: Food webs; Nutrient cycling; Nitrogen mineralization; Cover crops; Legumes; Organic

A.P. Barba de la Rosa, Inge S. Fomsgaard, Bente Laursen, Anne G. Mortensen, L. Olvera-Martinez, C. Silva-Sanchez, A. Mendoza-Herrera, J. Gonzalez-Castaneda, A. De Leon-Rodriguez, Amaranth (*Amaranthus hypochondriacus*) as an alternative crop for sustainable food production: Phenolic acids and flavonoids with potential impact on its nutraceutical quality, *Journal of Cereal Science*, Volume 49, Issue 1, January 2009, Pages 117-121, ISSN 0733-5210, DOI: 10.1016/j.jcs.2008.07.012.

(<http://www.sciencedirect.com/science/article/B6WHK-4T8HHDH-4/2/40a6acbe52ec30774e46c8f0170b7928>)

Abstract:

The demand for food is increasing, not only to meet food security for growing populations, but also to provide more nutritious food, rich in good quality proteins and nutraceutical compounds. The amaranth (*Amaranthus hypochondriacus*) plant, in addition to its high nutritive and nutraceutical characteristics, has excellent agronomic features. The objective of the present study was to analyze some physical and proximal-nutritional properties of amaranth seeds obtained from different varieties grown in arid zones and characterize their phenolic acids and flavonoids. Two commercial (Tulyehualco and Nutrisol) and two new (DGETA and Gabriela) varieties of *A. hypochondriacus* were grown at the Mexican Highlands zone. Tulyehualco and DGETA varieties had higher seed yield of 1475 and 1422 kg ha⁻¹, respectively, comparable to corn and soybean production in agricultural areas. Gabriela had the highest protein content of 17.3%, but all varieties had an adequate balance of essential amino acids. Polyphenols as rutin (4.0-10.2 [μ]g g⁻¹ flour) and nicotiflorin (7.2-4.8 [μ]g g⁻¹ flour) were detected. Amaranth can be cultivated in arid zones where commercial crops cannot be grown; the seeds besides their well known nutritive characteristics could be a source of phenolic compounds of high antioxidant properties.

Keywords: Crop yield; LC/MS/MS; Protein content; Phytochemicals; RAPD

Jazeem Wahab, Medicinal and Aromatic Crops. Harvesting, Drying and Processing. Serdar Oztekin, Milan Martinov (Editors). Haworth Food and Agricultural Products Press, Binghamton, New York, USA, xx + 320 pp, 2007. US\$49.95 (softback) ISBN: 978-1-56022-975-9; US\$89.95 (hardback) ISBN: 978-1-56022-974-2., *Agricultural Systems*, Volume 99, Issue 1, December 2008, Page 65, ISSN 0308-521X, DOI: 10.1016/j.agsy.2008.04.003.

(<http://www.sciencedirect.com/science/article/B6T3W-4TDYP4Y-1/2/cc7aaf9a2cc6e040e8f6eae8e091bb7a>)

Daniela Soleri, David A. Cleveland, Garrett Glasgow, Stuart H. Sweeney, Flavio Aragon Cuevas, Mario R. Fuentes, Humberto Rios L., Testing assumptions underlying economic research on transgenic food crops for Third World farmers: Evidence from Cuba, Guatemala and Mexico, *Ecological Economics*, Volume 67, Issue 4, 1 November 2008, Pages 667-682, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2008.01.031.

(<http://www.sciencedirect.com/science/article/B6VDY-4S26K36-2/2/2d99233a57f858cef1f25f887cee26f7>)

Abstract:

Transgenic crop varieties (TGVs) are being promoted as essential for improving small-scale Third World (SSTW) agriculture. Most economic research on this topic makes critical, untested assumptions, including that farmers will choose TGVs over other varieties because TGVs are economically optimal and because farmers are risk neutral profit maximizers. We tested these assumptions using data from a survey of 334 farmers in 6 communities in Cuba, Guatemala and Mexico in which farmers ranked 4 real and hypothetical maize varieties for eating and sowing. Our

results did not support these assumptions. Most farmers preferred farmer varieties for sowing and especially for eating, avoiding TGVs, a preference associated with being risk averse and with non-monetary preferences. Farmers more integrated into modern agriculture were more likely to choose TGVs. These results suggest that farmers most in need of support and most important for conserving genetic diversity are least favorable toward TGVs, and that alternative ways of improving SSTW agriculture should receive more attention.

Keywords: Transgenic crops; Genetic engineering; Maize; Corn; Third World farmers; Economic assumptions; Risk; Cuba; Guatemala; Mexico

Audun Korsæth, Relations between nitrogen leaching and food productivity in organic and conventional cropping systems in a long-term field study, *Agriculture, Ecosystems & Environment*, Volume 127, Issues 3-4, September 2008, Pages 177-188, ISSN 0167-8809, DOI: 10.1016/j.agee.2008.03.014.

(<http://www.sciencedirect.com/science/article/B6T3Y-4SG017R-1/2/fadfb846472b5edee233faeed3d56c8>)

Abstract:

An ideal agricultural system should both maximize food production and minimize undesirable effects on the environment. The long-term Apelsvoll cropping system experiment, located in southeast Norway, was used in this study, to compare yields, major N flows (in particular measured leaching/runoff losses) and the N loss-to-food production ratios (LFP-ratios) in six different cropping systems over a 4-year period. The experiment included three systems with cash-cropping (CA1: conventional arable farming; CA2: arable farming practice with environmentally sound management; OA: organic arable farming with 25% of the area as green manure, and three systems with both arable and fodder crops, representing mixed dairy production (CM: conventional farming practice with 50% grass-clover ley; OM1: organic farming with 50% grass-clover ley; OM2: organic farming with 75% grass-clover ley). The forage production was assumed to be used for milk and meat production, in amounts calculated on the basis of available feed and estimated requirements for dairy cattle. All farm produce (cereals, potatoes, milk and meat) was converted into metabolizable energy for human consumption. Organic cropping gave significantly lower yields than conventional cropping, for both arable and mixed dairy systems, most likely due to sub-optimal plant nutrition and the lack of plant protection in the organic systems. The average net energy production in CA1 and CA2 was 2.4-5.3 times greater than that in the other systems, which illustrates the energy costs of taking 25% of the area out of food production to produce green manure (OA) and the energy cost of including an extra trophic level in the nutrient chain (CM, OM1 and OM2). Only CA2 and CM appeared to have a balanced N budget, whereas the other systems all had N deficits, in particular CA1 and OA. The total N losses to drainage were largest from CA1, but not significantly larger than those from OA, which had the largest N runoff of the systems, most likely due to the green manure in its rotation. The conventional system with environmentally sound management (CA2) had the lowest LFP-ratios overall. Among the arable cropping systems, the organic system with 25% green manure (OA) had the highest LFP-ratios. The mixed dairy systems had generally higher LFP-ratios than the arable systems. Including leaching/runoff N losses in the LFP-ratio, CA1, CA2, OA, CM, OM1 and OM2 appeared to lose 0.6, 0.4, 1.1, 0.9, 1.2 and 1.1 kg N, respectively, per GJ of produced metabolizable energy for human consumption.

Keywords: Arable cropping systems; Cereal yields; Human nutrition; Food production; Loss-to-production ratios; Mixed dairy systems; Net energy production; Nitrogen budgets; Yields

J. Rissler, K.P. Stillerman, A Growing Concern: Vulnerability of the Food Supply to Contamination by Drug-Producing Crops, *Journal of the American Dietetic Association*, Volume 108, Issue 9, Supplement 1, ADA 2008 Food & Nutrition Conference & Expo, ADA 2008 Food & Nutrition

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(<http://www.sciencedirect.com/science/article/B6T3W-4PGH4JY-1/2/3707c399e07c1d1e334c67e44ee880dc>)

Ervin Balazs, *Genetically Engineered Crops, Interim Policies, Uncertain Legislation*, Iain E.P. Taylor (Ed.), 2007, Haworth Food and Agricultural Products Press, New York, London, Oxford an imprint of Haworth Press Inc, 10 Alice Street Binghamton, NY 13904-1580, \$59.95 hard cover, ISBN 978-1-56022-988-9, \$29.95 soft cover, ISBN 978-1-56022-989-6, E-mail: , Web: www.HaworthPress.com., *South African Journal of Botany*, Volume 74, Issue 1, January 2008, Pages 172-173, ISSN 0254-6299, DOI: 10.1016/j.sajb.2007.11.002.

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Eun Young Choi, Robin Graham, James Stangoulis, Semi-quantitative analysis for selecting Fe- and Zn-dense genotypes of staple food crops, *Journal of Food Composition and Analysis*, Volume 20, Issue 6, September 2007, Pages 496-505, ISSN 0889-1575, DOI: 10.1016/j.jfca.2007.01.004.

(<http://www.sciencedirect.com/science/article/B6WJH-4N5CX9Y-1/2/1853171f6d48a25f4edc73185f6013c5>)

Abstract:

Four semi-quantitative screening methods were developed for plant breeding purposes to identify iron (Fe) and zinc (Zn)-dense genotypes in germplasm, elite lines and early generation progeny. Methods include colour image analysis for Fe and Zn in wheat and rice grains, and spectrophotometric analysis of Fe and Zn in ground flour of rice, wheat, potato, sweet potato and cassava. Staining with 71 mM Perl's Prussian blue solution (PPB) and subsequent image analysis with Adobe Photoshop(R) to determine pixel numbers in the stained regions lead to the quantification of Fe. Due to differences in grain size between the genotypes evaluated, correlations between inductively coupled plasma-optical emission spectrophotometry (ICP-OES) Fe and PPB derived Fe were improved by standardizing according to grain weight. The ratio of total blue pixel number (TPN)/total grain weight (TGW) of 21 rice lines correlated ($r=0.84$, $p<0.001$) with the Fe concentration derived by ICP-OES. Similarly, a colorimetric method was developed for Zn analysis using 1.56 mM Dithizone (DTZ) solution and subsequent quantification by image analysis with Adobe Photoshop(R). As with the Fe analysis, the ratio of TPN/TGW of 70 wheat lines correlated better with ICP-OES Zn analysis ($r=0.82$, $p<0.001$) and successfully separated low and high Zn grain germplasm. Ground polished rice and wheat flour were spectrophotometrically analysed after simple extraction in 0.5 M HCl solution using a modified 2,2'-dipyridyl method for Fe, and a modified Zincon(R) method for Zn. These two methods show good correlations with ICP analyses ($r=0.93$ and 0.92 for Fe and Zn, respectively) and thus can be used for semi-quantitative screening to discriminate between genotypes that are either high or low in Fe or Zn. The more precise ICP-OES and AAS methods could then be used to quantify actual amounts of Fe and Zn in those genotypes identified as Fe- and Zn-dense from the initial screening.

Keywords: Perl's Prussian blue (PPB); Dithizone (DTZ); 2,2'-dipyridyl; Zincon

Francesco N. Tubiello, Jeffrey S. Amthor, Kenneth J. Boote, Marcello Donatelli, William Easterling, Gunther Fischer, Roger M. Gifford, Mark Howden, John Reilly, Cynthia Rosenzweig, Crop response to elevated CO₂ and world food supply: A comment on 'Food for Thought...' by Long et al., *Science* 312:1918-1921, 2006, *European Journal of Agronomy*, Volume 26, Issue 3, April 2007, Pages 215-223, ISSN 1161-0301, DOI: 10.1016/j.eja.2006.10.002.

(<http://www.sciencedirect.com/science/article/B6T67-4MCWMJH-1/2/e1fc61a53098dfcb291f81a500fd5654>)

Abstract:

Recent conclusions that new free-air carbon dioxide enrichment (FACE) data show a much lower crop yield response to elevated CO₂ than thought previously - casting serious doubts on estimates of world food supply in the 21st century - are found to be incorrect, being based in part on technical inconsistencies and lacking statistical significance. First, we show that the magnitude of crop response to elevated CO₂ is rather similar across FACE and non-FACE data-sets, as already indicated by several previous comprehensive experimental and modeling analyses, with some differences related to which 'ambient' CO₂ concentration is used for comparisons. Second, we find that results from most crop model simulations are consistent with the values from FACE experiments. Third, we argue that lower crop responses to elevated CO₂ of the magnitudes in question would not significantly alter projections of world food supply. We conclude by highlighting the importance of a better understanding of crop response to elevated CO₂ under a variety of experimental and modeling settings, and suggest steps necessary to avoid confusion in future meta-analyses and comparisons of experimental and model data.

Keywords: CO₂ crop response; FACE; Chambers; Experimental and model data; Climate change; World food supply

Maren E. Veatch-Blohm, N.K. Fageria, V.C. Baligar and R.B. Clark, *Physiology of Crop Production*, Food Products Press/Haworth Press Inc., Binghamton, NY, USA (2006) 345 pp., \$ 49.95 softcover, ISBN: 1-56022-289-1; \$ 69.95 hardcover, ISBN: 1-50622-288-3., *Industrial Crops and Products*, Volume 25, Issue 1, January 2007, Page 108, ISSN 0926-6690, DOI: 10.1016/j.indcrop.2006.09.001.

(<http://www.sciencedirect.com/science/article/B6T77-4MG1NX5-1/2/5629927b79596f5bde0082bb7b9c76d7>)

Tahirou Abdoulaye, John H. Sanders, *New technologies, marketing strategies and public policy for traditional food crops: Millet in Niger*, *Agricultural Systems*, Volume 90, Issues 1-3, October 2006, Pages 272-292, ISSN 0308-521X, DOI: 10.1016/j.agsy.2005.12.008.

(<http://www.sciencedirect.com/science/article/B6T3W-4JCCM67-1/2/f080733577dabc9deab95ca852f222cd>)

Abstract:

New technology introduction in this semiarid region of the Sahel is hypothesized to be made more difficult by three price problems in the region. First, staple prices collapse annually at harvest. Secondly, there is a between year price collapse in good and very good years due to the inelastic demand for the principal staple, millet, and the large changes in supply from weather and other stochastic factors. Thirdly, government and NGOs intervene in adverse rainfall years to drive down the price increases. Marketing strategies were proposed for the first two price problems and a public policy change for the third. To analyze this question at the firm level a farm programming model was constructed. Based upon surveying in four countries, including Niger, farmers state that they have two primary objectives in agricultural production, first achieving a harvest income target and secondly achieving their family subsistence objective with production and purchases later in the year. Farmers are observed selling their millet at harvest and rebuying millet later in the year. So the first objective takes precedence over the second. A lexicographic utility function was used in which these primary objectives of the farmer are first satisfied and then profits are maximized. According to the model new technology would be introduced even without the marketing strategies. However, the marketing strategies accelerated the technology introduction process and further increased farmers' incomes. Of the three marketing-policy changes only a change in public policy with a reduction of the price depressing effect (cereal imports or stock releases) substantially increases farmers' incomes in the adverse years. In developed countries crop insurance and disaster assistance is used to protect farmers in semiarid regions during bad and very bad (disaster) rainfall years. In developing countries finding alternatives to the poverty-nutritional problems of urban residents and poor farmers to substitute for driving down food prices in adverse years could perform the same function as crop insurance in developed countries of facilitating technological introduction by increasing incomes in adverse rainfall years in developed countries.

Keywords: Inventory credit; Marketing strategy; Inorganic fertilizers; Fertility depletion; Farm level programming; Micro-fertilization; Sidedressing

Kathy S. Roberts, Marie Boyle Struble, Christine McCullum-Gomez, Jennifer L. Wilkins, *Use of a Risk Communication Model to Evaluate Dietetics Professionals' Viewpoints on Genetically Engineered Foods and Crops*, *Journal of the American Dietetic Association*, Volume 106, Issue 5, May 2006, Pages 719-727, ISSN 0002-8223, DOI: 10.1016/j.jada.2006.02.008.

(<http://www.sciencedirect.com/science/article/B758G-4JTJ7J1-T/2/de8d44eb10f1c05af81c3d25a214366d>)

Abstract:

The complex issues surrounding the application of genetic engineering to food and agriculture have generated a contentious debate among diverse interest groups. One pervasive dimension in the resultant discourse is the varying perceptions of the risks and benefits of genetically

engineered foods and crops. In the risk communication model, technical information is evaluated within the context of an individual's values and perceptions. The purpose of this study was to explore how dietetics professionals respond to a complex set of interrelated issues associated with genetically engineered foods and crops and to identify what varying viewpoints may exist. Participants were asked to sort a total of 48 statements distributed across eight issue areas according to level of agreement and disagreement. Using Q methodology, a total of 256 sortings were analyzed using the centroid method and varimax rotation in factor analysis. Three distinct viewpoints emerged: Precautionary (R²=43%), Discerning Supporter (R²=11%), and Promoting (R²=5%). Across all viewpoints, respondents agreed that dietetics professionals should employ critical thinking skills to communicate the social, economic, environmental, ethical, and technical aspects of genetically engineered foods and crops. The findings have implications for how dietetics professionals can foster an open interchange of information among diverse groups.

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Abstract:

This paper provides guidance on how to assess the safety of foods derived from genetically modified crops (GM crops); it summarises conclusions and recommendations of Working Group 1 of the ENTRANSFOOD project. The paper provides an approach for adapting the test strategy to the characteristics of the modified crop and the introduced trait, and assessing potential unintended effects from the genetic modification. The proposed approach to safety assessment starts with the comparison of the new GM crop with a traditional counterpart that is generally accepted as safe based on a history of human food use (the concept of substantial equivalence). This case-focused approach ensures that foods derived from GM crops that have passed this extensive test-regime are as safe and nutritious as currently consumed plant-derived foods. The approach is suitable for current and future GM crops with more complex modifications. First, the paper reviews test methods developed for the risk assessment of chemicals, including food additives and pesticides, discussing which of these methods are suitable for the assessment of recombinant proteins and whole foods. Second, the paper presents a systematic approach to combine test methods for the safety assessment of foods derived from a specific GM crop. Third, the paper provides an overview on developments in this area that may prove of use in the safety assessment of GM crops, and recommendations for research priorities. It is concluded that the combination of existing test methods provides a sound test-regime to assess the safety of GM crops. Advances in our understanding of molecular biology, biochemistry, and nutrition may in future allow further improvement of test methods that will over time render the safety assessment of foods even more effective and informative.

Keywords: Food; Plant biotechnology; Genetic modification; Genetic engineering; Genetic manipulation; Transgenic crops; Novel foods; Recombinant proteins; Plant metabolism; Regulation; Safety assessment; Risk analysis; Molecular characterisation; Toxicology; Allergy; Substantial equivalence; Unintended effects; Bioinformatics; In vitro test methods; In vivo test methods; Animal testing; Post market monitoring; Estimated consumption; Exposure assessment; Compositional analysis; Advanced analytical methods; Profiling

L. Lazzeri, M. Errani, O. Leoni, G. Venturi, *Eruca sativa* spp. *oleifera*: a new non-food crop, *Industrial Crops and Products*, Volume 20, Issue 1, 5th European Symposium on Industrial Crops and Products and the 3rd International Congress and Trade Show GreenTech 2002, July 2004, Pages 67-73, ISSN 0926-6690, DOI: 10.1016/j.indcrop.2002.06.001.

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Abstract:

The use of oil with a high level of erucic acid in some industrial sectors appears to offer excellent prospects from a technological and environmental point of view. This study was carried out to determine the potential of a new *Eruca sativa* spp. *oleiformis* selection named Nemat as a source of high erucic oil in the Po Valley environment. This species, classified as catch crop of the nematode *Heterodera schachtii*, showed a wide adaptability both in spring and autumn sowing and permitted a generally satisfactory productive yield over 3-year trials, with a grain yield ranging between 1.9 and 2.2 t ha⁻¹ (autumn sowing). Seeds presented an oil concentration around 290 g kg⁻¹ with significant higher amount in spring sowing, while fatty acid composition was characterised by a long chain content higher than 53%. The residual meal presented a high level of thiofunctionalised glucosinolates (GLs), showing some interesting perspectives in integrated pest management.

Keywords: *Eruca sativa*; Glucosinolates; Brassicaceae

Delano James, Anna-mary Schmidt, Use of an intron region of a chloroplast tRNA gene (*trnL*) as a target for PCR identification of specific food crops including sources of potential allergens, *Food Research International*, Volume 37, Issue 4, May 2004, Pages 395-402, ISSN 0963-9969, DOI: 10.1016/j.foodres.2004.02.004.

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Abstract:

Simple but reliable PCR techniques were developed for the detection and identification of several food crops, including crops known to contain allergens. A single pair of oligonucleotide primers (PL-1C and PL-2D), that target the *trnL* region of the chloroplast tRNA gene in polymerase chain reaction (PCR) analysis, was used to amplify crop specific fragments. The specific DNA fragments were of the following sizes; 387 bp (canola), 532 bp (corn), 571 bp (potato), 584 bp (soybean), 615 bp (white and red rice), 642 bp (peanut), and 662 bp (wheat). Each amplified fragment was reliably identified using 3% agarose gel electrophoresis. The amplified fragments were cloned, sequenced, and a variable region was used to design specific sense primers for identity confirmation of some selected crops. When combined with the antisense primer PL-2D, specific fragments of 403, 397, 343, and 304 bp were amplified for peanut, wheat, soybean, and rice, respectively. These are common crops known to contain allergens. The PCR techniques described may be easily adapted for the detection of other crops and may be modified for use in multiplex PCR detection techniques, or micro-/macro-array analysis.

Keywords: Peanut; Wheat; Soybean; Canola; Corn; Potato; Rice; Food composition; Allergens; Chloroplast DNA; *trnL* intron; Polymerase chain reaction