AGRICULTURE

Dining Out Behavior in China and the Implications in the Post-COVID-19 Era

Student researcher: *Ji Yong Kwon, Senior*

Using data collected from restaurants in China's major cities, this study focuses on Chinese restaurant dining consumption and its response to economic and socio-economic changes. The purpose of this study is to identify factors that affect dining out behavior, dining out type, and dining out expenditure empirically for understanding the enormous food service market in China. Results have shown that family income, childhood residence, and family size are important factors in how often people dine out. For example, individuals with higher incomes are more likely to dine out more often than those with lower incomes, and people in urban areas tend to dine out more frequently than those in rural areas. The choice of dinner type, that is, business versus family or friend, is influenced by several factors. These factors include the individual's gender, family income, childhood residence location, frequency of dining out, and frequency of dining with the same main guests. People spent more money on business dinners and the expenditure level varies by type of dinner. Because China is becoming rapidly urbanized, differences in dining out behaviors between rural and urban residents were also investigated. Although the data used were collected prior to the COVID-19 pandemic, the relevance of the study is clear as restaurant sales resume and dining out is expected to remain stable, making this study important for understanding people's dining behavior in China.

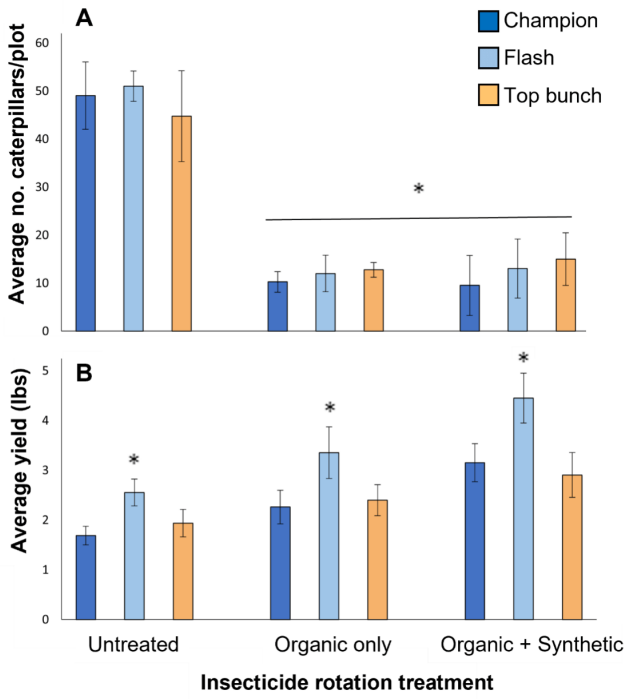
Family dining out in restaurant.

Research advisor H. Holly Wang writes: "Ji-Yong Kwon's honors thesis at the Department of Agricultural Economics investigates Chinese dining out consumption behavior using data our team collected from restaurants in three Chinese cities. With his strong econometric skills, he has derived results that contribute to the understanding of the food service industry in a fast-developing economy."

Evaluating the Efficacy of IPM Strategies Against Insect Pests of Collards

Student researcher: *Elliott Masterson, Junior*

Insect pests threaten food security worldwide, and the FAO predicts up to 40% of crops are lost to insect damage every year. While synthetic insecticides are commonly used by farmers, integrated pest management (IPM) strategies that combine variety selection and organic insecticides are also available but may be underutilized due to limited information about their



The average number of caterpillars (A) observed on three collard varieties (var. champion*,* flash*, and* top bunch*), and average yield (B) of each variety in untreated, organic-only, and organic + synthetic insecticide-treated plots at Throckmorton-Meigs Purdue Agricultural Center from June through August 2022. Collard yield was based on six harvest events. Bars represent means ± 1 SEM and asterisks denote significant differences between treatments at* $\alpha = 0.05$.

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efficacy. To address this knowledge gap, we evaluated rotations of synthetic and organic insecticides in tandem with variety selection as strategies against a major pest group in collard production: caterpillars.

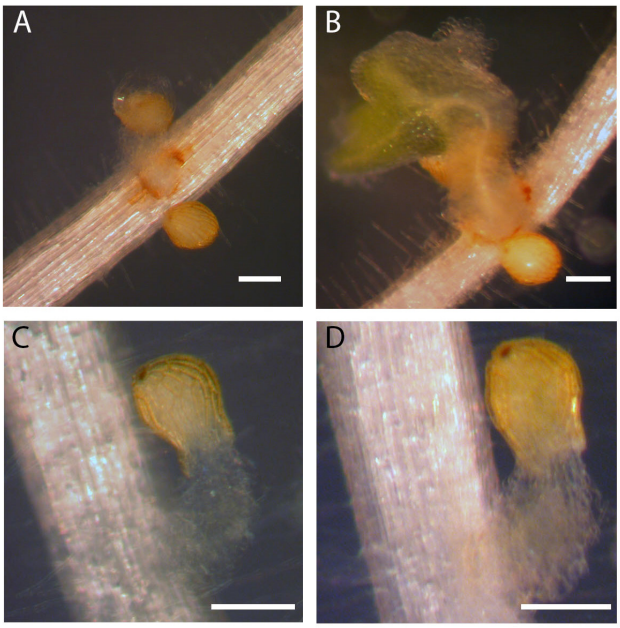
Over a 13-week period from June through August 2022 at the Throckmorton-Meigs Purdue Agricultural Center, we scouted replicated plots of collards (var. *flash*, *champion*, and *top bunch*) and recorded the number and identity of caterpillars on plants of each variety when subjected to rotations of synthetic + organic, organic-only, or no insecticides. We also recorded yield across varieties and treatments on six dates. We found 4 caterpillar species feeding during the season but there was no difference in mean number of caterpillars on any of the three collard varieties. Synthetic + organic and organic-only rotations suppressed caterpillars equally well, and these plots had significantly fewer caterpillars than untreated plots ($P < 0.05$). Finally, we found that collards var. *flash* had significantly higher yields than var. *champion* or *top bunch* ($P < 0.05$) regardless of insecticide rotation, but yields did not differ between synthetic + organic and organic-only sprayed plots ($P = 0.07$). Our results demonstrate that organic products alone can be just as effective against caterpillars as a rotation of synthetic and organic products.

Research advisor Elizabeth Y. Long writes: "This project emerged from requests from backyard gardeners who wanted more information about how to manage insect pests on their vegetables with products you can find at home improvement stores. There are a lot of questions about the efficacy of organic insecticides in particular and it was fun to work with Elliott and see such good results using these products. Elliott's enthusiasm for agriculture and helping people find inexpensive and effective solutions to manage pest insects made this project both fun and successful!"

Laboratory Screening of Sorghum Lines for Incompatibility: A Postattachment Resistance Mechanism to the Parasitic Weed *Striga hermonthica*

Student researcher: *Cameron Matthews, Senior*

Striga hermonthica is an obligate root parasitic weed in sorghum, reducing crop yield severely, especially in low-input agriculture common across sub-Saharan Africa. Host plant resistance is an essential component of *Striga* control. Only one resistance gene is known, *LGS1*, controlling strigolactone production. Sorghum *lgs1* mutants have reduced *Striga* germination stimulant activity. After germinating in response to host-exuded strigolactones, *Striga* attaches to its roots. Another resistance mechanism called incompatibility occurs at the postattachment stage. *Striga* on an incompatible host fails to form the functional xylem connection necessary to sustain continued growth. We screened 58 inbred sorghum lines of common pedigree, including some released as resistant varieties in Africa, by laboratory co-culture that allowed successive observations of parasitic attachments. Differences in *Striga* germination stimulant activity between lines were overcome by exogenous application of strigolactones. One parent was the donor of both *lgs1* and incompatibility. The second parent was a high stimulant (*LGS1*) line with presumed susceptibility to *Striga*. Phenotyping included *Striga* germination stimulant activity, germination inhibition, haustorial initiation by the sorghum roots as well as the number of *Striga* attachments and whether these grew over the observation period. Although the second parent was *LGS1*, it did not contrast with the resistant parent sufficiently enough in terms of postattachment success of *Striga* to distinguish the progeny lines for resistance at



Striga *growth on a susceptible and resistant sorghum root.* Striga *attached to a susceptible sorghum root at 10 (A) and 17 (B) days of co-culture in agar. Attachment on a resistant sorghum root at 10 (C) and 17 (D) days.* Striga *on the sorghum with incompatibility fails to grow. Bar = 0.2mm.*