

## Comparison of Integrated Pest Management Strategies in Different Tea Growing Countries with Special Reference to Pesticide Residue Monitoring

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### Introduction

Tea (*Camellia sinensis* (L) O. Kuntze) is an intensively managed perennial monoculture crop cultivated on large and small scale plantations situated between altitudes 41°N and 16° S. Tea plants are attacked by several pests and diseases and also invaded by numerous species of weeds, which compete with tea plants for moisture and nutrients. Hence to augment the productivity of tea and to protect the plants from pests and diseases, it is necessary to adopt plant protection measures using synthetic chemicals. Tea is the secondly most consumed beverage in the world. Tea is considered as a 'health beverage' due to its antioxidant properties and resultant beneficial effects on human health. Such beverage should be free from toxic elements such as pesticide residues and heavy metals.

To obtain a clear idea about pesticide residues in tea, it is important to understand the situation about pests, pesticide usage and Integrated Pest management (IPM) strategies in leading tea growing countries. Also it has been recognized as important for all the stakeholders in the tea industry by Food and Agricultural Organization (FAO) /Intergovernmental Group on Tea (IGG).

### Methodology

Tea growing countries such as Sri Lanka, India, Bangladesh, Japan, Kenya, Zimbabwe, Malawi, Iran, Argentina and China were selected to gather information in this study. Cluster sampling was done according to the Regions (South East Asia, Africa, and America). Data on different foliage stem and root pests, pesticide usage and Integrated Pest management (IPM) strategies were obtained from the different tea growing countries through questionnaires as primary data. Data were summarized, analyzed and presented using descriptive statistics.

### Results and Discussion

Pests affecting yield and quality of tea in different tea growing countries are varied. The highest number of pests causing crop losses was reported in Japan.

Due to long established tea plantations and warm humid climate in summer with a wide range of environmental conditions has resulted large number of pest species in Japan. Sri Lanka and Kenya were ranked as second and third. In contrast, Argentina did show only a single pest incidence. Comparison of pesticide usage in different tea growing countries is presented below.

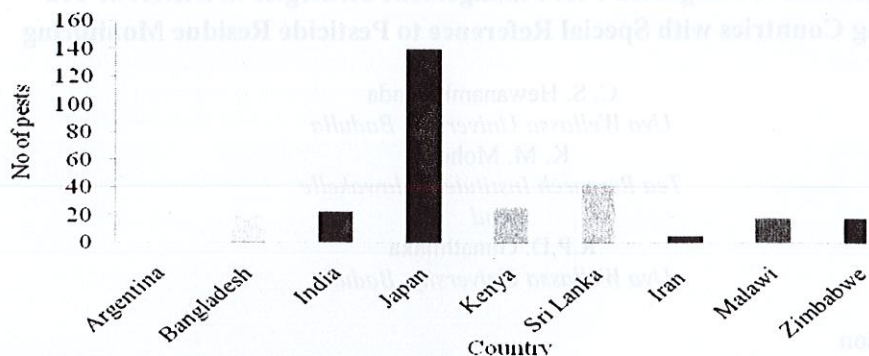


Figure 1: Pests leading to crop losses in tea in different tea growing countries

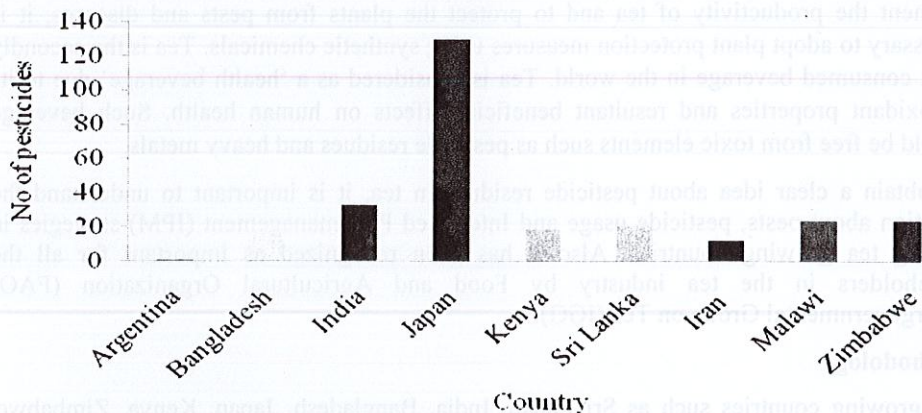


Figure 2: Pesticide usage in tea in different tea growing countries

The highest number of pesticide usage in tea fields were reported in Japan. Japan has lagged behind other developed countries in the practice of IPM strategies. In Japan, there is growing public concern about the excessive use of agricultural chemicals. Most farms are small, growers and must secure a constant yield and income. These pressures force them to spray chemicals to avoid any risk of pest injury. India were ranked as second in using of pesticides to control pests though it shows less number of pests when compared to Sri Lanka. And in Sri Lankan Situation though it ranked second but the ratio of number of pests to pesticide usage is less when compared to other countries.

### Conclusion

The information showed a clear correlation between the number of pests and pesticide usage in tea growing countries except in Sri Lanka. Interestingly, African tea growing countries were identified as pesticide consuming region with significant pest and disease incidences though less compared to rest of the tea growing regions.

Data also revealed that Sri Lanka is the leading country in adopting in IPM strategies for tea pest management with least and rational use of pesticides despite occurrences of many key pests. Other methods included use of tolerant cultivars, biological and cultural methods. This would have lead to the accolade behind the Sri Lankan tea as the cleanest tea in the world with respect to pesticide residues.

The comparative data analysis also showed how Sri Lanka adopts stringent IPM strategies by minimizing pesticide load in tea and TRISL recommendations on GAPs in view assuring product quality aimed at international standards which was not evident much in other tea growing countries. Overall, immerging pest and disease incidences in countries with shorter cultivation experiences were evident which is an alarming situation requiring harmonizing pesticide usage and MRLs for the benefit of the consumers.

### **References**

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