

## **Electronic Pest Control Devices: A Review of their Necessity, Controversies and a submission of Design Considerations**

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**ABSTRACT:** *The use of Electronic Pest Control Devices has been bedeviled by lots of controversies bothering on their effectiveness. The arguments are that they are ineffective, partially effective or very effective. This work reviewed the underlying factors that led to the introduction of Electronic Pest Control Devices, their advantages over other pest control measures, and examined the controversies surrounding their usage. Investigation reveals that habituation is the reason behind the controversy while delay of habituation by the introduction of variability is a way out of the controversy. Design considerations and practices to technically fortify the device and aid in the delay of habituation were also proffered. **KEYWORDS:** Pests, conventional pesticides, habituation, design considerations.*

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### **I. INTRODUCTION**

The continuing population explosion has confronted mankind with many problems, including the major one of imminent starvation. To cope with this challenge, aggressive agriculture was embarked upon at the turn of the nineteenth century. Agricultural mechanization led to the production of more crops for the populace. Storage programs were vigorously pursued to avoid wastage of surpluses. Then came the advent of pest infestation which also underwent population explosion to become a formidable enemy and threat to food sufficiency. Pests, in this light are unwanted animals that interfere with domesticated plants and animals [1]. They are insects, birds or rodents that cause damage to sown seeds, seedlings, fruits, seeds, flowers, buds, leaves, roots, and tubers of crops either in the field or in the store. Pests are estimated to consume 33 percent of crops grown in the United States. On a worldwide basis, pests consume approximately 35 percent of crops [2]. This represents an annual loss to pests of about \$18.2 billion in the United State alone [3], while estimates of annual losses of cereals to the red-billed quelea range from at least \$1 million in Somalia to \$ 6.3 million in the Sudan.

### **II. CONVENTIONAL PESTICIDES**

In order to devise an effective means to control the various pests that take such a heavy toll of our agricultural crops, pesticides were developed. Pesticides are chemicals designed to combat the attack of various pests on agricultural and horticultural crops. They are believed to affect the central nervous system of pests, resulting in their death. With the manufacture of the first synthetic organic pesticides called DDT (1,1,1-trichloro-2,2-bis-ethane) in 1942, it was estimated to have reduced losses to pest by half. More improvements in pesticides performance were recorded year after year. The acceptance of this technology by farmers led to more research and development in the pesticide sub sector which led to the introduction of a variety of pesticides. As at now, pesticide production is a \$32 billion industry with its application standing at more than 5 billion pounds annually [4]. The story in developing and underdeveloped world where pesticides now flood the market attest to the acceptance and wide scale use of pesticides and its dividends. Researchers have shown that a lot of economic losses would be incurred without pesticide use and substantiated the resultant increases in yield from pesticide use [5]. In Ghana, which is the world's premier cocoa exporting country, the application of pesticides has almost tripled the yield and in Pakistan, extensive use of pesticides on sugar crop increased the yield by 30 percent. The United Nations Food and Agricultural Organization (FAO) have estimated that without the use of pesticides, some 50 percent of total cotton production in developing countries will be destroyed by pests. It is clear that pesticides may be the single most important factors in improving food production in the underdeveloped countries [6].