HIGHLIGHT ON DESERT LOCUST LAST PLAGUE (2004-2005) AND ITS CONTROL OPTIONS

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Abstract

Desert Locust plagues in 1989 and 2004 infested Red Sea Costs, New Valley, Sinai and the mast of Delta governments in Egypt. These areas have received heavy swarms of this pest. Control efforts successfully combated these swarms and prevented any damage in Egyptian crops and fruit. During November, 2004 unexpected Desert Locust swarms attacked these areas on unusual Northem westem winds. The direction of migrated swarms during 1984 plague was quite different; they were migrated on Northern eastern winds to Red Sea Coasts through the southern eastern desert of Egypt as usual.

The swarms of the last plague (2004-2005), were chemically combated by liquid insecticides (E C formulation).

1. Desert Locust Plagues:

Large parts of Africa suffered a Desert Locust plague between 1956-1989 and 2004-2005. Egypt received heavy swarms on the Red Sea Casts and Western desert during this plagues The national efforts in Egypt were successfully competed unexpected invasions from West African and Sahel countries in 2004 and 2005 It is due to that Desert locusts often breed in remote, sparsely populated areas and impermanent breeding sites. The produced swarms were usually migrate on Northern eastern winds to south of Egypt, hut during the last plague, these swarms were migrated on Northern western winds to Northern of Egypt and infested New Valley, Nobaria, Sinai and Delta Governorates.

Chemical control was the only control option during the 1986-1989 and 2004-2005. Locust campaigns in Egypt, the Sahel region and North Africa In Egypt shout 2280 Km^2 Were treated with approximately 40 tons of liquid pesticides (EC. formulation)

2. Control Strategies:

The French research organization, PRIFAS (1989), conjectured that control efforts destroyed 20% of the desert locust population in late 1988 and early 1959, 30% perished in storms over the Atlantic, 30% were tilled by low temperature, and 20% by insufficient rainfall But, the usual view of those involved in control campaigns is that control measures are the key to ending plagues that is exactly what happened in 2004-2005 plague.

1. **Upsurge Or Plague Prevention (Preventive Strategy):**

It has been claimed that plague prevention costs less than plague control This entirely depends on whether the outbreak would develop into a plague if it is controlled, and if so, whether this can be prevented.

The preventive control strategy was considered appropriate when used is conjunction with the persistent insecticide dieldrin However, there is now great doubt shout the effectiveness of this strategy when none-persistent pesticides are used The preventive strategy therefore needs to he analyzed critically, and may have to he adjusted on the basis of such an analysis.

The current strategy of Locust affected countries and the FAO is that of "plague prevention". Surveillance and control of the Desert Locust consist of the following three steps

1-Monitoring of ecological conditions in the potential breeding areas (they are not permanent areas)

2- Ground surveillance of potential breeding areas

3-Intervention where there is a threat of gregarization, based on density assessment of locusts.

In practice, the early stages described shove are often not detected in time and gregarization occurs within the context of this control strategy, differing to make action and the object of control measures,

One group asserts that plague can be locusts to appear, insisting that there is little point in monitoring solitarious populations (Jones, 1989).

The opposite view holds that effective control possible after a majority of the overall locust population has made the transition to the gregarious phase The arguments cited in favor of this view, is as follows:

Heavy rainfall causes the population solitarious locusts to reproduce, causing the population to spread out over large areas. The first gregarious insects appear at particularly favourable sites, and measures to combat them have no significant impact on the development of the population as a whole. As the solitary insects continue to spread throughout the area, increasing numbers of them make 'the transition to the gregarious phase, which is associated with a tendency for them to aggregate. This concentration of insects in smaller areas lets the overall population be systematically combated, thus effectively preventing plagues (Jones, 1989).

1.2. Curative Strategy:

Also, there are two possible approaches. One is try to systematically put an end a plague, and the other is to protect crops without actually combating the locust population as a whole.

The advocates of the approach of completely eliminating existing gregarious swarms assume that a preventive approach would require a large number of expensive and labour4ntensive monitoring units, and even so could not be correctly carried out They assert that, in the final analysis, plagues can not be prevented; but after they have begun they can be successfully combated by deploying resources that can be mobilized on a short-term basis. Large-scale extermination of the locusts, thus puffing an end to the plagues, can be achieved by using airplanes to fight the swarms (Symmons, 1992)

The opposite approach is quite different, concerning on protection of crops It focuses not on controlling development of desert locust populations, but instead on directly shielding valuable crops. By means of specially designed measures, the attempt is made to combat only those locusts that directly threaten production. No efforts are made to influence the depending on climate conditions - always ends with a natural collapse of the locust population.

1.3. Applied Strategy:

As the locust outbreak of recent years have shown, the concept of preventive control favoured by the FAD has not been sufficiently effective.

The remoteness of the areas that have to be monitored and the lack of infrastructure make for difficult working conditions and an inadequate flow of information Marital conflicts in parts of Mali, Niger, Chad, Sudan and Ethiopia have also impeded and endangered survey activities in the past. Consequently, frequent use is also made of the curative strategy. But ignorance about the potential damage desert locusts can realistically be expected to inflict results in rather aimless control efforts. When Swarms are sighted and control seems to be possible, the locusts are actively combated, but without attempting to assess potential losses.

2. CONTROL METHODS:

3.1. Insect Growth Regulators:

Chemical control is still the main method for reducing locust in crop areas In trails to explore less hazardous chemicals, attention was directed to the anti-chitin synthesis compounds. Fourth and fifth instars nymphs of *Shistocerca gregaria* were found to be sensitive to diflubenzuron (TH 60-40) and the percentage of moulting abnormalities proportionally increased with the dose (Many *et al*, 1981). Also the nymph of *Melanoplus Sanguinipes* were very sensitive to diflubenzuron when reared continuously on treated wheat seedlings (Elliot and Lyer, 1982). (Robertson and Boelter, 1979) reported that diflubenzuron foliar deposits were resistant to rainfall, leaching and photo-degradation factors and many remain active for 7 weeks.

Diflubenzuron (CME), Teflubenzuron and Chlorofluazuron (SKI) were tested against the nymph instar of Desert Locust under field conditions. All the treated nymphs were failed in ecdysis during the next moult or to the adult stage. Alt these compounds caused insecticidal and morphogenetic effect against this insect (El-Cammal and Hendy, 1992).

So, several attempts are directed to evaluate insect growth regulators (IGRs), anti-moulting agents and antifeedant aiming to prevent the multiplication and metamorphosis of the nymphal instars of *S. gregaria*. Some of these compounds are highly specific to hopper stage by contact or stomach action (El-Gammal, 1992), also Juvenile hormone analogues, fenoxycarb completelt prevented metamophosos of this insect (EI-Gammal et al, 1989)

3.2. Pathogens Op Locust And Grasshoppers:

A variety of pathogens are available as potential control agents of locust and grasshoppers These includes fungi (Carruthers et at, 1997), Nematodes (Baker and Capinera, 1997).

Since, 1989 over 150 isolated virulent against Orthoptera have been found (Lomer et al, 1997), but, there are many biological reasons to searching the environments of the target species; isolates may be better adapted to, for example, UV radiation, temperature and humidity extremes (Mc Cammon and Rath, 1994).

Field trials to investigate the combination between *Metarhizium flavoviride* and used growth regulators revealed that, the integration between *M. Flavoviride* and She full dose of consult (37.Ig.a.i. /g.) was the most effective integral action, which induced 67 2% reduction after 5 days of application and 96.8 % after 15 days. On the other hand, the efficiency of the integrated action of the antifeedant agent, azadirachtin with the antimoulting, Consult (as a bait) was more potent, than the bait of *M. Flavoviride*, especially in their latent effects. Thus, it was found that, the most potent integrated action was induced by the compination between the anti-moulting effect of Consult and She fungi, *M. Flavoviride*, while the liquid formulation *M. Flavoviride* spores exhibited high efficiency than the powder one giving sufficient percentages of reduction in the population density of L.m. migratorioides (44.0%, reduction after 5 days of application and 77.7 % after 11 days). (E1-Gammal et al 2004).

3.3. Antifeedant:

Many years ago, the antifeedant properties of the neem tree *Azadirachta indica* A Jjuss, were first reported in field experiments with the adult desert locust (Pradhan and Jotwani, 1968). The primary antifeedant component of neem seeds is azadirachtin a tri-terpenoid (Nakanishi 1975).

Neem extracts contain many compounds; their combined activities include antifeedant properties, Insect Growth regular (IGR) activities, ovipositor deterrent effect, and effects on insect fecundity (Schhmutterer, 1990).

Champagene et al, (1989) reported that the desert locust *S. gregaria* is She most sensitive insect So the antifeedant action of azadirachtin Moreover, the neem tree leave extracts exhibited high antifeedant activity against the same pest (El-Gammal et al, 1988).

Champagene et al , (1989) added that the migratory grasshopper, Melanoplus sanguinipes was undeterred by feeding on cabbage leaf discs treated with up So 550 ppm azadirachtin; however, azadirachtin consumed by 5^{th} instars nymph had a clear mpultdisrupting effect that was dose dependant.

So, Neem or Margosa tree has attracted much attention as an effective antifeeding agent against wide variety of insects, Locust have received most of the preliminary trails wit its powder or solvent extracts (EI-Gammal et u(1988 and El-Gammal, 1994)

3.4. EGG PODS EXTRACTS:

3.4.1 Ethanol extracts:

Ethanol extract of *schistocerca gregaria* (Forsk) egg pods (froth and masses) were prepared The sediments of these extracts were re-dissolved in saline solution These solutions were applied directly to the ovispositing sites (sand) of the ovispositing solitary or gregary female adults. The numbers of egg pods, laid eggs, hatched percentages and the reproductive potential of the exposed adults were significantly reduced This effect was more pronounced by the application of ethanol extracts from solitary phase to the gregary one and vice versa, than their own phase. A disturbance in their haemolymph main metabolites (proteins, carbohydrates, lipids and cholesterol) was associated with the reduction in their reproductive parameters. These findings are the first record for the suppressive effects of a natural extracts of some insect tissues on their reproductive potential, so this study could be considered as a new contribution for a novel research approach for insects control using some natural extracts from their own tissues, (El-Gammal et al, 2002).

3.4.2 Hexane extracts:

Froth (foam) and egg mass of *Schistocerca gregaris* (Forsk) egg pods were segregated and extracted separately in hexane. The ovipositing sites of the ovipositing 8 days old female adults of the two phases (gregary or solitary) were contaminated with these extracts Gregary and solitary ovipositing females were exposed to froth and egg mass extracts in hexane, respectively. The exposure of these insects to both extracts significantly reduced their produced numbers of egg pods, laid eggs, hatched eggs and the reproductive potential, these results led to some trails to identify the effective compounds So, GC-MS analysis was conducted .by two different capillary columns (carbowax and S % phenylpolysiloxane) GC-MS profile of hexane froth extracts of gregary and solitary egg pods disclosed 9 and 35 peaks for each phase, respectively The obtained results indicated the presence of several volatile compounds such as eugonal, isoeugonal, it needs further separation and biological biossay to give the complete chemical structure for the effective compounds in these extracts. (El-Gammal et al, 2003).

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