

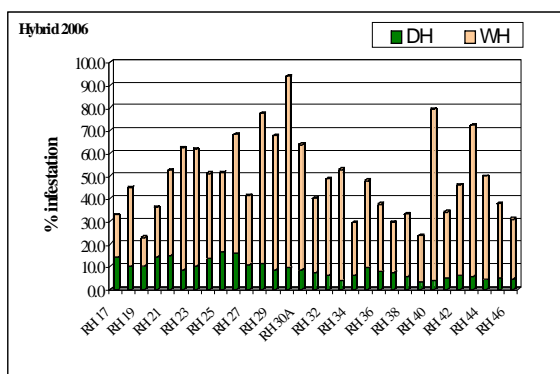
Integrated Pest Management

Integrated Pest Management was identified as a key element of sustainable agricultural development in the Policy and Strategy for agriculture developed by Government of Pakistan as part of its response to increasing misuse/overuse of pesticides and their negative impacts on the society. IPM research activities of PARC seek to improve the livelihoods of small-scale farm families, thus helping to alleviate poverty and health risks while protecting the environment. We believe that this can best be achieved by nurturing farm families' capacities to self-reliantly manage their field ecologies, generate/evaluate new knowledge and technologies, and cooperatively work together with other farmer families.

INTEGRATED PEST MANAGEMENT

Rice

- Evaluated candidate rice varieties and hybrids for resistance to SB, LF and WBPH. None was found resistant to these major pests. Majority of the material was susceptible or moderately susceptible.
- In reference studies to wild rice species and rice cultivars, *Oryza brachyantha* and *O. rufipogon* were least preferred to LF larvae as compared to Super Basmati and Basmati 2000.
- Evaluated wild rice species for resistance against bacterial blight. *Oryza australiensis*, *O. grandiglumis*, *O. rhizomatis*, *O. alta*, *O. meridionalis*, *O. nivara* and *O. brachyantha* were highly resistant to bacterial blight.



Reaction of rice hybrids to SB



Stem borer infestation to NUYT

Oilseed

- Sunflower hybrids were evaluated for their resistance against insect pests. It was observed that hybrids PARSUN-2, LG-5660 and 63A82 had lowest infestation with whitefly population of 1.1 to 2.1 while in NK-S-278 infestation was highest with whitefly population of 3.5/leaf. For plant hopper, hybrid 64A63 had the minimum population (2.0 /leaf) and in Hysun-33 infestation was with plant hopper population of 7.3/leaf.
- Twelve entries of sesame were evaluated against plant hopper infestation, where the population ranged from 1.3-1.8/leaf in different entries. The phylloidy disease was found on all the entries. However, none of the entry had resistance against phylloidy.
- *B. juncea* entries were screened against turnip aphid, *Lypaphis erysimi*. The lowest (1.2-1.0 cm/shoot) infestation was recorded on P-78 and BARD-I. Other entries had moderate infestation ranging from 2.0 to 3.6 cm/shoot. Ten entries of *B. napus* were also screened against turnip aphid, *Lypaphis erysimi*. Heaviest aphid population was recorded on Shiralee and lowest on KN-135 (0.5 cm /shoot) and 97-5/24 (1.2 cm/shoot).

Weed Management in Wheat

- Wheat production is higher in early sowing trials where number of plant tillers was 340/m² and grain yield was highest in Puma Affinity/Super sprayed plots with production of 4.8 and 3.9 t/ha.

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***Avena fatua* and *Phalaris minor* in Wheat**

- Isoproturon was the best treatment. The least response to Isoproturon was shown by *A. fatua* collected from Tandojam, 14.36%, Lodhran 22.5% and NARC 55.44%. *P. minor* from Lodhran showed signs of Isoproturon resistance.

Maize

- Maize fields at NARC and Fateh Jang with mulching treatment produced 6.4 t/ha.



Effect of mulching on maize yield

Honeybee Hives

Management of mite *Tropilaelaps clareae*, with thymol and formic acid was carried out on 12 Langstroth hives with modified bottom for putting inside trays through the back of the hive. Thymol was 99% and formic acid 85% effective and honey production was 30 kg and 21 kg in thymol and formic acid treated hives, compared to control where bees were in moribund condition.

Vegetables

- Red pumpkin beetle started appearing in the first week of April and population remained high from first week of May to 1st week of June and started decreasing afterwards.
- Onion varieties having less number of young growing leaves during the peak population period of thrips were less attacked. Yellow varieties were more resistant/tolerant to *T. tabaci* as compared to red varieties.
- Maximum marketable fruit yield (25.07 t/ha) was obtained when tomato plants were grown under muslin cloth cover and straw mulch was applied for control of fruit borer.

Potato

- Neem extract 2% solution effectively reduced the jassid population 80 - 91% during autumn season and it was 90-93% with commercial pesticide. The reduction in jassid population resulted in increased yield over control.

Tea

- The noctuid borer “*Agrotis* species” damaged 2% stem of growing seedlings. The snails fed on the growing buds and young leaves of the nursery plants. But removing of plant portion above 15 cm from the ground minimized the snail's damage. The aphids “*Toxoptera aurantii*” also damaged the growing buds and the leaves by sucking the sap but thumb nailing of plants escaped the insect attack.
- Coccinellids controlled the insects in the tea nursery. One beetle on an average ate 80 aphids under controlled conditions in the laboratory.
- The noctuid borers were also controlled by the application of Sevin dust @ 2.0 g/m² in between the beds and the polythene tubes at an interval of one month. The aphids were controlled by spraying

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- Cypermethrin at the strength of 1.0l in 150l water.
- The use of sodium chloride was found very effective for the control of snails but the side effects were observed that sodium salt increased the pH of the soil, which in no case is useful for tea as it is an acidic soil-loving crop.
- The application of integrated pest management practices and minimum use of pesticides not only reduced the labour charges of nursery but also encouraged biological agents during 2006-07.

SARC, Karachi

- Redomyl Gold among fungicides was the most effective in controlling the seed borne mycoflora; others effectiveness is as Aliette > neem seed powder > Antracol > sodium hypochlorite.
- Seventeen genera and 32 species of fungi were isolated from 14 samples of chili seeds purchased from open market by using standard blotter technique.
- In vitro studies on chilli, neem (*Azadirachta indica*) extract was effective for minimizing the population of nematodes namely, *Hoplolaimus indicus*, *Meloidogyne incognita* and *Pratylenchus penetrans* followed by Carbofuran over control.
- Nematode species *Hemicriconemoides mangiferae*, *Hoplolaimus pseudoropustus* and *Helicotylenchus indicus* in mango were more or less equally well controlled by various treatments. Carbofuran was the most effective followed by neem and eucalyptus leaf extract.
- Neem oil spray after seven days interval was better as compared to pesticide spray for the control of army worm in sugarbeet.
- Under IPM based control trials, nine study sites, in districts of Balochistan namely Muslim Bagh, Hanna, Urak and Mastung were selected while in Sindh three control sites in Thatta and Malir area were chosen for trapping and poison baiting. Results of live trapping and leg-held traps showed 76% and 46% respectively.
- The data related to area wise bait application trials revealed the highest mortality success at Shernab, Mastung (98.53%) followed by Hanna Urak (95.83%). When compared the success of acute, i.e. zinc phosphide and chronic rodenticide bait i.e. brodifacoum the success of control trials using brodifacoum bait remained 98.5% followed by zinc phosphide i.e. 92.60%.
- Both sexes of bandicoot rat preferred rice the most and wheat the least. A significant difference in intake between wheat and rice ($P > 0.05$) was noted among both sexes. While a non-significant intake was evident in all other grains ($P < 0.05$).
- The dry pellet weight of the Tyto was 2.0-7.3 and its size was 1.2 - 5.2 x 0.9 - 4.0 cm (L x W). Results of the analyzed pellets revealed presence of skeletal remains of the *Bandicota bengalensis*, *Nesokia indica*, *Rattus rattus*, *Mus musculus* and *Suncus* sp. and skeletal bones of birds were also found.