MEETING

ABSTRACTS OF PAPERS PRESENTED AT

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Dedicated to the Memory of Dr. Shoshana Yathom

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Shoshana Yathom – In Memoriam

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It is quite natural that entomologists of the generation of S. Yathom are retiring and young scientists who did not know her are being accepted in academic institutions and agricultural organizations. Therefore, it is important to describe and detail the contribution of Dr. Yathom to entomological agriculture to the new generation of workers. She was one of the few entomologists who had the opportunity to 'breath agriculture' from early childhood until retirement. She lived and studied at the Miqwe Yisra'el agricultural school, which strongly influenced her decision to choose agricultural research as a profession. Her work at the ARO started in 1951, she acquired a Ph.D. degree in 1960, and continued to work as a senior entomologist until her retirement in 1990. I will dwell on two aspects of her work: entomological research, and personal merit – which is closely linked with her professional contribution.

A. Dr. Yathom was involved in her work, not only in research *per se*, but also exerted efforts to bring the research results to full application at the levels of the extension service personnel, the crop inspectors and the farmers. She was deeply devoted to the main objective of the ARO, namely, to convert agricultural research from theory into practice. She belonged to the rare type of investigators who sought answers and solutions to entomological problems in the field. She brought the problems from the field to the laboratory and then returned to the field with the solutions, which very often rewarded the farmer with economic gains. Dr. Yathom viewed the pest situation in the broad sense of the word and therefore could understand and forecast the problems that needed to be solved. I will mention in brief, Dr. Yathom's major scientific contributions.

1. *Earias insulana* was studied in collaboration with the late Prof. E. Rivnay, at a time when not much was known about this pest. As a result of phenological studies, the chemical control of *E. insulana* became effective.
2. *Delia (Hylemia) antiqua.* The life tables of this fly constituted the core of her Ph.D. thesis supervised by Prof. Zvi Avidov. In phenological work the insect's diapause and activity periods were determined and control based on using less chemicals was established.
3. *Delia (Hylemia) platura* was a serious pest in the 1950s. She conducted biological studies of the insect and brought about improvements in chemical control through screening of insecticides.
4. *Delia flavibasis*. Biological studies in wheat were conducted, leading to life tables and control.
5. *Atherigona soccata.* Work in sorghum was done with the aim of esablishing life tables and understanding the potential of reproduction and damage. Better control was developed by using systemic insecticides applied to soil to replace the ineffective overhead sprays.
6. *Phthorimaea operculella* was a serious pest in the 1960s. Monitoring by pheromone traps in tomato represented well the pest's status in the field.

7. *Rhizoglyphus robine.* This soil acarine which caused severe damage to onion, was studied in collaboration with Prof. U. Gerson. Monitoring traps were developed and recommendations for control were provided.
8. *Liriomyza trifolii* was studied in *Gypsophilum* and other plants in glasshouses. Further, she conducted a study of quarantine methods using gamma irradiation of the plants to eliminate the pest in flowers for export.
9. *Insect light traps.* This study was conducted over 30 years. A national network of traps was used and moth catches were identified taxonomically. The records were analyzed to determine population movements, diapause periods, geographical origins and densities. Phenological changes in the moth populations affected by climatic factors were suggested. The three main moth groups studied were Phytometrinae, Sphingidae and Heliothinae. The flight behavior and migration of Sphingidae elicited special interest and attention in the study.

B. The work of Dr. Yathom was characterized by the capacity to complete the work with thoroughness, devotion and persistence down to the smallest details which allowed her to gain full knowledge of the subject. This knowledge was acquired and distributed with much modesty. Furthermore, Shoshana Yathom contributed to the community; she was the secretary and president of the Entomological Society of Israel for several terms, which included chores of organizing symposia and meetings. These meetings helped to extend the exchange of knowledge and experience in insect pest management among the different plant protection disciplines. She helped new immigrant scientists in smoothing their integration process in Israel. The memory of Dr. Yathom will remain with us, with her high scientific and personal merits that she showed during her life.

Possible Involvement of the Onion Thrips in the White-Straw Syndrome of Onion in Israel

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The onion crop that is sown in January and harvested during the summer has a high incidence of plant death. The leaves of the dead plants remain erect, dry out and turn white. The normal maturation of the affected plants is impaired, leading to substantial yield loss. This phenomenon is commonly referred to as white-straw syndrome. In previous studies it was demonstrated that pathogenic bacteria and fungi are associated with plants showing this syndrome. Also, in 1996, the iris yellow spotted virus (IYSV), of the tospovirous group, was isolated from plants showing the white-straw syndrome. The vector for IYSV is the onion thrips, *Thrips tabaci.* In a series of field trials, the effect of thrips control on the severity of the white-straw syndrome was evaluated. A direct relationship was found between the efficacy of thrips control and reduction in the severity of the syndrome. Yield was increased significantly in the insecticide-treated plots, the most effective insecticides being methiocarb (Mesurol) and furathiocarb (Deltanet). Combined application of fungicides and insecticides improved the suppression of the white-straw syndrome. It is hypothesized that white-straw syndrome is a symptom that may be induced independently by various pests, *viz.* bacteria, fungi, viruses and insects.

Modes of Dispersal and Biological Control of Broad Mite, *Polyphagotarsonemus latus*

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Broad mite, *Polyphagotarsonemus latus* (Banks), is an important cosmopolitan pest on many commercial crops and its control requires numerous pesticide applications. The mite attacks all young plant parts (leaves, stems, flowers and fruit) and it is very small and difficult to detect. Our research objectives were: to establish how the mite invades screenhouses, whether borne on wind currents or carried by insect vectors (phoresy); if the latter case, to determine whether the phoretic relationship is specific to a certain group of insects and to assess the efficacy of the phytoseiid predator *Neoseiulus cucumeris* for broad mite control. Sticky traps were placed on the windward side, outside and inside the screen-house, and examined at 2-week intervals in autumn 1999, in order to monitor broad mite invasion. The phoretic relationships between the broad mite and three insects, namely, *Bemisia tabaci*, *Aphis gossypii* and *Frankliniella occidentalis*, were studied by placing all three insects, frozen, on individual cucumbers heavily infested with broad mites and allowing them to choose. For biological control of broad mite on pepper, special slow-release sachets, containing the predator, were hung on the stems of individual plants. In the sticky traps broad mites were found only when attached, or adjacent, to *B. tabaci*. No windborne broad mites were caught in these traps. A significant positive association was found between *B. tabaci* and the broad mite. The choice test clearly demonstrated the mite's preference for whiteflies over the two other insects. The release of *N. cucumeris* had a significant effect on broad mite populations. Further experiments will be conducted in the coming season to substantiate these findings.

The Function of the Courtship Display of Two Species of Male Widow Spider, *Latrodectus pallidus* and *L. revivensis*

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Male widow spiders, *Latrodectus pallidus* and *L. revivensis* (Theridiidae), show a characteristic display on a female's web. This may consist of (i) spinning silk over the female's web, (ii) cutting parts of the female's web and rolling them up, and (iii) jerking movements while approaching the female. The display may serve to reduce predation risk from the female, provide the female with information about male quality, or reduce male–male competition. The display is reduced to jerking when males approach mated females. The risk of predation is similar with virgin and mated females, so the cutting and spinning display does not reduce predation. Features of the display apparently do not relate to male quality. When a rival male is placed on a female's web, the displaying male ceases web-cutting and spinning and runs directly to the female. Only the jerking display is retained. Web-cutting and spinning appear to conceal virgin females from rival males. Given first-male sperm priority, this costly display is less important when courting a mated female and it loses its significance when a rival male is already on the web.

Is Dufour's Gland Secretion an Egg-Marking Pheromone or a Queen Signal in Honeybees?

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Although the queen honeybee is the major reproductive member of the hive, workers can lay eggs, and are responsible for the production of approximately 0.1% of the male brood. Queens are also distinguished from workers by their pheromonal bouquet, exhibiting caste-specific compositions

in at least two exocrine glands. We focused our study on Dufour's gland (DG), which opens into the dorsal vaginal wall and was suggested to be the source of an egg-marking pheromone. In queens, glands are more developed than in workers and are fortified with long chain esters that are absent in queenright (QR) workers. Queenless workers, however, possess the queen-specific esters in their DG secretion. We used both chemical and behavioral approaches to elucidate the function of DG secretion. Chemical analysis revealed the presence of DG esters on the queen-laid eggs, albeit in minute quantities. The behavioral experiments focused first on testing worker policing, *e.g.* the selective elimination of worker-born eggs by the worker nestmates in a QR colony. It was demonstrated that QR workers readily discriminate between queen- and worker-laid eggs, selectively eliminating the latter. However, neither queen's DG secretion nor its synthetic ester constituents prevented egg policing, refuting the hypothesis that the secretion serves as an egg-marking pheromone.

We then tested the hypothesis that the queen DG constitutes a part of the queen signal. Application of queen glandular secretion or the synthetic mixture of its ester constituents on a glass slide or on a worker induced retinue formation around the 'surrogate queen'. It was concluded that DG secretion constitutes part of a complex queen signal that is the basis of the social integrity of the honeybee colony. The presence of these esters on queen-laid eggs further suggests that they may function as a queen fecundity signal, a hypothesis that remains to be tested.