CURRICULUM VITAE

Dr. RAZA MUHAMMAD MEMON
Senior Scientist, Plant Protection Division
Nuclear Institute of Agriculture, Tando Jam-70060, Pakistan
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Father's Name	Wasaro Memon
Date and Place of Birth	26-07-1970, Arazi, District Jamshoro
Nationality	Pakistani
PIN	14949
Present Address	B.No. 08 Marvi Garden Jamshoro road, Qasimabad, Hyderabad.
Permanent Address	P.O Arazi Taluka Sehwan District Jamshoro.
Specialization	Entomology
Date of joining PAEC at NIA, Tandojam	02-12-2002

Tweleve year research experience

Academic and professional careers

Matriculation	Science	B.I.S.E, Hyderabad	1985	1st division
F. Sc.	Pre-Medical	B.I.S.E., Hyderabad	1987	2nd division
B.Sc. Agric. (Hons)	Entomology	Sindh Agriculture University Tando Jam	1994	1st division
M. Sc. Agric.(Hons)	Entomology	Sindh Agriculture University Tando Jam	1995	1st division
PhD	Entomology	Sindh Agriculture University Tando Jam	2013	-

ii) Professional career

Position held	From	To	Organization
S.A Agric:	02-12-2002	04-05-2004	Nuclear Institute of Agriculture, (NIA), Tando Jam
Junior Scientist	05-04-2004	30-11-2007	-do-
Sr. Scientist	01-12-2007	To date	-do-

Funded Project Completed (as Principal Investigator)

1. Augmentation of parasitoids for area-wide management of sugarcane borers using nuclear techniques funded by IAEA (Worth € 25000), CRP No. 13940/RO (2006-2011)

Ongoing Funded Projects (as Principal Investigator)

1. Integrated Pest Management of Sugarcane Borers Project (Coordinated Project with Sugar Mills) (1989-Todate)

2. Integrated Pest Management of Sugarcane Borers Project (Coordinated Project with Faran Sugar Mills) worth Rs. 1.5 million (March 2014- Feb. 2015)

Project Submitted for Funding to PAEC

- Establishment of Production Cell for Bio-control Agents to Manage the Insect Pests on Area-wide Basis. (Source of Funding SPD / PSDP, Worth Rs. 33.0 million).

Scientific Acknowledgment

- Member Board of Studies, Dept. of Entomology, SAU, Tandojam.
- Member Board of Studies, Dept. of Plant Protection, SAU, Tandojam.
- Resource Person of Fauji Fertilizer Company for Farmers High Profile Meetings.
- Resource Person of Pakistan Society of Sugar Technologist (PSST).
- Resource Person of Organization for Nature Conservation and Agriculture Development (ONCAD).
- Resource Person of Syngenta Pakistan Limited.
- Resource Person of Farmers' Participatory Saline Agriculture Development Project Badin
- Approved Co- Supervisor for M.Sc:& PhD Students in Deptt. of Entomology, SAU, Tandojam.
- Approved Co- Supervisor for M.Sc:& PhD Students in Deptt. of Plant Protection, SAU, Tandojam.
- Approved Co-Supervisor for M.Sc:& PhD Students in Deptt. of Zoology, University of Sindh, Jamshoro.

Fellowship / Trainings / Workshops (International)

- Four Months Fellowship on Integrated Pest Management from 01-04-2008 to 31-07-2008 at IAEA Laboratories Seibersdorf, Vienna, Austria.

- Workshop on Dengue mosquito IAEA Laboratories Seibersdorf, Vienna, Austria, from 08-10-2011 to 11-10-2011 organized by IAEA.

Trainings/courses (National)

- 11th Annual Training course on the "Safety measures in the use of radiation and biology", from 20-12-2004 to 25-12-2004 at NIAB, Faisalabad.

- 33rd Post graduate training course on "Nuclear and other advanced techniques in agriculture and biological research" from 05-12-2007 to 16-12-2007 at NIAB, Faisalabad.

- Attended one day seminar on "Quality management and its significance in the present scenario" held at Nuclear Institute of Agriculture (NIA), Tandojam on April 19, 2007.

- Training workshop on "Project Formulation" held on October 19-20, 2011 at Sindh Agriculture University Tandojam organized by Pakistan Science Foundation Islamabad.

- Training course 4Q HRD during 30 December 2013- 10 January 2014 Programme held at KINPOE Karachi organized by International Affairs and Training Division PAEC Islamabad.

Trainings /workshops organized:

- 1st National workshop on biocontrol technology held at NIA, Tandojam from March 24-26, 2009.
- 2nd National workshop on biocontrol technology held at NIA, Tandojam from April 27-29, 2010.
- 3rd National workshop on biocontrol technology held at NIA, Tandojam from April 5-7, 2011.
- 4th National workshop on biocontrol technology held at NIA, Tandojam from May 2-4, 2012.
- 5th National workshop on biocontrol technology held at NIA, Tandojam from June 18-20, 2013.

Current Research Responsibilities: (Principal Investigator)

- Integrated Management of Sugarcane Borers.
- Biological control of insect pests of cotton, vegetables and fruits.

Awards / Certificates:

- Certificate awarded for successful completion of training course on the "Safety measures in the use of radiation and biology" (2004).
- Certificate awarded for successful completion of training course on "Nuclear and other advanced techniques in Agriculture and biological research" held at NIAB, Faisalabad (2007).
- Certificate awarded for attending one day seminar on "Quality management and its significance in the present scenario" held at Nuclear Institute of Agriculture (NIA), Tandojam on April 19, 2007.
- Certificate awarded for successful completion of four months IAEA fellowship on Integrated Pest Management at IAEA Laboratories Seibersdorf, Vienna, Austria (2008).
- Certificate awarded for successful completion of Training workshop on "Project Formulation" held at Sindh Agriculture University Tandojam organized by Pakistan Science Foundation Islamabad (2011).
- Certificate awarded for successful completion of Training course held at KINPOE Karachi under 4Q HRD Programme organized by International Affairs and Training Division PAEC Islamabad (2014)

Technologies perfected at NIA, Tandojam:

Biocontrol technology for Sugarcane borers and cotton pest:

After the series of comprehensive strenuous research efforts biocontrol technology has been perfected under field conditions, it was introduced to farmers and Sugar Mills of Sindh. Coordinated Projects on Integrated Pest Management of Sugarcane Borers and sucking insect pests of cotton in all seven sugar mills and two farms of progressive growers of Sindh are running satisfactorily. During 2014 seasons an area of 107,500 hectares of sugarcane through egg parasitoid *Trichogramma chilonis*(Ishii) and an area of 1500 hectares of cotton through predator *Chrysoperla carnea* (Neuroptera: Chrysopidae)was treated successfully with biocontrol technology.

Significant Research Endeavour:

I joined PAEC as Scientific Assistant (SA-Agri.) on December, 02, 2002 in Entomology presently Plant Protection Division and re-appointed as Junior Scientist in November 2004. Further I was promoted as Senior Scientist in December, 2007. I remained involved in various goal oriented research projects. The main achievements during my service tenure are as under:

- The studies were conducted during the IAEA project entitled "Use of nuclear techniques for colonization and production of egg and larval parasitoids of sugarcane borers. To evaluate the use of gamma radiation to improve the production and field performance of *T. chilonis* (Ishii) and *Cotesia flavipes* (Cameron) for biological control of sugarcane shoot borer. The results of radiation studies revealed that maximum parasitization of 67.5%, emergence of 88.8% and female sex ratio of 61.3 % were confirmed at 25 Gy. *S. cerealella* eggs were used as hosts for *T. chilonis.* Suitability of non-irradiated host eggs decreased as the age of the eggs increased with no parasitization of eggs older than 4 days. However, irradiation of host eggs using 20-25 Gy decreased the age effect and significantly more 2-, 3-, 4- and 6-day-old irradiated eggs were successfully parasitized. Therefore, radiation doses of 20 and 25 Gy were most effective for economical production of *T. chilonis*. Irradiation of host eggs did not affect the hatch percentage up to a dose of 15 Gy. Hatchability was significantly reduced at higher doses, with negligible hatching at 50 Gy. In another experiment, radiation at 60-80 Gy improved the suitability of *C. infuscatellus* larvae for parasitism by *C. flavipes*, allowing normally unsuitable fourth and fifth instar larvae to be successfully parasitized. The sex ratio of *C. flavipes* reared on irradiated larvae skewed in favor of females.

- The studies were conducted during the IAEA project entitled "Augmentation of parasitoids for the management of sugarcane borers using nuclear techniques. The aspire of this research work is to develop biological control based IPM model for efficient and economical management of sugarcane borers with the help of an egg parasitoid *Trichogramma chilonis* (Ishii) and a gregarious larval parasitoid *Cotesia flavipes* Cameron. Population dynamics of sugarcane stem borer on eight commercial varieties of sugarcane was evaluated. The adults of sugarcane borers emerged from over wintering larvae during fourth week of February. The eggs were recorded in the sugarcane field from last week of February to first week of November and larval infestation was recorded around the year. Results revealed that none of the varieties showed complete resistance to borer infestation. The early maturing and high sugar content variety SPSG-26 showed highest susceptibility

while minimum damage was observed in late maturing variety Disco (43/60). The maximum larval populations in spring autumn and ratoon plantation were recorded as 30.8, 25.2 and 25.8% with mean population of 16.0, 12.8 and 12.2%, respectively.

- Effect of different infestation levels of *C. infuscatellus* on the yield and sugar recovery differed at various infestation levels (i-e 0, 5, 10, 15 and 20%) with a direct impact on the quantity and quality of two sugarcane commercial varieties CPF -237 and Thatta -10. Infestation of sugarcane stem borers was inversely proportional to the quantity and quality of sugarcane. Maximum cane weight/sample of 13.5 ± 0.21 and 12.1± 0.05 kg (Mean ± S.E) were recorded in CPF-237 and Thatta-10 varieties at 0% infestation level, while minimum at 20% infestation (9.3 ± 0.12 and 8.5 ± 0.12 kg), respectively. Highest sugar recovery (11.0 ± 0.08 and 10.2±0.11%) was observed at 0% infestation while lowest (9.3±0.12 and 8.5 ±0.12%) at 20% infestation in both the varieties. The effect of sugarcane varieties planting seasons on the incidence and establishment of parasitoids was observed. The results revealed that there were no significant differences among varieties for parasitism incidence but comparatively more parasitism was observed in Disco (43/60) and NIA -98.

- Experiment regarding augmentation of parasitoids to study the influence of release intervals and densities of *T. chilonis* for the management of sugarcane stem borer showed that the parasitization of *T. chilonis* was highest 52.4 with least infestation of 3.1 was observed in the blocks where the parasitoids were released at weekly interval as compared to plots where fortnightly and monthly releases were made. Identical results were obtained in the blocks when 80 thousand parasitoids were released on the monthly basis. However, the infestation was below the economic threshold levels ranging from 0.2 to 10.4% in all the blocks where parasitoids were released in variable numbers.

- The rate of parasitism was influenced by temperature and relative humidity. Maximum parasitism in sugarcane field was observed in the month of October (49.2 ± 2.95 %) when the temperature ranged between 25-30 ^{o}C. The mean population of *T. chilonis* was 7.5, 8.0, 5.8, whereas, of *C. flavipes* was 3.1, 3.6, 3.4 in spring, autumn and ratoon crops respectively. Relative suitability of eight local wheat varieties for mass rearing of *Sitotroga cerealella* (Olivier) as host was determined.

- The efficacy of egg and larval parasitoids when applied alone and in combination in sugarcane field showed that they worked well together and suppressed the pest population to 4.4 as compared to the mean larval population of 8.2 when *T. chilonis* was applied alone and 14.1 when *C. flavipes* was applied alone and 21.2 in control.

- Provision of supplemental host for initial survival and establishment of parasitoids in the field showed that the establishment of parasitoids was higher in the sugarcane block where supplemental host was provided to the parasitoids.

- The efficacy of egg and larval parasitoids when applied alone and in combination in sugarcane field showed that they worked well together and suppressed the pest population to 4.4 as compared to the mean larval population of 8.2 when *T. chilonis* was applied alone and 14.1 when *C. flavipes* was applied alone and 21.2 in control.

- Effect of secondary predators on Tricho cards with reference to placement and time release revealed that maximum establishment of parasitoids were observed in the block where Tricho cards were released at middle portion of plant in evening time and maximum predation of secondary predators was observed at lower portion of the plant.

- During studies, sugarcane field was surveyed to record any new spp. of parasitoids and predators. No new species was observed during study period. And egg parasitoid *T. chilonis* and larval parasitoid *C. flavipes* were found most abundant and effective in parasitizing the eggs and larvae of *C. infuscatellus.* Among the predators *Chrysoperla carnea,* lady bird beetles and *Geocoris punctipes* were also active around the year in all locations.

- The efficacy of different granular insecticides was also determined in sugarcane field. The results showed that larval infestation significantly declined (6.6%) in the plot treated with Quick 10G twice during the entire growing season.

Other facts:

- Member Exhibition Committee NIA.
- Member Weighing and Assessment Committee NIA
- Member Institutional Review Committee.
- Member Annual Report Committee NIA.

Publications:

International journal	**National HEC recognized journals**	**Books Published**	**Papers in Proceedings**	**Articles/ Brushers**	**Total**
05	08	01	04	04	21
	Impact Factor: 1.05				

Ph.D / M.Phil / M.Sc (Agri.) Hons. / Internees Supervised:

Ph.D	**M.Phil**	**M.Sc (Agri.) Hons.**	**Internees**
01	--	04	35

List of Publications:

Books

1. **Raza, M.** (2014) Biocontrol Technology for Sugarcane Stem Borer. LAP LAMBERT Academic Publishing, Germany, ISBN No. 978-3-659-64337-8

International

1. **Raza, M.**, Q. Ahmad, A.G. Soomro, S.M.M. Rashidi and N. Ahmad. (2014) Significance of irradiated supplemental host to enhance the performance of *Trichogramma chilonis* (Ishii) in the sugarcane fields Life Science International Journal. 8: *3002-3007.*

2. **Raza, M.**, Q. Ahmed, N. Ahmad, M. M. Shah and N. Depar (2014) Varietal responses on the population dynamics of sugarcane stem borer and its parasitoids Academia Journal of Agricultural Research 2(3): 087-092.

3. Anilla, H.M, M. Gadehi, A. G. Soomro, A. Asghar, A. Latif, S.M.Kori and **R. Muhammad** (2014). Optimum crop productivity in rain fed area of Thana Bola Khan, Sindh, by application of wind energy International Journal of Engineering Research and Application 4:8 (3): 9-14.

4. **Raza, M.** Q. Ahmed, S.M.M. Rashidi and N. Ahmad (2013) Role of irradiated and chilled host *Sitotroga cerealella e*ggs to enhance the parasitic potential of egg parasitoid *Trichogramma chilonis* (Ishii) Academic Journal of Entomology 6 (3): 133-138, 2013.

5. Fatima, B., N. Ahmad, **R. Muhammad**, M. Bux and Q. Ahmad, 2009. Enhancing biological control of sugarcane shoot borer, *Chilo infuscatellus* (Lepidoptera: Pyralidae), through use of radiation to improve laboratory rearing and field augmentation of egg and larval parasitoids. Biocontrol Science and Technology, Vol. 19, S1: 277-290.

National

1. Qadeer A., **R. Muhammad**, T. J. Ursani, N. Ahmad, M. M. Shah and N. Depar (2014) Effect of population density on the fecundity of *Chrysoperla carnea (*Neuroptera: Chrysopidae) under laboratory condition. Sindh University Research Journal (Sci. Ser.) 46:2:257-260.

2. **Raza M.**, M. A. Rustamani, R.D Khuhro and S. M. Nizamani. (2012) Predation on egg parasitoids *Trichogramma chilonis:* effect of timing and placement of irradiated host eggs on effectiveness of augmentative releases in sugarcane fields. Sarhad J. Agric.Vol:28(3) 451-455.

3. **Raza M.**, M.A. Rustamani, N. Suleman, N. Ahmed, and Q. Ahmed (2012). Impact of release intervals and densities of *Trichogramma chilonis* (Ishii) (Hymenoptera: Trichogrammatidae) against the sugarcane stem borer, *Chilo infuscatellus* (Lepidoptera; Pyralidae) under field conditions. Journal of Basic & Applied Sciences, 2012, 8, 472-477.

4. **Raza M.**, M. A. Rustamani, N. Ahmed, and Q. Ahmed (2012). Effect of different infestation levels of *Chilo infuscatellus* (Snellen) on quantity and quality parameters of sugarcane Journal of Basic & Applied Sciences, 2012, 8, 702-706

5. Qadeer A., **R. Muhammad**, N. Ahmed, J. Ahmed, S. Naz, H.Ali and N. Suleman (2012).Effect of different Photo periods on the biological parameters of *Chrysoperla carnea* under laboratory conditions. *Journal of Basic & Applied Sciences,* 2012, *8,* 638-640.

6. Ahmad, N., Sarwar, M., Wagan, M.S., **R. Muhammad** and Tofique, M. (2011).Conservation of Bio-control agents in cotton, *Gossypium hirsutum* L. field by food supplement for insect pest management. The Nucleus 48: 255-260.

7. Sarwar, M., N. Ahmad, Q. H. Siddiqui, **R. Muhammad**, M. Sattar and M. Tofique, (2003). Varietal resistance in stored mungbean against the infestation of pulse beetle, *Callosobruchus analus* (Fabricius) (Coleoptera: Bruchidae). Pakistan J. Zool., 35: 301-305.

Proceedings

1. Fatima, B., N. Ahmad, M. Bux, **R. Muhammad** and M. Sattar. (2003). Bio-control technology for area-wide management of sugarcane borers. *In:* Proc. National Executive Symposium in Technologies Developed for Commercialization Challenges and Opportunities. NIFA Peshawar, September 21-22, 2003. pp. 146-147.

2. Fatima, B., N. Ahmad, M. Bux, **R. Muhammad** and M. Sattar, (2005). Use of gamma radiation for the economical production of an egg parasitoid, *Trichogramma chilonis* (Ishii). Proc. FAO/IAEA Intr. Conf. Area-Wide Control of Insect Pests: Integrating the sterile insect and related techniques, 9 – 13 May 2005, IAEA – CN – 131 pp. 349-350.

3. Bilquis F., N. Ahmed, M Bux, **R. Muhammad** and Q. Ahmed, (2006). Integrated management of sugarcane borers with particular reference to biological control. PSST proceeding on Agriculture P: 33-42
4. Fatima, B., N. Ahmad, Moula Bux and **R. Muhammad**, (2007). Efficacy of different artificial larval diets on the development of *Chrysoperla carnea* (Stephen). Proceedings 41st Annual Convention, Pakistan Society of Sugarcane Technology, held at Rawalpindi from 21 – 22 August 2006. PP. 285.

Abstracts

1. **Raza M.**., B. Fatima, N. Ahmad, M. Bux and Q. Ahmad, (2005). Use of Nuclear Techniques for Economical rearing of an Egg parasitoid *Trichogramma chilonis.* Proc. 2nd National Conference on Agriculture and animal Sciences held at SAU, Tando Jam, Nov; 23-25

2. Bakhsh, M. B. Fatima, N. Ahmad, **R. Muhammad** and Q. Ahmad, (2005). Nuclear Techniques. A Tool to Induce Tolerance against Pesticides in *Trichogramma chilonis.* Proc. 2nd National Conference on Agriculture and Animal Sciences held at SAU, Tando Jam, and 23-25 Nov., 2005.

3. Bukhsh, M. B. Fatima, N. Ahmad, **R. Muhammad** and Q. Ahmad (2005). Nuclear Techniques; A Tool to Induce Tolerance against Pesticides in *Trichogramma chilonis.* Proc. 2nd National Conference on Agriculture and Animal Sciences held at SAU, Tando Jam, 23-25 Nov., 2005.

4. Qadeer A., B.Fatima, N. Ahmed, **R. Muhammad**, and M. Bux (2006). Provision of different proteins in adult diet of *Chrysoperla carnea* 26th Pakistan Congress of Zoology (International). P.65. Held at Punjab University of Lahore April 4-6.

5. **Raza M.,** B.Fatima, N. Ahmed, M. Bux and N. Ahmed (2006)**.** Effects of low temperatures on prolonged storage of *Chrysoperla carnea* (Stephens) (Neuroptera: Chrysopidae). 26th Pakistan Congress of Zoology (International). P: 65 Held at Punjab university of Lahore April 4-6

6. Bilqees, F., N. Ahmed, **R. Muhammad**, M. Bux and N. Ahmed (2006).Use of Irradiation in conjunction with low temperature for prolonged storage of Cotesia *flavipes*. 26th Pakistan Congress of Zoology (International). P: 65 Held at Punjab university of Lahore April 4-6.

7. Ahmad, Q., B. Fatima, M. Bux and **R. Muhammad** (2007). Determination of suitable packing material to avoid cannibalism in the larval rearing of *Chrysoperla carnea.* .Proc. 27th Pakistan Congress of Zoology (International), Volume 27: (In press).

8. Qadeer A., N. Ahmad and **R. Muhammad** (2010).Production of good quality parasitoid, *Trichogramma chilonis* (Ishii) for field release.30th Pakistan Congress of Zoology (International). P; 72 held at University of Faisalabad.

9. **Raza M.**, N. Ahmad and Q. Ahmed (2010).Significance of releasing place and time on the establishment of parasitoid, *Trichogramma chilonis* (Ishii) in sugarcane field.30th Pakistan Congress of Zoology (International). P; 72 held at University of Faisalabad.

10. Suleman, N., S. Ali., **R. Muhammad**., Q. Ahmad and N. Ahmad. (2011). Do the toxic cardenolides reduce the suitability of *Aphis nerii* for predators? A case study with two predators *Menochilus sexmaculatus* and *Chrysoperla carnea*. Proc. 31st Congress of Zoology International. pp 116 held on April: 19-21 at University of Azad Jamu and Kashmir Muzaferabad.

11. **Raza, M.,** N. Suleman, Q. Ahmad, and N. Ahmad (2011). Effect of secondary predators on parasitoid cards with reference to placement and time of release in sugarcane field. Proc. 31st Congress of Zoology International. pp 115 held on April: 19-21 at University of Azad Jamu and Kashmir Muzaferabad.

12. **Raza, M.**, M. Anwar, N. Suleman, N. Ahmad and Q. Ahmad (2012). Effect of different infestation levels of *Chilo infuscatellus* (Snellen) on quality and quantity parameters of sugarcane. 32nd Pakistan Congress of Zoology held on March: 6-8 at GC University Lahore.

13. Suleman, N., S, Ali, **R. Muhammad**, Q. Ahmad and N. Ahmad (2012).Effect of cold storage on the fitness of zigzag beetle *Menochilus sexmaculatus* (Fabricius). 32nd Pakistan Congress of Zoology held on March: 6-8 at GC University Lahore.

Articles

1. Dasti, A.H., N. Ahmad, S. M. M. Shah Rashdi**,** N, H. Khuhro**, R. Muhammad** and Q. Ahmad, (2004) Pest scouting in cotton. Monthly Sindh Zarat, April, 2004, pp, 15.

2. Qadeer, A., **R. Mohammad,** N. Suleman, N. Ahmad and S. Ali (2012) Dost Jeet *Chrysoperla carnea* Jay Zaria Nuksan kar Jeetan Jo Tadaruk. Monthly Sindh Zarat. (25), P-20, May-2012.

Pamphlets

1. .Nazir A, N. Suleman, **R. Muhammad** and Q. Ahmed, (2012) "Hiyatiati Tareeqa Insidad. Ganne ke keeron ka Moassar Hal" pp.: 1-8.