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A MANAGEMENT PACKAGE FOR BEAN FLY IN GRAIN LEGUMES

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Cowpea, green gram, black gram and soya beans are the major grain legumes cultivated in the Dry Zone of Sri Lanka. The mean annual rainfall in the Dry Zone is 1500 mm with 400 mm experienced in the Yala season. Due to their low water requirement grain legumes could be grown successfully in the dry zone during the Yala season. However, yield losses due to pests and diseases is a major production constraint. Bean fly is a major pest in grain legumes, in this area.

Bean fly Ophiomyia phaseoli (Trion) (Diptera: Agromyzidae) is tiny, black and about 2 mm long. It lays slender white eggs singly in holes made on the upper surface of young leaves, especially near the petiole end of the leaf. The larva of this pest is a small, white, maggot. It bores down inside the stem and feeds on the stem just above the ground level. The leaves often turn yellow, giving the plant a poor appearance, as a result of the damage to the stem where the larvae had been feeding. The barrel shaped pupae are dark brown and about 3 mm long. The total life cycle is 2-3 weeks.

At present the recommendation of Department of Agriculture to control bean fly is to use oxydemeton methyl, formulation, monocrotophos, or omethoate at 7 (DAE) days after seedling emergence. These insecticides are highly toxic and polute the environment. An integrated approach is adviced

currently for pest management because of its safety and cheapness in pest management.

Out of the grain legumes, cow pea, green gram, black gram, and soya beans are in the decending order of susceplibility to the pest. Therefore, it is important to pay more attention to protect cowpea from this pest because of its high susceptibility.

It has been reported that bean fly population tends to be high in the second and third week of May. Therefore, beanfly damage could be minimized to a great extend by planting cowpea/green gram with the first rains of the Yala season during the period from end of March to early April. If the cultivation is delayed resistant varieties such as sudumung can be used. The infected crop appears yellow two weeks after emergence of seedlings if the infestation is high. Earthing up the seedlings at this time, helps to form advantitious roots useful for the recovery of plants, from bean fly damage. It has been reported that there are six pupal parasites of the bean fly in Sri Lanka. These parasites are useful to keep the pest population at a low level. Seed treatment method can be adopted if a susceptible variety is cultivated in the late Yala season. Soaking the seeds in a solution of monocrotophos (1 ml of monocrotophos per 1 liltre of water) or treating with Carbosulfan at the rate of 2 g per 100 g of seeds are two such methods. Integration of the methods mentioned above would help to keep the pest population low, and thereby increase the yield of grain legume crops.

EFFECT OF PACKING MATERIALS ON CALLOSOBRUCHUS MACULATUS (F) DAMAGE TO STORED COWPEA (VIGNA UNGUICULTA L)

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Abstract

An experiment was conducted to compare polyethylene packs with gunny sack and supersack for effective storage of cowpea seeds under conditions prevailing in the dry zone of sri Lanka.

The difference in the percentage of damaged seeds, as well as germinability of the seed was not significantly different among the seed lots stored in sacks made up of these packing materials, during the first eight weeks of storage. But the percentage of damaged seeds and eggs/seed were significantly lower in polyethylene packs than in the sacks made from the other two materials at nine and eleven weeks of storage.

Introduction

An experiment was conducted to compare the effect of storing cowpea seed in 3 types of packing materials namely, polythene (gauge 300), gunny and supersack. This experiment was conducted in a completely randomized design with 4 replications. Five hundred grams of newly harvested fresh cowpea (Cultivar "MI-seed 35") were introduced into 3 types of bags (25 x 15 in size), tied well and then placed in seperate chamber of 15 x 15 x 15 cm2 size. Number of damaged seeds (seeds with holes after emergence of

the adult pest) were counted fortnightly, starting from three weeks after storing, taking fifty seeds at random. Number of eggs in those seeds were also counted using a magnifying glass (X5). Undamaged seeds stored in different storage bags were taken to find the percentage of germination at monthly intervals. Germination test was conducted in a completely randomized design with four replications. One hundred seeds were put into a clean pertridish, (10 cm) and soaked in water for twenty four hours. Then these seeds were transferred to another clean petridish, with a filter paper. Number of germinated seeds were counted on the third day. Initial moisture content of the seed was measured using the oven dry method (temperature was maintained between 130-133^0 c for one hour).

The moisture content of cowpea seeds before storing was 13.9% by weight. Maximum air temperature for the study period ranged from 26.1-35.0^0 c and maximum temperature ranged from 16.5-27.2^0 c. The mean relative humidity during this period was 70.04% with a range of 41%-95%.

Results and discussions

Percentage of damaged seeds at 3,5 and 7 weeks after storage were not significantly different among the three packing materials used. However, therr werer significant differences in the percentage damaged seed at 9 and 11 weeks of storage. Percentage of damaged seeds was 38% when seed was stored in polythylene bags for 11 weeks. But in the case of gunny and supersack it was 87% and 92% respectively, when stored during the same period (Fig.1). The low damage in seed stored in polythylene bags could be explained by the reduced oviposition by the female of Callosobruchus maculatus on cowpea seeds stored in these bags.

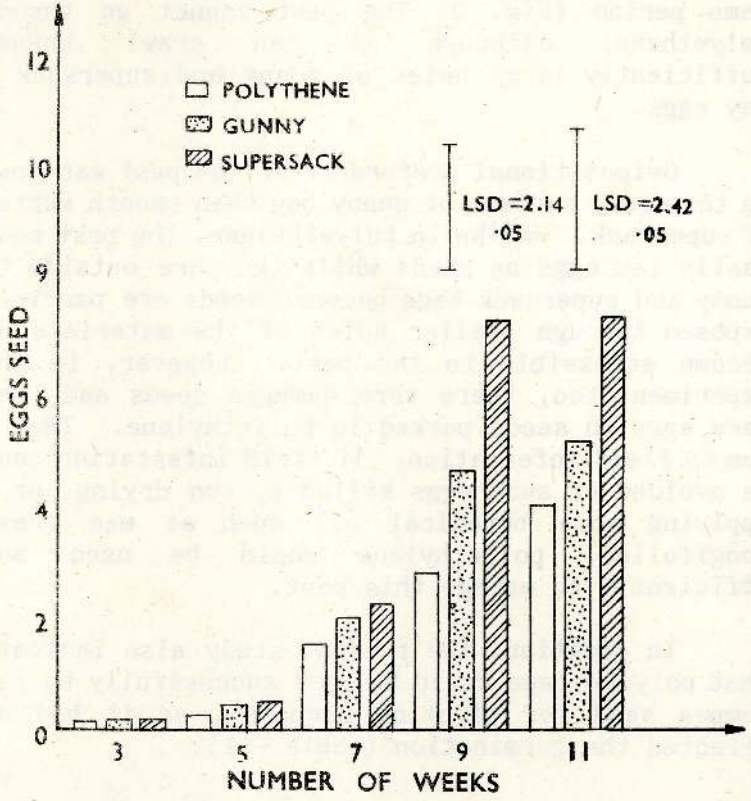

Fig. 2 Relationship between eggs/seed and the storage period of cowpea seeds in different packing materials.

The number of bruchid eggs/seed in different storage materials were significantly different at 9 and 11 week of storage. But it was not significantly different upto the 7th week. The lowest value, 3.88 eggs/seed, was recorded in polyethylene when stored for 11 weeks. The highest value of 7.16 eggs/seed recorded in supersack while the figure for gunny bags was 5.2 eggs/seed for the same period (Fig. 2) The pest cannot go through polyethene, although it can crawl through sufficiently large holes of gunny and supersack to lay eggs.

Ovipositional preference of the pest was lower on the woody surface of gunny bag than smooth surface of supersack. Unlike in polyethylene, the pest could easily lay eggs on seeds while they are outside the gunny and supersack bags because seeds are partially exposed through smaller holes of the materials and become accessible to the pest. however, in this experiment too, there were damaged seeds and there were eggs on seeds packed in polyethylene. That is due to field infestation. If field infestation could be avoided or such eggs killed by sun drying, or by applying some botanical oil such as mee (Besia Longifolia), polyethylene could be used more efficiently to manage this pest.

In addition, the present study also indicates that polyethylene could be used successfully to pack cowpea seed for planting purposes, as it had not affected the germination (Table - 1).

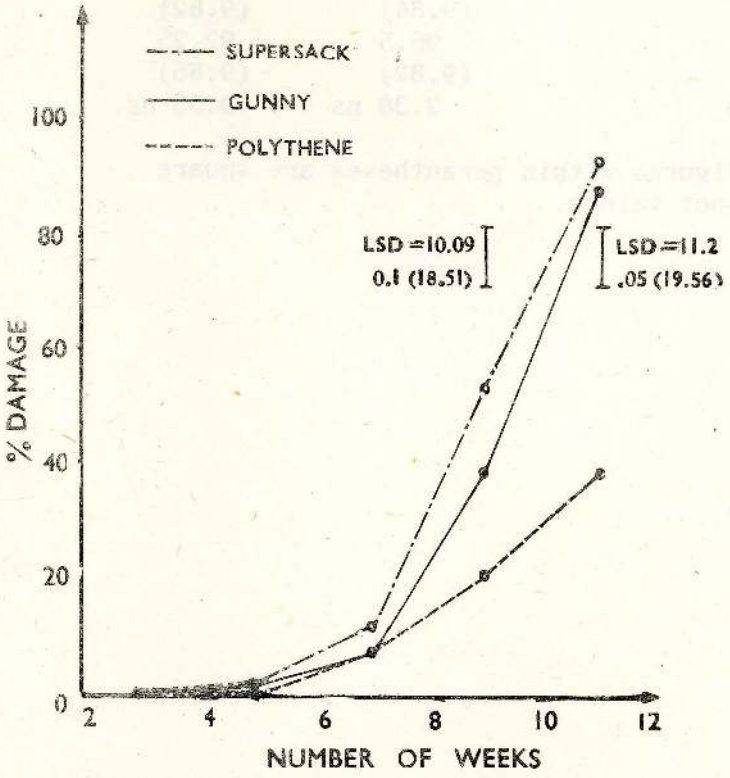

Fig. 1 Relationship between the percentage of damaged cowpea seeds and the storage period in different packing materials.

Table - 1 Percentage germination of cowpea seed stored in different materials.

Packing Materials used	Period of storage	
	One Month	Two Months
Polythylene	98 (9.89)	96.5 (9.82)
Supersack	96.5 (9.84)	96.5 (9.82)
Gunny	96.5 (9.82)	92.25 (9.86)
F value	2.38 ns	0.55 ns

* Figures within parantheses are square root values.

APPLAUD - AN INSECT GROWTH REGULATOR
Its Efficacy Against Rice Brown Planthopper

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INTRODUCTION

The growing awareness of the adverse consequences of present day insecticides has confirmed the importance of developing alternate tools and methodologies for pest management. Hence a keen interest has been directed towards the Insect Growth Regulators (IGR) popularly known as the "third generation insecticides" for the control of insect pests. In a broad sense, IGRs are chemical substances that alter growth and development of insects. Their effects have been observed on embryonic, larval and pupal development, on metarmorphosis, on reproduction in both males and females and on behaviour (Watson *et. al.*,1975). Since this group of chemicals affects only specific insects and apparently does not show any undesirable effects on humans, wild life, and the environment, it has been identified as an effective tool in insect pest management.

Brown planthopper (BPH) has been, and still is, one of the major rice pests. Most farmers depend heavily on insecticides for their control. Furthermore, a number of insecticides used against other rice pests are known to induce resurgence of BPH (Heinriches *et.al.*, 1982). Since the present

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Applaud (Common Name - Buprofezin) has been found effective against a number of planthoppers (Delphacidae), Leafhoppers (Cicadellidae and Deltocephalidae), whiteflies (Aleyrodidae), and scales (Coceidae and Diaspididae) else where.

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insecticide recommendation for BPH control (Department of Agriculture, 1986) is confiened to a granular formation (Carbofuran 3% G). (2) EC formulations (BPMC 50% and Propoxur 20% EC) and a WP (MIPC 50% WP). The current emphasis is on the development of an integrated pests management system for rice pests. A need has arisen to identity new methodologies for BPH management. Hence it with this purview that an investigation on the efficacy of Applaud an insect Growth Regulator - (Anonymous, 1983) was conducted.

MATERIALS AND METHODS

The experiment was conducted in yala 1989 in bunded-field plots measuring 6mx3m each. There were 21 plots: 7 lengthwise and 3 breadth wise. Seedlings of Bg 94-1 a BPH - susceptible 105 day variety were transplanted at 18 days after sowing, with a hill spacing of 15cm x 15cm and at 3 seedlings per hill. Basal fertilizer mixture was incorporated into the soil before transplanting at the rate of 190 kg/ha. At 2 weeks after transplanting (WATP) and at 5 WATP, urea (125 kg/ha) and TDM (125 kg/ha) respectively were broadcast into the plants. To establish a BPH population in the field, nymphs from the greenhouse culture were released into the plots at 4 WATP at a rate of 1000 nymphs/plot.

There were seven treatments : viz : two concentration (50 ai g/ha and 25 ai g/ha) of Applaud 10 WP and 25 WP: Carbofuran (3% G): BPMC (50% EC): and an untreated control. These treatments were replicated 3 times in a Randomized Complete Block Design. The plots were treated with insecticides at 8 WATP. The spray formulations were applied at a rate of 250 l/ha.

The BPH and spider populations in each plot

were asessed at 1 day before (IDB) and 1. 7. 14 and 21 days after (DA) the insecticide treatment (T). The population asessment of BPH was hased on the visul counting of adult and nymphs in 30 randomly selected hills/plot. The asessment of spider populations was based on the number of spiders in 3.1m units/plot. At maturity,the percentage area hopper burned was asessed in each plot.

RESULTS

Table 1 summarizes the BPH population in the plots treated with different insecticides and in the untreated control. High BPH mortality was observed in Carbofuran and BPMC treated plots at 1 DAT. Furthermore Applaud selectively reduced the nymphal population as compared to Carbofuran and BPMC which affected on adults and nymphs equally.

To estimate the BPH mortality following the insecticide treatment the BPH population at 1 DAT. 7 DAT. 14 DAT and 21 DAT were subjected to covariance annlysis using the BPH polulation at 1 DBT as the covariates. The adjusted values for BPH population in plots treated with different insecticides and in the untreated control are given in Table 2. At 1 DAT. the BPH populations in Carbofuran and BPMC treated plots were significantly lower than those in the applaud treated plots and in the untreated control. However at 7 DAT. there were no significant differences between the BPH population in all insecticide treated plots. At 21 DAT and BPH populations in Applaud treated pots were significantly lower than those in the Carbofuran and BPMC treated plots.

There were no significant differences between the spider population in Applaud treated plots and in the untreated control (Table 3). Carbofuran and BPMC

had significantly reduced the spider populations when compared to Applaud.

Table 4 indicates the area damaged due to BPH in the plots treated with different insecticides and in the untreated control. In general all insecticide treated plots had less damage than the untreated control. The plots treated with Applaud at the rate of 50 ai g/ha showed the least damage than the plots that received Applaud at the rate of 25 ai g/ha.

DISCUSSION

These results indicate that the Applaud doses tested were as effective as Carbofuran and BPMC in controlling BPH. Applaud at 50 ai g/ha had shown comparatively better results than Applaud at 25 ai g/ha in BPH mortality and area showing damage. The low BPH populations in Applaud treated plots could be due to the direct effect of applaud on BPH nymphs and the indirect effect due to high natural enemy populations in the applaud treated plots than in the Carbofuran and BPMC treated plots.

Tests conducted at the International Rice Research Institute. (1981) on the efficacy of Applaud have shown that the chemical has high activity against nymphs of planthoppers and leafhoppers. Furthermore, the tests have shown that Applaud does not show quick-killing action against nymphs but most of them are killed at molting stage of the instar, hence it takes 3 -7 days to control the target insects.

As a result of its high slectivity on target pests, long residual effect, low mammalian-toxicity, absence of cross-resistance, and a number of other desirable characters, Applaud has been recommended for BPH control in a number of Asian countries

including the Philippines and Indonesia (Government of Indonesia - Regulations : further control of Brown Wereng that infest paddy - Presidential Instruction No.31/ 1986)

ACKNOWLEDGEMENTS

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Table 1 BPH population (no./30 hills) in plots treated with Applaud. Carbofuran and BPMC and in the untreated plots before and after treatment. CRBS, Batalagoda, Yala 1989.

Chemical	Dosage	1DBT			1DAT			7DAT			14DAT			21DAT		
	ai g/ha	A	N	T	A	N	T	A	N	T	A	N	T	A	N	T
Applaud 25WP	50	15	76	91	13	86	99	02	47	49	00	11	11	01	41	42
Applaud 25WP	25	09	65	74	11	71	82	00	35	35	06	23	29	07	53	70
Applaud 10WP	50	12	63	75	05	59	64	05	26	31	01	07	08	00	13	13
Applaud 10WP	25	08	82	90	15	88	103	07	51	58	00	31	31	21	45	66
Carbofuran 3% G	660	13	59	72	02	11	13	00	48	48	19	03	22	12	34	46
BPMC 50% EC	700	11	85	96	00	08	00	00	19	19	00	21	21	08	68	76
Untreated		02	68	70	17	63	80	25	287	312	185	728	883	538	807	1345

Average of 3 replications with 30 samples each (to the closest whole number)

1 DBT - One day before treatment
DAT - days after treatment
A = adult, N = nymph, T = total

Table 2 Effect of Applaud, Carbofuran and BPMC against field populations of Brown Planthopper (Based on the data in Table 1)

Chemical	dosage AI G/HA	BT	1DAT	7DAT	14DAT	21DAT
Applaud 25WP	50	91.3	270.3 a	11.5 b	16.7 c	19.9c
Applaud 25WP	25	74.7	314.3 a	24.8 b	73.4 bc	42.7c
Applaud 10WP	50	75.1	243.0 a	17.5 b	17.3 c	19.4c
Applaud 10WP	25	90.5	248.2 a	19.6 b	82.8 bc	65.2c
Carbofuran 3% G	660	72.1	64.4 b	14.7 b	144.4 b	238.4b
BPMC 50% EC	700	96.8	66.6 b	14.1 b	118.4 b	220.9b
Untreated		70.3	267.1 a	1086.9 a	1719.2 a	2012.4a
		NS				
CV %		21.7	21.9	34.2	18.1	20.5

1. Adjusted values from covariance analysis. Average of 3 replications with 30 samples each. Means in a column followed by the same letter are not significant at 5% level by DMR.

Table 3.Spider population (no/m')before and after treatment. CRBS, Batalagoda. Yala 1989.1

Chemical	dosage ai g/ha	BT	1DAT	7DAT	14DAT	21DAT
Applaud 25WP	50	29.3	18.6 a	30.0 a	34.0 a	38.0 a
Applaud 25WP	25	27.0	20.3 a	28.7 a	33.0 a	39.0 a
Applaud 10WP	50	23.3	14.0 ab	26.0 a	38.0 a	27.7 b
Applaud 10WP	25	30.6	23.3 a	25.0 a	27.0 a	22.3 b
Carbofuran 3%G	66.0	23.6	8.7 b	5.3 b	11.3 b	9.3 c
BPMC 50% EC	700	23.3	9.7 b	8.7 b	11.0 b	10.0 c
Untreated		26.6	24.0 a	33.0 a	34.6 a	25.3 b
		NS				

1. Average of 3 replications with 3 samples each.
   Means in a clounn followed by the same letter are not significant at 5% level by DMRT

Table 4. Percent area damaged due to BPH. in treated and untreated plots.CRBS, Batalagoda. Yala 1989.

Chemical	dosage ai g/ha	% Hopper burn
Applaud 25 WP	50	1.6
Applaud 25 WP	25	6.6
Applaud 10 WP	50	1.6
Applaud 10 WP	25	6.6
Carbofuran 3% G	660	8.3
BPMC 50% EC	700	6.6
Untreated		28.3

Average of 3 replications.

MALE CONFUSION TECHNIQUES
GLAMOUR TOOL OF INSECT PEST MANAGEMENT

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The search for better strategies to manage insect pests, in the most economical and least hazardous way, goes on. This is especially important because of the excessive reliance on chemicals to control insect pests. Male confusion technique is becoming a glamour tool of insect pest management. This is a new, imaginative and creative approach to the problem of sharing the earth with other creatures.

The technique

The strategy in using this technique is to use the instinctual behaviour of the insect pests, to regulate their population. Insect behaviour in searching for food, oviposition site selection, and locating sexual partners, are stimulated and controlled by chemicals. Pheromones are a kind of chemical that carry behaviourial messages. Mating behaviour in many insects is initiated and controlled by sex pheromone, and they can be used to manipulate the mating behaviour of insect. The use of sex pheromones appear to be highly effective in manipulating insect behaviour to manage pests.

How natural sex pheromones work

The release of sex pheromones by insects is a complex process related to sexual maturity of the virgin female. Female sex pheromone is received by specialised sensory sensilla of antennae in the Males. These sensilla are exceedingly sensitive to

the pheromone. Most of the pheromones are species specific. The positive response of the male depends on the threshhold level of the pheromones in the air. These activities are regulated by photoperiod and light intensity.

The Constraints

1. Insects respond to several stimuli that are heterogenous. If one stimulus is blocked they will look for other stimuli.

2. Insects have secondary response avenues. They may overide pheromone stimulus. Some insects use pheromone as well as visual stimuli.

3. Mating behaviour of all the insects are not clearly known.

4. Should know the exat pheromone release rates, and the release rhythm of sex pheromones.

Some experiences:

1. When male confusion technique was tested in the control of Gypsy moth with Disparlure (Sex pheromone of Gypsy moth), the mating success was decreased from 81.3% in control areas to 35% in the treatment.

2. Gossplure and synthetic analog Hexalure, when continuously evaporated into the air of cotton fields, showed a reduction in larval boll infestation comparable to commercial insecticide application.

3. 99% disruption of orientation of male red banded leaf roller was achieved in Vineyards with 50;50 blend of 2-11-tetradecenly acetate.

The effect of the female sex pheromone will excite the male and promote take off. The male then files upwind commonly following a zigzag course, orienting himself to the adour corridor by random searching.

The lateral displacements will become smaller as the insect appraoches the female, where the pheromone odour gradient is steep. Landing is induced by high concentration of pheromone, in some cases at least with visual stimulus, directing the male over the last few centimetres. It has been found on the basis of pheromone release rates, male response thresholds and molecular dispersal in air, that a male might be attracted from a distance up to 100 metres.

How to use sex pheromones as mating confusants.

Use of sex pheromones as mating confusant is based on the concept that the positive orientation of male insect is dependent on threshold levels of the female sex pheromone in the air.

Many sources of synthetic sex pheromones would be introduced into the native environment of the insect so as to saturate the air. This will prevent the male from achieving positive orientation to the concentration gradient of the sex pheromone emanating from the female and therby the mating would be prevented.

Disruption of positive orientation and prevention of mating is due to the confusion of the male, created by the introduction of the synthetic sex pheromone to the environment.

The advantages of this method

1. It is precise and species specific; and hence the non-target organisms are not affected.

2. It is non-toxic and there is no residual or contamination effect.

3. There is no environmental pollution.

4. There would be no development of insect resistance.

5. Suitable for inclusion in the intergrated pest management programs.

COMMUNICATION : WHAT IS IT?

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Introduction

Four things enable survival and progress of the human race. They are love, matter, energy and information. Communication helps us to express and receive love because it has been communicated to us in our child hood. We know something about matter and energy because, others have communicated about them to us. We give and receive information through communication.

To those around us, we can communicate our concern, affection, respect, obedience, co-operation, good will or displeasure and anger. In addition, communication enables us to enrich our understanding about ourselves and the things around us.

Communication is a very useful activity. Skillful communication increases ones chances of success when dealing with others. Yet, not all our communication acts are effective. Therefore we need to examine the characteristics of communication.

Characteristics of communication

Communication is a transactional, symbolic process that enable people to,

- establish or facilitate human interaction
- exchange information
- influence attitudes or behaviour of others

Communication as a process

A process is continuous and on going, and the end as well as the beginning of a process are arbitray. A process is dynamic, not static.

As you read this article, you are involved in a communication transaction with its author. When did this start? Is it when you saw the title and wanted to read the contents? You can read this article because you had studied the English language. Otherwise the letters and words of this article would have been meaningless. You would have realized the importance of communication, some day, that you may not remember now. Your interpretation and reactions to the sentences in this article will depend on the beliefs (you have acquired) and the attitudes you have developed over a long period of time. The information presented in this article was influenced by study, experience and impressions of the past. How effectivce this communication effort would be related to behaviours we have learnt or acquired from our child hood or even before. Perhaps here could be the influence of genetic factors that started their influence even before we were born.

Because communication is a process, the outcomes of a communication act are influenced both by internal and external factors. If the most appropriate words are used to make easy to understand sentences, it is a internal factor within the communication process. Yet, if you are disturbed by an urgent message from some one near and dear to you, while reading this article, our communication transaction can come to an abrupt end; and it is an external factor that interferes with the communication process at least for the time being. There are many other factors that influence

the communication process, either in a favourable or unfavourable way.

Communication is a transactional process

Communication can be viewed from a relational perspective. When two or more people engage in a communication act, it comprises of a relationship. The factors in a communication transaction affect each others behaviour. If the students look bored and uninterested, that can influence the teacher unfavourably and he may not be able to do his presentation well, while he may be able to do an excellent presentation to another group of highly interested, deeply motivated and enthusiastic students. The same group of sleepy students mentioned earlier may eagerly await a presentation from another teacher whom they admire and respect.

Communication is symbolic

One symbol set we use in communication acts is language. The ability to use language as well as the capacity for linguistic symbolizing is far superior among humans, than any other animal species. Yet symbolizing is not verbalizing alone. Knapp (1972) is one of the communication researchers who asserts that more meaning is communicated non-verbally than verbally.

However not all non-verbal behaviours are symbolic. When some one closes his eyes due to intense light it is not symbolic, but when the same person closes his eyes for an instant while discussing a complicated problem, it could very well be symbolic.

Communication for exchanging information

Information is power. To make decisions, to find solutions to problems, as well as to identify problems and assign priorities we need information. Communication paves the way for us to receive or acquire information.

Specially for researchers, extensionists and trainers information confers tremendous power. A person reputed to possess a lot of useful knowledge is normally viewed as a credible communicator. People carefully listen to those who are recognized to be knowledgeable.

Knowledge is valuable, and so is information. A farmer who receives adequate information relevent to his activities, problems, solutions, appropriate production technologies, market demand, price trends, and means for maximization of profits; and wisely uses the information received can surely be on the way to success in farming.

An individual can study, learn, gather information and become knowledgeable so that he can trade information expertise for increased social status, (added economic security) and achieve more intellectually rewarding and personal relationships.

The material poverty of the economically and socially disadvantaged people, arises from poverty of information. The basis of success in life, is the formulation and use of better decisions. Better decisions demand adequate, useful, relevent information. Information is a form of currency needed to achieve upward social and economic mobility.

Money must be invested to make more money and

information is needed to acquire more information. If the poor are to be on the road to progress and prosperity, they need not only financial assistance but the information that can help them to move towards progress and prosperity.

Lack of information limits peoples depth of understanding and the ability to find alternatives. Communication helps us to provide information to those who need it.

A model of the communication process

A model is a systematic representation which abstracts, classifies, describes certain potentially relevent aspects of a process.

Because communication is a transactional process let us call the two individuals engaging in communication, (in this example) communicator A, and communicator B. The behaviour of any one of these individuals is controlled by psychological (internal) and sociological as well as cultural factors, to varying extents.

Sociological Context

Communicator Cultural back ground Communicator

A B

Psychological context

A model of the communication process

The psychological context in which a person communicates is the result or consequence of his past experiences, perceptions and emotional state.

Sociological and cultural factors influence the individuals to varying levels and they may be strong or weak depending on the education, training, guidance, received and several other factors. The responses and reactions of an individual towards the communication depends on several variables of which the most important ones are, credibility, trustworthiness and perceived dynamism of the source.

This model indicates the great influence of psychological factors on the communication process. Greater emphasis and consideration on psychological factors will increase the success of communication effort.

New horizons

We do not communicate for the sake of merely communicating. Particularly in Agricultural extension we seek to help people to achieve productivity improvement or else we may be interested in economic, rural or community development.

When development is a priority goal, we as communicators must think, plan and act as development communicators. Development communication is an area for us to study and gain mastery of. Development communications thus becomes a tool of great value to an agricultural extension worker or development worker.

Conclusion

Humans engage in self communication (intrapersonal) as well as with others (inter personal). Both these types are important. Inter personal communication is useful for reflective

thinking, decision making, analysis and synthesis of information and ideas. Inter personal communication plays a vital role throughout our careers and lives. Communication is a process that is affected by past events, the communication situation, and the perceived future effects. It is also in gripped by cultural, sociological and psychological factors; and these must be understood correctly to achieve effective communication. Communication models help to view the process before hand and anticipate probable reactions, and responses and assess the final result.

PEST MANAGEMENT PACKAGE FOR COWPEA BRUCHID IN GRAIN LEGUMES IN SRI LANKA

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Maha Illuppallama

Introduction

Cowpea bruchid Callosobruchus maculatus F. (Coleoptera: bruchidae) is a major storage pest in grain legumes. It has been reported that it can destroy the untreated cowpea up to 87% in a period of nine months during storage.

Two Callosobruchus species are found in Sri Lanka. Climatic conditions of the dry zone of Sri Lanka (major grain legume production area) are favourable for their rapid multiplication. C. Maculatus could complete its life cycle within a period of 26-28 days under Maha illuppallama conditions. It has been reported that it could complete the life cycle within a period of 4-5 weeks duration, and of the larval period of D.maculatus decreases with increasing temperature.

There is a general practice among traders to use insecticides liberally to keep the pest under control. Occasionally consumers come across grains of cowpea or green gram emanating smell of insecticides. So there is a need to educate the farmer and the trader to control this storage pest without using pesticides. This paper proposes a pest management package for cowpea bruchid, based on the research findings under dry zone conditions.

Preventive measures

In managing cowpea bruchid, oviposition should be prevented because damage become severe when the infestation is high. Timely harvesting is an easy method to minimise egg laying in the field. Unthreshed cowpea pods could be stored for a longer period with lower damage than threshed seeds Cowpea (Cultivar MI - 35).

Seeds stored in gunny bags for 11 weeks suffered 87% damage (expressed as percentage of seed damaged), while the seed retained in the pods stored in gunny bags suffered only 46% damage after being stored for 27 weeks. The stored pods should be husked when they are about to dehisce. Sun drying of seeds is helpful to kill bruchid eggs. However,over drying beyond 3 days continuously increases ovipositional preference of bruchid due to roughness of seed coat caused by cracking. It was also recorded earlier that female bruchid finds it easy to move and lay eggs on green gram seeds with a rough seed coat,as compared to those with a shiny seed coat. Paddy husk ash 4% by weight can be used to prevent bruchid damage..

1. Applying 5 ml of mee (Besia longifolia) oil to 1 Kg cowpea seeds lowers the ovipositional preference and increase egg mortality. Problems of rancidity does not arise when Mee oil is used.

2. Margosa (Azadirachta indica) oil could also be used when seeds are meant for planting.

3. Seeds treated with oil or ash could then be packed in polythene to avoid the infestation and sent to the market. If a farmer wants to store his seeds for a better market, he can do

so by storing seeds in barrel-shaped clay "bissa" without a significant damage to the seeds. A layer of powdered leaves of margosa sprinkled on the seeds helps to bring down the pest population in the "bissa".

Varieties with small seeds and glossy seed coats have been shown to be associated with a higher degree of resistance than large seeds with dull surfaces. Such varieties could be promoted in areas where bruchid infestation in high.

Chemical methods of control

Use of methyl pirimiphos (Actalic) either as 25% solution sprayed on to the storage bags containing seeds meant for consumption, or mixing the seed with 2% dust where seeds are to be used as planting materials, is the current method recommended to control this pest. Fumigation by methyl bromide or phostoxin could be used in large warehouses. However, insecticides application is considered as the last resort as it creates other problems like environmental pollution, development of resistance by the pest, and health hazards.

THE NEED FOR CAREFUL CROP WATER MANAGEMENT TO PREVENT DETERIORATION OF GROUNDWATER QUALITY IN NORTH WESTERN REGOSOL BELT.

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Introduction and background:

In Kalpitiya peninsula (on the west coast of Sri Lanka) intensive agriculture is gaining increased importance. Kalpitiya soils are highly permeable regosols, overlying fine to coarse sands with a shallow groundwater layer used both for irrigation and potable needs. The main crops grown are onions, chillies, potatoes and vegetable crops including gherkins; the latter being recently introduced. Fertilizer application sometimes exceed 700kg N/ha per annum, when three crops a year are raised and therefore the risk of nitrate leaching to the groundwater in these permeable soils can be considered high and significant.

The deterioration of groundwater quality due to long term leaching of agrochemicals(on intensively cultivated land) has been identified in many countries. In the United Kingdom, during the last 10-15 years, groundwater nitrate concentrations have exceeded the EC guideline value of 10mg N/L in some areas due to increased use of N-fertilizers, following the intensification of agriculture during the 1950's and 1960's.

Groundwater monitoring has shown that pesticide residues, at concentrations above the recommended "drinking water guideline value" can occur, particularly where the water-table is shallow and

the "unsaturated zone" is relatively permeable. For example, on Long Island (New York) the use of the soil insecticide Aldicarb was discontinued because of its widespread occurrence in groundwater (Pacenka et al 1987).

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Adequate numbers of detailed studies on the contamination of groundwater due to leaching of agrochemicals must be conducted in the developing countries,because of the high rates of applications of both fertilizers and pesticides
on crops (with irrigation, even upto three crops per year) while shallow groundwater is often the only source of potable water.

A small scale research project funded by overseas Development Administration, UK is currently being undertaken by the Agriculture Department, Ceylon institute of scientific and Industrial Research (C.I.S.I.R.) and the water Resources Board in collaboration with British Geological Survey to investigate the leaching of nutrients and specific pesticide compounds in to groundwater in the Kalpitiya peninsula.

Results and discussion

Preliminary results of a study indicated that the nitrate concentrations of shallow groundwater, beneath intensively cultivated soils are higher than 30 mg W/L for most of the year, and exceed 50 mg N/L during some months. These values are very high compared with the low groundwater nitrate concentrations of less than 2-3 mg N/L observed in

areas where intensive cropping is not practised. Excessive nitrate in drinking water can cause " Methaemo globinaemia" in young infants which can be fatal. A possible link between high nitrate content of drinking water and stomach cancer has been suggested by Fraser et al (1980). High nitrate observed in the Jaffna Peninsula is Perhaps due to leaching of agrochemicals from intensively cultivated soils, Nagarajah et al, 1988).

Change in EC of ground ater at Kalpitiya

Month	Domestic well		Agricultural Wells	
	Period 1 1984-1985 (ds/m)	Period 2 1986-1987 (ds/m)	Period 1 1984-1985 (ds/m)	Period 2 1986-1987 (ds/m)
June	0.16	0.18	0.31	0.81
July	0.22	---	0.35	---
August	0.35	0.18	0.42	0.75
September	0.54	0.17	0.54	0.78
October	0.32	0.32	0.42	0.78
November	0.42	0.39	0.35	0.51
December	0.35	---	0.35	---
January	0.35	0.32	---	0.50
February	---	0.34	---	0.84
March	0.42	0.31	0.42	0.75
April	---	0.35	---	0.77
May	0.40	0.31	0.41	0.87

Above table shows the electrical conductivity (EC) values of one agricultural and one domestic well during the periods of May 1984 to May 1985 and May 1986 to May 1989. While EC of the domestic well reemained the same over the two periods concerned, EC of the agricultural well located about 8 km. away from the domestic well shows higher value during the latter period indicating a gradual built up of salinity in the ground water. It is clear that in the areas where the soils are highly permiable and the water table is shallow, consideration needs to be given to measures to reduce the harmful environmental impact of intensive cultivation, if agriculture is to be sustained in the longer-term. Apart from the risk to potable supplies, such high nitrate concentrations also represent a considerable loss of valuable plant nutrients.

The soil insecticide carbofuran has also been studied under this programme and there is evidence to suggest that upto 25% of the applied dosage may be leached below the root zone. However, carbofuran is not detected in ground water although one of its breakdown products has been widely observed and appears to be persistant in groundwater for at least several months.

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INTERCROP, COCONUT LANDS WITH LEMONINE

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The profit margin from intercropping coconut lands depend mainly on the compatability of crop combinations. Therefore a number of crop combinations were studied. at the Regional Agricultural Research Centre, Makandura to identify a few profitable intercrop combinations for coconut holdings. Particularly in the wetter parts of the Kurunegala district lemonine intercropping was promising. It is expected that lemonine cultivation could also be expanded to most of the relatively dry areas of Makandura region with supplimentary irrigation.

Lemonine belongs to the family Rutaceae. It is an intra-generic hybrid of lemon (C.Lemon) and lime (C. aurantifolia). A lemonine fruit is light green to lemon yellow in colour, with a slightly smooth surface and gloss. The shape is ellipsoid to obvate with a diameter of 2-3 cm. The lemonine fruit is rich in vitamin C, and also in minerals Calcium, Phosphorus, and Iron. These fruits can be used in making fresh cool drinks, preserved foods, or as a raw material in some industries.

Lemonine plant grows erect. Its growth is localised in the terminal portions with litttle activity of the lateral buds. As the branch extends, the weight of leaves and fruits and the effect of shade from foliage will generally force it towards a horizontal position.

A planting space of 3x3m can be used i.e. two rows per coconut avenue. With proper crop

management the first harvest can be obtained about 14-15 months after planting. A high level of production can be maintained for 6-7 years and perhaps extended further with good management. Lemonine grows and yields well in well drained fertile soils (P.H. of 5-6). In a well maintained crop, under low country wet and intermediate climatic conditions, fruits can be harvested bi-weekly throughout the year. Thus it is ideal to be grown in Gampaha and Kurunegala districts.

By following the management practices recommended by the Department of Agriculture the projected fruit yield is about 10,000 - 11,000 kg per acre. This will give the farmer an additional income of about 1,500-2,000 rupees per month. The break down of the cost of cultivation and the income in general, for an acre of intercropped lemonine growth on coconut lands are given below.

Labour	-	Rs.6,000
Fertilizer, agro chemicals	-	Rs.2,500
Total cost	-	Rs.8,500
Total income	-	Rs.30,000 (10,000kg Rs.3/kg)
Profit	-	Rs.21,000
Monthly income	-	Rs.1,790

Because of regular and heavy bearing habit and easy management of the crop, lemonine cultivation can be promoted as a suitable intercrop in the coconut triangle.

SOME ASPECTS RELATED TO AGRICULTURAL TRAINING

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Introduction

Training is only a means of achieving an end - it is not an end in itself. Let us look at the definition of training. "Training is the process of bringing about desirable changes in behaviour that leads to better job performance".

We are interested in agricultural training. Logically a prerequisite to an analysis of training needs in the field of agriculture is to clearly identify what we want to achieve. They are usually related to improving productivity and effective resource use to maximize benefits and gains while avoiding waste. Thus we need productivity needs analysis, to ensure cost effective training programmes.

Productivity needs analysis

At this stage we must state the objectives. Objectives must be related directly to post - training performance and indicate the results desired. It is the performance and results that determine the worth of any organization or department. Mere survival is not enough. An organization must serve a worthy purpose and make an adequate contribution to national development.

A broader view training

Agricultural training objectives are almost

always related to performance and results, and they should be set carefully.Often they may relate to the following areas.

1. Market, clients, customers and their expectations. (To Provide their requirements)
2. Innovation and its advantages (better efficiency, profits)
3. Productivity expected or desired.
4. Physical and financial resources available (To make the best possible use)
5. Profitability (economic gains)
6. Management or performance level desired (efficiency, goal achievement)
7. Personnel development (for purposeful efforts)
8. Accountability (to those concerned)

What do we aim at by setting objectives? We must first decide what we want to achieve. Then we must determine what to achieve and how to measure it. The results of measurement will indicate what has been achieved and then we can compare it with the objectives.

Most organizations have several goals. But the relative importance of each will vary depending on time and place. What do we want? Produce more food? Produce commodities for a foreign market? Teach people about nutritious food and motivate them to produce what they should consume? Is it to develop group work through Co-operation? Is it to help farmers make bigger profits? What is your goal?

The ultimate goal to be achived must be made

with a clear understanding of what we should do and must do. This understanding must arise from identifying both the felt needs and real needs of trainees. Training needs must be very carefully explored and correctly identified. We must again critically examine what we propose to achieve. That is the most important step. We have to make the best use of time and resources allocated for training.

Before stating objectives

The correct identification of objectives and statement of specific objectives must be determined after a series of observations, discussions, interviews and preferably through the use of an appropriately designed, and correctly administered questionnaire.

A preliminary step

Before designing a questionnaire to explore training needs, finding answers to the following questions may be helpful.

1. What are the objectives of your training organization?

   (a) Are they stated in writing and agreed on?
   (b) What areas do they cover?
   (c) Who proposed them?
   (d) When were they revised (recently)?
   (e) How often they are used?
   (f) How long they have been used?
   (g) Are they still valid?

2. Do the trainers have objectives?

(a) How were they determined?
(b) Are they broad or specific?
(c) Do they fit horizontally?
(d) Can performance related to these objectives be measured?
(e) Are they genuine educational objectives?
(f) Are they discussed with the trainees before training begins?
(g) Do they fit vertically?

3. Do you have a long term training plan? If yes, then,

(a) What period does it cover?
(b) What subject matter areas does it cover?
(c) When was it prepared?
(d) Is it compatible with the present situation?
(e) How detailed and adequate is it?
(f) What data justifies it?
(g) How useful is it.

4. Who identifies training needs? This is a very important area. Let us examine some aspects related to who identified training needs.

(a) Who perceives them?
(b) What methods were used to assess trainining needs?
(c) What is the relationship with those assessments and the needs of the farming community?
(d) Does authority support responsibility?
(e) What amount of trainee participation was used?

(f) How often are they revised?
(g) What job descriptions and job analysis findings were used?

5. Is there a human resource development plan training plan that serves to develop human resources?. To do that, let us examine some of the important issues in this area.

(a) Who is responsible for planning? Who has authority to plan?
(b) How many trainers were trained during the past 12 months? (and by whom?)
(c) Training in what subjects or skills has been done, and were they adequate?
(d) What portion of training has been like "Gangata Kepuwa Ini".
(e) Are training Competencies assessed? And how?
(f) How is training appraisal done? What were the reactions?
(g) Has initiative, imagination and creativity been rewarded?

6. Is there an annual training plan?

(a) When are the budgets prepared?
(b) Does the budget accompany a work schedule?
(c) How is the work schedule planned?
(d) Is it flexible? Is it revised?
(e) What is the progress achieved?
(f) How are the "Multiplier effects ensured"?
(g) Is monitoring and evaluation in-built into the system?

7. If you are a trainer, think of these.

(a) What types of decisions do you make?
(b) When did you last review in depth your work, and your progress?
(c) How often do you do it?
(d) Can you delegate? Delegate what?
(e) Do you have to handle other official assignments not related to training?
(f) Do you want to be one of the best in your profession?
(g) What are your key result areas?

This long list of questions is not irrelevant. Build up your own questionnaire while thinking of your tasks. Proceed to get your data. This demands a lot of work, but they help you to be closer to reaching the right training needs. The journey is long. Yet, even the longest journey starts with one step.

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