TEA RESEARCH ASSOCIATION
Arunachal Advisory Centre
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QUARTERLY ADVISORY BULLETIN

Number 3 July-September, 2019

Arunachal Advisory Centre, Tea Research Association, Itanagar(AP) is issuing Quarterly Advisory Bulletin, No-3 for the benefit of the tea growers of Arunachal Pradesh. We hope that this bulletin will adequately meet the technical requirement of the tea growers to maintain and improve their tea fields in terms of yield and quality. We expect that the growers shall go through the bulletin and implement the advices in their tea fields to achieve desired quality crop in this quarter of the cropping season.

A. Management of Unprune Tea

- Continue to pluck close to janam in 7 days interval and pluck hard to remove all the banjhi shoots from the plucking table along with ready two and a bud. Small growing shoots should be retained on the table.
- If there is any weak patches in unprune sections with poor status of maintenance foliage, adopt liberal plucking for 2-3 rounds to cover up the exposed stubs. Don't dip hands inside the pockets of the table and allow to fill up the pockets to merge with the flat plucking surface.
- Proposed unprune teas for next season should plucked close to janam maintaining flat and even plucking surface by adopting breaking break process allowing to build up no undue creep.

B. Management of LP, DS and MS Tea:

- The Light pruned teas where yet to complete the formation of the plucking table should continue to tip at the predetermined height removing only fully open two leaves and a bud in seven days interval.
- The LP, DS & MS teas where the table is satisfactorily formed continue to pluck close to janam in 7 days round. The peripheral primaries of light pruned and deep skiffed teas should be plucked at least 1 cm above the general height to facilitate spreading of the plucking table.

C. Management of Young tea:

- Continue de-budding of the teas planted in March-April above 20 cm from the ground to encourage the lateral growth below that height by removing the swell up auxiliary buds without damaging the main stem and mother leaf.
- De-centre the teas planted in March-April within the month of August coinciding with inter-flush dormancy period at the height of 20cm from the ground where 2-3 laterals are emerged below this height. The single steamer plants should be thumb pruned at 20cm from the ground.
- In teas planted in October- November and already completed de-centering, necessary heading back operation should be imparted 5cm above the de-centered mark to remove the thick branches which may be 1-2 in numbers in a plant to facilitate equal spreading of the frame. This operation should be completed within July-August.
- The de-centered/head backed teas should be tipped at 65cm from the ground (60 cm in hilly areas of high altitude) to form the plucking table.

D. Management of Pest & Disease:

Salient points on IPM & PPC:

- Procure and use only TRA/CIB approved green/blue label chemicals with appropriate dilution and maintain appropriate interval between spraying and plucking to achieve maximum residue limit (MRL) of the applied chemical in made tea.

- Use proper nozzle and maintain adequate nozzle pressure (40 psi for pesticide sprayer and 10-12 psi for weedicide sprayer) in conventional spraying machine.
- As much as possible avoid blanket application of pesticide. Try to confine on spot treatment. Keep strict vigil on plantation for early detection of pest/disease occurrence.
- Put maximum thrust on appropriate cultural practices to reduce the attack of pest & disease.
- Always wear protective gear at the time of pesticide application. Store the pesticide in safe ventilated places away from child, livestock, fire, water sources etc.
- Do not use the empty container of pesticide for household purpose.
- Keep the tea plantation healthy and maintain bush hygiene throughout the year to minimize the chance of pest/disease attack. Keep the surrounding environment of the planting area neat and clean without disturbing the natural flora & fauna to keep the activities of predators and parasite alive for natural control of pest/disease.
- Use naturally available and TRA approved effective crude water extract of native plants as alternate of chemical pesticides for controlling pest & disease.

Helopeltis:

Helopeltis is one of the major sucking pest for keeping strict vigil during this quarter of the year. The following measures should be taken to control the pest if infestation is noticed.

- Pluck the infested shoots before taking up any chemical control measure. Adopt a round of black plucking.
- Keep the ground and the surrounding areas weed free taking special removal measures of the secondary host plants.
- Trim the hanging shade tree branches over the plucking table and the 'matidals' of the tea bushes. If necessary improve the drainage by removing the blockage to drain off the rain water in quick time.
- Application of insecticide should be taken up immediate after plucking. Adopt barrier spraying technique against Helopeltis. Spraying should be done in early morning or late afternoon when the pest is active on the tea bushes.
- If the infestation is noticed in patches apply Thiamethoxam 25 WG @ 50gm in 200 l of water or, Thiacloprid @ 200 ml in 200 l of water in spot. If infestation is already spread out, a blanket round may be necessary at 7/15 days interval depending upon the severity of the infestation. Use alternate insecticide in follow up rounds.
- In rainy season if application of insecticide is unavoidable, evaluating the weather condition, apply a round of TRA/CIB approved synthetic pyrethroids in short rain free period.
- Bio-garden should apply neem formulation like Azadiractin 5% @ 135 ml in 200 l of water.
- Application of 10% water extract of common weeds like *Clerodendrum viscosum, Polygonum hydropiper, Cassia alata, Xanthium strumarium, Vitex negundo etc.* are quite effective against this pest. The fresh foliage with tender stem and flowers should be crushed and soaked in adequate water for around 3-4 days. The volume should be increased to maintain 10 % concentration of the original raw material in ultimate spray fluid.

Red spider:

Usually in rainy season population of Red spider are reduced but resurgence of this pest is found in favorable weather condition from the tea areas where the shade status is inadequate. Take special care to improve the shade status of such sections. The following chemical measures are found to be effective in controlling Red spider mite.

- If infestation is noticed in patches apply a round of Fenazaquin 10% EC @ 500 ml in 200 l of water, Hexythiazox @ 80 ml in 200 l water, Fenpyroximate 5EC @ 133 ml in 200 l of water etc at 7/15 day interval if live population is noticed. Alternate acaricide should be used in each round.
- Water extract formulation of common weeds mentioned under Helopeltis is also effective against this pest

Looper caterpillar:

This is the most devastating Sewing pest which attacks the foliage. The young caterpillar eats the young leaves making holes at the margin of leaf blades. Mature caterpillar not only eats away both young & mature leaves completely but also eats the barks of the branches. The insect pupates in the cracks & crevices of tea & shade tree and the collar soil of tea & shade tree. The moths lay egg in the cracks & crevices of the shade tree trunk up to the height of 10'-12' & after hatching up spread over tea plants through salivary thread. The looper caterpillar attacks the tea plant in mix broods.

- Keep strict vigil for early detection of the pest incidence.
- If infestation is noticed apply a round of Emamectin Benzoate 5%SG @ 80g in 200 l should be applied covering entire tea bush.

Greenfly & Thrips:

- Black pluck the infested section prior to initiate any chemical control measure.
- Take the chemical measures as mentioned against Helopeltis.
- Yellow sticky trap is a very effective tool for early detection/controlling of these pests. Place the trap at plucking table level fixing on bamboo post at strategic points. Ready to use Yellow sticky card traps are available in the market. Alternately adhesive smeared bright yellow colored polythene sheet may be used for trapping these pests. The adhesive should be prepared by mixing Hot Melt Pressure Sensitive Adhesive (HMPSA) with normal thinner @ 300ml HMPSA in 1000ml of thinner.

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Black rot:

Black rot is a fungal disease which infects the mature leaves of the tea bushes. The infection of this disease generally occurs from the month of April and reaches the pick in this quarter of the season. The following measures should be taken up against this disease.

- Remove all the infected dried up leaves from the infected bush prior to take any chemical measure.
- Apply a round of COC @ 500 gm in 200 l of water targeting the under surface of the infected leaves following up with Hexaconazole 5EC @ 200 ml in 200 l of water in 15 days interval.
- Continue spraying in 15 days interval with Hexaconazole 5EC in severely infected sections for initial 2 rounds and thereafter in monthly intervals with COC till the disease disappear.

Red rust:

This algal disease normally infects the young branches & maintenance foliage of tea. The infected leaves of young branches become yellowish in patches. Brick red fructification is noticed on infected leaves & branches. Infected branches die in patches.

- Predisposing factors of this disease such as inadequate shade, water-logging, low soil potash, improper soil pH, presence of overgrown green crop should be eradicated by taking appropriate measures in time.
- If fructification persists in young stem or foliage spray Copper Oxy-chloride 50WP @ 500gm in 200litres of water using hand sprayer; first two rounds at 15 days interval and subsequent two rounds at monthly intervals.
- Spray should be targeted to the foliage as well as the young branches. Use of a sticker is beneficial.

E. Weed management:

- In pruned and deep skiffed field, where ground is yet to cover up and weed growth is heavy, apply a round of Glyphosate 71%SG @ 1.5 l in 200 l water on grassy weeds or, 2 l in 200l water for mixed weed of 8-10 cm tall before onset of monsoon.
- During monsoon Paraquat 500g in 200 lit of water should be applied, if necessary.
- In unprune tea Paraquat for grass or Gluphosinate Ammonium (1l in 200 l water) for broad leaf can be applied on need basis.
- Over grown weeds should be sickled first and herbicide should be applied on regrowth.
- Obnoxious weeds like Fern/*Polygonum* /*Mikania* etc. should be manually uprooted.

F. Fertilizer Management:

- The second round of the chemical fertilizer should be applied within the month of August at a rain free weather condition and on weed free ground to get maximum utilization of the fertilizers by the tea plants.
- In plain areas, fertilizers should be applied uniformly on the ground as broadcast. In hilly areas, fertilizers should be applied in a half circular band on the up slope keeping a distance from the collar.
- The following table should be considered for fertilizer application in mature tea sections.

For Plain Areas					
Production of Green leaf (kg/bigha)	**Requirement of Nitrogen (kg/bigha)**	**Requirement of Phosphate (kg/bigha)**	**Requirement of Potash (kg/bigha) (on the basis of soil test report)**		
			Low (< 60 ppm)	**Medium (60-100 ppm)**	**High (> 100 ppm)**
Up to 900	Urea 25 kg	RP 10 kg	MOP 20 kg	MOP 15 kg	MOP 10 kg
900 – 1200	Urea 25 to 30 kg	RP 10 to15 kg	MOP 20 to25 kg	MOP 15 to18 kg	MOP 10 to 15 kg
1200 – 1500	Urea 30 to 40 kg	RP 15 to 25 kg	MOP 25 to 30kg	MOP 18 to 25 kg	MOP 15 to 22 kg
1500 – 1800	Urea 40 to 45 kg	RP 25 kg	MOP 30 to35 kg	MOP 25 to 30 kg	MOP 22 to 25 kg

For Hilly Areas					
Up to 360	Urea 15 kg	RP 10 kg	MOP 14 kg	MOP 11 kg	MOP 8 kg
360 – 600	Urea 15 to 25 kg	RP 10 kg	MOP 12 to 20kg	MOP 11 to 15kg	MOP 8 to 11 kg
600- 850	Urea 25 to 35 kg	RP 10 kg	MOP 20 to 25kg	MOP 15 to 22kg	MOP 11 to 15 kg

* **1 Hectare = 7.5 Bigha = 2.47 Acre (Land area measurement)**

* **RP- Rock phosphate (24% phosphate),ppm- an unit of measurement**

- At formative stage of young tea, YTD mixture should be applied in four splits at two monthly intervals with Nitrogen, Phosphate & potash @ ratio 10:5:10 (Nitrogen 10kg, Phosphate 5kg and Potash 10kg in 100 kg YTD mixture) where soil available potash is above 100ppm. If potash level is below 100ppm then the ratio of Nitrogen, Phosphate & Potash should be 10:5:15. The table below indicates the requirement of Nitrogen, Phosphate & Potash to prepare YTD mixture @ 10:5:10 (urea as the source of Nitrogen, SSP as the source of phosphate and MOP as the source of potash), total quantity of YTD mixture per *bigha* per year and the application procedure of the fertilizer mixture.

Age of the tea	Nitrogen (kg/bigha /yr)	Phosphate (kg/bigha /yr)	Potash (kg/bigha /yr)	Filler (kg/bigha /yr)	Total quantity of YTD mixture including filler(kg/bigha/yr)	Application method of YTD mixture
0 year	Urea 6-12	SSP 8-17	MOP 4-9	8-16	26-54 (Depending upon the growth vigor of the tea plant)	Ring in 2-3 splits &15 cm apart from the collar region
+1 year	Urea 23-29	SSP 33-42	MOP 18-22	33-40	107-133 (Depending upon the growth vigor of the tea plant)	Ring in 4 splits &15 cm apart from the collar region
+2 year	Urea 29-35	SSP 42-50	MOP 22-27	40-48	133-160 (Depending upon the growth vigor of the tea plant)	Ring in 4 splits & 20 cm apart from the collar region
+3 year	Urea 35-40	SSP 50-58	MOP 27-31	48-56	160-185 (Depending upon the growth vigor of the tea plant)	Ring in 4 splits & 20 cm apart from the collar region
+4 year	Urea 40-43	SSP 58-62	MOP 31-33	56-60	185-198 (Depending upon the growth vigor of the tea plant)	Strip in 2splits
+5 year	Urea 40-43	SSP 58-62	MOP 31-33	56-60	185-198 (Depending upon the growth vigor of the tea plant)	Strip in 2splits

- **1 Hectare = 7.5 Bigha = 2.47 Acre (Land area measurement)**

- Filler as mentioned in the table should be incorporated with the chemical fertilizer to make up the volume and to avoid any chance of fertilizer injury to the young tea plant. Dry cattle manure, dry soil, dry coarse sand etc. may be used as filler.
- In +4 & +5 year old plantations, the 2nd split of YTD mixture should be applied in late August.

G. Clonal Nursery Management:

- To raise VP nursery in autumn, filling up of sleeves with top soil having pH range 4.5-5.0 and % of organic carbon not more than 1%, should be completed within September.
- In spring raised sleeve nurseries 1st round of sorting should be completed within September to facilitate equal growing condition to young saplings.
- Application of YTD mixture should be started from the month of August @ 10:5:10 diluted to 1:9 part by adding soil in monthly interval on the saplings attained the height of 15 cm with 4-5 leaves.
- Precaution should be taken in timely adjustment of the over head shade to prevent drip damage of the sleeves.
- Hand weeding should be done time to time to avoid the dominance of weed growth on the sleeves. Mossy growth should be scraped out to provide better aeration to the root zone of the young saplings.
- Protect the saplings from pest/disease attack by adopting TRA approved pest/disease management practices. Keep the drains free flow to provide prompt drain out of rain water from nursery site.

List of CIB/TRA/PPC approved Agro-chemicals for use in Tea as on 30th June, 2019

Name of Agro-chemicals	Trade Name	Manufacturer	Dose		MRL (mg/Kg)			Pre Harvest Interval (Days) as per PPC Ver. 10
Acaricide			**HV**	**LV**	**India**	**EU**	**Japan**	
Cyflumetofen 20 SC	Foster	Dhanuka Agritech Ltd	1:500	1:250	0.05	-	40	-
Dicofol 18.5 EC	-	-	1:400	1:200	40	20	3	16
Ethion 50 EC	-	Shivashakti Bio	1:400	1:200	5	3	0.3	10
Fenazaquin 10 EC	-	-	1:400	1:200	3	10	10	12
Fenpyroximate 5 EC/SC	Mitigate	Isagro (Asia) Agrochemicals Pvt. Ltd.	1:1500	1:750	2	8.0	40	–
Hexythiazox 5.45 EC	-	-	1:2500	1:1250	15	4	15	12
Propargite 57 EC	-	-	1:400	1:200	10	10	5	20
Sulphur 80 WP	-	-	1:200	1:100	-	-	-	10
Sulphur 40 WP	-	-	1:200	1:100	-	-	-	10
Sulphur 52 SC	-	-	-	-	-	-	-	-
Spiromesifen 240 SC	-	-	1:1000	1:500	70	50	30	14
Etoxazole 10 SC	Borneo	Sumitomo Chemical India Ltd	1:1600	1:800	15	15	15	-
Flufenzin 20 SC	-	-	-	-	-	0.1	-	-
Insecticide								
Azadirachtin 1% EC	-	-	-	-	-	0.01	-	-
Azadirachtin 5% EC	-	-	1:1500	-	-	0.01	–	-
Bifenthrin 8% SC	-	-	1:1600	1:800	30	30	30	5
Clothianidin 50 WDG			1:4500	1: 2250	0.7	0.7	50	14 – 21
Deltamethrin 2.8 EC			1:2000	1:1000	5	5	5	10
Deltamethrin 11 EC	-	-	-	-	5	5	5	-
Phosalone 35 EC	-	-	1:400	1:200	–	0.05	15	-
Quinalphos 25 EC	Ekalux	Syngenta India Ltd.	1:400	1:200	0.01	0.05	0.1	20
Quinalphos 20 AF	-	-	1:400	1:200	0.01	0.05	0.1	-
Thiacloprid 21.7 % SC	Alanto	Bayer Crop Science Ltd.	1:1000	1:500	5	10	30	7 – 14
Thiamethoxam 25 WG	Actara Sukgan	Syngenta India Ltd. Adama India Pvt Ltd	1:4000	1:2000	20	20	20	10
Emamectin Benzoate 5% SG	Pocket	Isagro (Asia) Agrochemicals Pvt. Ltd.	1: 2500	–	0.01	0.02	0.5	7
Fenpropathrin 30 EC	-	-	1:1600	1:800	2	2	25	8
Flubendiamide 20 WG	-	-	1:5000	–	50	0.02	50	7
Thiamethoxam 12.6% + L- Cyhalothrin 9.5%	Alika	Syngenta India Ltd.	1:2666	1:1333	20 0.05	20 0.01	20 15	-
Emamectin Benzoate	-	-	1:2000	1:1000	0.01	0.02	0.5	7*

3% + Thiamethoxam 12% WG					20	20.0	20	
Bio-Pesticide								
Beauveria bassiana 2.5 WP (cfu 2x10 gm)	-	-	-	-	-	-	-	-
Herbicide								
Glyphosate 41% SL	-	-	2-3 L/ha	-	1	2	1	-
Glyphosate (Ammonium Salt) 71% SG	-	-	1.5 kg/ha for broad leaf, 2.0 kg/ha for mixed population	-	1	2	1	-
Glufosinate Ammonium salt 13.5 SL	Sweep Power	UPL Ltd	1L in 200 l water for broad leaf and 3L in 200 L water for monocot	-	0.01	0.1	0.3	-
Glyphosate (Ammonium Salt) 5% SL	-	-			1	2	1	
Oxyfluorfen 23.5 EC	-	-	1kg./ha	-	0.2	0.05	-	-
Paraquat Dichloride 24% SL/ WSC	-	-	500 ml – 1 L/ha in 200 lit of water	-	0.2	0.05	0.3	7
Oxyfluorfen 2.5% + Isopropyl amine salt of Glyphosate 41%w/w SC	-	-	-	-	0.2 1	0.05 2	- 1	-
Carfentrazone ethyl 0.43% + Glyphosate 30.82 EW		FMC India Ltd.	3000 ml in 500 L water/ha	- -	0.02 1	0.02 2	0.1 1	-
Indaziflam 1.65% w/w + Glyphosate-isopropyl ammonium 44.63% w/w SC	-	-	2.5 L /ha in 500 L water	-	- 1	- 2.0	- 1	-
Fungicide								
Copper Oxychloride 50 WP	-	-	1:400	1:200	150 as Cu	40	-	7 – 14
Carbendazim 12 % +	-	-	1:400	1:200	0.5	-	-	-

Mancozeb 63% WP					3			
Hexaconazole 4% + Zineb 68% WP	-	-	-	-	0.02 0.1	0.05 -	-	
Hexaconazole 5 EC	-	-	1:1000	1:500	0.02	0.05	-	12
Propiconazole 25 EC	-	-	1:1000	1:500	0.1	0.05	0.1	14
Tetraconazole 3.8% w/w (4% w/v)	-	-	1:1000	1:500	-	0.02	20	-
Trifloxystrobin 25% + Tebuconazole 50% WG	-	-	1:4000	1:2000	-	0.05 0.05	5 50	-
Spray adjuvant (Sticker) recommended by TRA								
Magic Shakti	-	Nivshakti Bioenergy Pvt. Ltd.	20 ml in 200 L spray fluid	-	-	-	-	-
Nutrastick	-	Gassin Pierre Pvt Ltd	20-50 ml in 200 L spray fluid	-	-	-	-	-
Tip Top	-	Krishi Rasayan	100 ml in 200 L spray fluid	-	-	-	-	-
APSA 80	-	Amway India Enterprise (P) Ltd.	100 ml in 200 L spray fluid	-	-	-	-	-
Wetcit	-	Dhanuka Agritech Ltd.	200 ml in 200 L spray fluid	-	-	-	-	-

***As per CIB-RC Label Claim Certificate**

Tolerance limit of 0.01 mg/kg shall apply in cases of pesticides for which MRL have not been fixed [FSSAI notification dated 24th December 2018]

Issued by Advisory Department, Tocklai Tea Research Institute, TRA, Jorhat, Assam

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