



TEA RESEARCH ASSOCIATION

Arunachal Advisory Centre

Dist. Papum-pare, Itanagar-791111 website-www.tocklai.net, e-mail- b.bordoloi@tocklai.net

QUARTERLY ADVISORY BULLETIN

Number 3

July-September, 2015

The Arunachal Advisory Centre, Tea Research Association, Itanagar (AP) is issuing this 3rd edition of the “Quarterly Advisory Bulletin,2015” with the support of the Department of Trade & Commerce, Govt. of Arunachal Pradesh for the benefit of the tea growers of the state. All the modern scientific approaches that should be adopted by the tea growers within this quarter of the year are compiled in this edition for best management of their tea fields to maximize the production of quality green leaves.

We expect the growers shall go through this bulletin and implement the advices in their tea fields to achieve desired crop in this season. We look forward for your valuable feedback to work together for the betterment of the upcoming tea industry of the state. Our official address is “Arunachal Advisory Centre, Tea Research Association, C/o Dept. of Trade & Commerce, APIDFC Building Ltd, C-sector, Itanagar-791111”, e-mail ID- b.bordoloi@tocklai.net, Mobile no- 08471948330.

A. Management of Unprune Tea

- Maintain a flat and even plucking surface in unprune tea and continue to pluck close to janam in 7 days interval. 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 to stimulate new shoot growth.
- If there is any weak patches still exists with exposed stubs in unprune sections, adopt liberal plucking for 2-3 rounds to cover up the exposed stubs. Allow the pockets to fill up naturally to merge with the flat plucking surface without dipping hand in the pockets during plucking.

B. Management of LP, DS and MS Tea:

- Maintain a 7 day round and pluck to janam taking the fish leaf to restrict undue creep and encourage subsequent growth. Shoots should not be plucked below the table level.
- If table is disturbed due to longer round of plucking do a round of breaking break of exposed stubs to level the table.
- The primaries of light pruned and deep skiffed teas around the periphery of the bushes should be plucked at least 1 cm above the general height to facilitate spreading of the plucking table and good ground coverage in quick time.
- The Light pruned and Deep skiffed teas which have suffered in the long dry spell at the beginning of the season should continue to tip at the predetermined height removing only fully open two leaves and a bud in seven days interval to stimulate the formation of the plucking table.

C. Management of Young tea:

- De-budding should be continued on the teas planted in March-April,2015 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-centered the teas planted in March-April,2015 within the month of August in inter flush dormancy period at the height of 20cm from the ground where 2-3 laterals have emerged below this height. Thumb pruned the single steamer plants at 20cm from the ground.
- Already 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:

Important guidelines on PPC:

- Please refer to the latest version of PPC (version-3) and QAB issued by Arunachal Advisory Centre, TRA for Integrated Pest Management of different tea pests and the approved list of Plant Protection Formulation (PPF) in Tea Board's web site www.teaboard.gov.in. Use only TRA/CIB/PPC approved chemicals with appropriate dilution and maintain minimum interval of 7 days between spraying and plucking to achieve the endorsed maximum residue limit (MRL) of the applied chemical in made tea.
- Use proper nozzle and maintain adequate 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 use protective gear at the time of pesticide application. Store the pesticide in safe ventilated places away from child, livestock, fire, water resources etc.
- Do not use the empty container of pesticide for household purpose. Dispose the empty container by burying at least 50cm depth in barren soil which is no use for cultivation purpose. Keep that area well fenced as a protective measure.
- 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 parasitoids 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 pests to keep strict monitoring during this quarter of the year. The long wet spell prevails during the last part of the previous quarter of the year creates conducive environment for building up of this pest. If infestation is noticed the following measures should be taken to control this pest.

- Pluck the infested shoots prior to initiate any chemical control measure. Adopt black plucking during the period of Helopeltis infestation.
- The ground and the surrounding areas should be kept weed free taking special removal measures of the secondary host plants.
- The hanging shade tree branches on the plucking table and the 'matidals' of the tea bushes should be trimmed.
- The drainage should be maintained properly to drain out 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 @ 67 ml in 200 l of water or, Clothianidin @ 45 ml in 200 l of water in spot. If infestation is already spread out, a blanket round may be necessary at 15 days intervals using alternate insecticide.
- In rainy season apply a round of synthetic pyrethroids like Bifenthrin or Fenprothrin (1:1600, HV) in short rain free period if pest is active.
- 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* etc are quite effective against this pest. 10kg of the fresh foliage with tender stem and flowers should be crushed and soaked in adequate water for around 36 hours. The volume should be increased to 100litres for maintaining 10 % concentration of the original raw material in ultimate spray fluid.

Red spider:

In rainy season infestation of Red spider is not so prominent however, resurgence of this pest is found in favorable weather condition in the tea areas of inadequate shade status. Special care should be taken to improve the shade status of such sections. The following chemical and non-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 @ 100 ml in 200 l of water etc at 15 days interval if live population is noticed. Alternate acaricide should be used in each round.
- In organic tea plantations spray of Neem formulation like Azadiractin 5% @ 135 ml in 200 l of water.
- The common weed *Clerodendrum viscosum* (*Dhapat tita*) at 10 % concentration is quite effective at the early stage of infestation.

Black rot

This fungal disease infects the mature leaves of the tea bushes. The infection of this disease usually 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 1-2 rounds of Hexaconazole 5EC @ 200 ml in 200 l of water in 15 days interval targeting the under surface of the infected leaves.
- In severely infected sections continue spraying thereafter in monthly intervals till the disease disappears.

E. Weed management:

- In pruned and deep skiffed tea field, where ground is yet to cover up and weed growth is heavy; apply a round of Glyphosate @1000 ml in 200 l water on succulent weeds of 8-10 cm tall before onset of monsoon.
- During monsoon Paraquat 500g in 200 lit of water should be applied on need basis.
- If necessary, Gluphosinate Ammonium against broad leaf weeds can be applied in unprune tea sections.
- Over grown weeds should be sickled first and herbicide should be applied on re-growth.
- 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 15-20 cm 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 to 15 kg	MOP 20 to 25 kg	MOP 15 to 18 kg	MOP 10 to 15 kg
1200 - 1500	Urea 30 to 40 kg	RP 15 to 25 kg	MOP 25 to 30 kg	MOP 18 to 25 kg	MOP 15 to 22 kg
1500 - 1800	Urea 40 to 45 kg	RP 25 kg	MOP 30 to 35 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 20 kg	MOP 11 to 15 kg	MOP 8 to 11 kg
600- 850	Urea 25 to 35 kg	RP 10 kg	MOP 20 to 25 kg	MOP 15 to 22 kg	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 dry 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.

H. Shade Nursery Management:

In hilly area of low altitude and in plain area, shade tree is an integral part of tea plantations. Adequate shade provides the condition of healthy growth of tea and thereby reduces the chance of pest infestation or, disease infection. Shade improves the micro-climate of the tea area and helps the tea plants to withstand in adverse climatic condition like drought, hail etc. Well drained high land having perennial water source nearby should be selected as site to raise the shade tree nursery.

- TRA approved permanent species of shade tree are:
Anadenanthera perigrina, Albizzia sinensis, Albizzia odoratissima, Acacia lenticularis, etc.
- TRA approved temporary shade species are:
Indigofera teysmanii, Leucaena leucocephala, Melia azadirach etc.
- Dolomite @ 500gm per cubic meter of soil and SSP @ 1000kg per cubic meter of soil should be incorporated for filling up sleeves for shade nursery.
- The seeds should be collected from disease and pest free mature trees. Collected seeds should be sown directly in sleeves sized 30 cm lay flat, 60 cm long and 300 gauge thickness within the month of April.
- After sowing seeds, light mulching should be done followed by regular watering to keep the soil moist. No overhead shade is necessary.

I. Photographs of Pest & Herbs



Red spider mite & eggs



Red spider infested tea plantation



Helopeltis



Damage symptom of Helopeltis

Photographs of *Clerodendrum viscosum* (*Dhapat tita*):



**Photographs of *Polygonum hydropiper*:
(*Pothorua Bihlongoni*)**

List of CIB-TRA approved chemicals (as on April, 2015)

(Prepared in the line with the list of approved PPFs for Plant Protection Code (PPC): version 3.0 by Tea Board)

Name of Chemicals	Trade Name	Dose		MRL (ppm)		
		HV	LV	India	EU	Japan
ACARICIDES						
Bifenthrin 8 SC	–	1:1600	1:800	–	5	25
Dicofol 18.5 EC	Diumite	1:400	1:200	5	20	3
	Colonel-S	Do	Do			
Ethion 50 EC	Ethion	1:400	1:200	5	3	0.3
Fenazaquin 10 EC	–	1:400	1:200	3	10	0.01
Fenpropathrin 30 EC	Meothrin	1:1600	1:800		2	25
Fenpyroximate 5 EC/SC	Sedna		1:1000	–	0.1	10
	Pyromite					
	Mitigate					
Hexythiazox 5.45 EC	–	1:2500	1:1250	–	4	–
Propergite 57 EC	–	1:400	1:200	10	5	5
Sulphur 80 WG	–	1:200	1:100	–	–	–
WettableSulphur 40 WP	Share	1:200	1:100	–	–	–
Spiromesifen 240 SC (22.9 w/v)	Oberon	1:1000	1:500	–	50	30
Etoazole 10 SC						
INSECTICIDES						
Azadirachtin 5% EC	–	1:1500		–	0.01	–
Bifenthrin 8% SC	–	1:1600	1:800	–	5	25
Clothianidin 50 WDG	Dantotsu 50 WDG	1:4500	1:2250	–	0.7	–
Deltamethrin 2.8 EC	Decis	1:2000	1:1000	–	5	10
Phosalone 35 EC	–	1:400	1:200	–	0.1	2
Quinalphos 25 EC	Flash	1: 400	1:200	0.01	0.1	0.1
Quinalphos 20 AF	–	1: 400	1:200	0.01	0.1	0.1
Thiacloprid 21.7% SC	Alanto	1:1000	1:500	–	10	30
Thiamethoxam 25 WG	Thiomex	1:4000	1:2000	–	20	20
HERBICIDES						
Glyphosate 41% SL	Globus	0.8kg a.i. /ha -1.2kg a.i. /ha		1	2	1
	Round – up					
Glyphosate 71% SG	–	1.5 kg/ha for broad leaf – 2.0 kg/ha for mixed population		–	2	1
GlufosinateAmonium 13.5 SL	–	1.5 kg/ha for broad leaf – 2.0 kg/ha for mixed population		0.01	0.1	0.3
Oxyfluorfen 23.5 EC	Oxygold	0.25kg a.i./ha			0.05	0.01
Paraquat Dichloride 24% SL/WSC	Herbucstone	1lit/ha in 200 lit of water		–	0.05	0.3
FUNGICIDES						
Hexaconazole 5 EC	–	1:1000	1:500	–	0.05	0.05
Propiconazole 25 EC	–	1:1000	1:500	–	0.1	0.1
Carbendazim 12% + Mancozeb 63% WP						