



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, 2014

The Arunachal Advisory Centre, Tea Research Association, Itanagar (AP) has been issuing Quarterly Advisory Bulletin for the benefit of the tea growers of the state from the first quarter of the year. The previous issues of these bulletins might be helpful for the growers. This is the 3rd edition of the "Quarterly Advisory Bulletin" prepared for the growers compiling all sort of cultural practices to be imparted in the tea fields within this quarter of the season. The Department of Trade & Commerce, Govt. of Arunachal Pradesh has supported Arunachal Advisory Centre, TRA, Itanagar in this effort so that the growers can avail maximum benefit from these bulletins to establish their tea field in absolute scientific ways and means to produce high quality tea. 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 industries 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.

A. Management of Unprune Tea

- Try to establish a uniform plucking table at desired level and 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 left on the table.
- Due to moisture stress, the numbers of banjhi shoots were predominant on the table at the beginning of the plucking season. Teas are gaining momentum towards productive phase after receiving some amount of rain at the mid part of the last quarter. At this juncture remove all banjhi shoots at soft stage to ensure continuation of growing phase of the tea bushes.
- 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, allow the pockets to fill up itself to merge with the flat plucking surface.
- Teas proposed to keep unprune in 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. If the top foliage status is found weak in later part of this quarter because of pest infestation or, infection of disease; add up a layer of fresh foliage in October-November within 3-4 rounds of plucking.

B. Management of LP, DS and MS Tea:

- The Light pruned and Deep skiffed teas should continue to tip at the predetermined height removing only fully open two leaves and a bud in seven days interval where yet to form the plucking table. The long dry spell has delayed the formation of the table.
- 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.

Issued by Arunachal Advisory Centre, TRA, Itanagar-791111
Supported & Circulated by Dept. of Trade & Commerce, Govt. of Arunachal Pradesh

C. Management of Young tea:

- De-budding of the teas planted in March-April should be continued above 20 cm from the ground to encourage the lateral growth below the referred height by removing the swell up auxiliary buds without damaging the main stem and mother leaf.
- De-centered the teas planted in March-April within the month of August at the height of 20cm from the ground where 2-3 laterals are emerged below this height and teas are in inter flush dormancy phase. The single steamer plants should be thumb pruned at 20cm from the ground.
- Teas planted in October- November where de-centering is already done heading back operation should be imparted 5cm above the de-centering 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 done within July-August at the time of inter flush dormancy.
- 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:

Helopeltis

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

- The infested shoots should be plucked before taking up 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 and the drainage should be maintained properly 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 @ 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 day intervals using alternate insecticide. In rainy season evaluating the weather condition, apply a round of TRA/CIB approved synthetic pyrethroids in short rain free period if spraying is unavoidable.
- 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. 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 maintain 10 % concentration of the original raw material in ultimate spray fluid. Entomo-pathogenic fungal formulation of *Beauveria bassiana* @ 1:200 can also be applied in humid but rain free pleasant weather condition.

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 @ 100 ml in 200 l of water etc at 15 day interval if live population is noticed. Alternate acaricide should be used in each round.
- In organic tea plantations spray Paraffinic Oil @ 2-3 l in 200 l of water in the first round and follow up with Neem formulation like Azadiractin 5% @ 135 ml in 200 l of water. The common weed *Clerodendrum viscosum* (*Dhapat tita*) at 10 % concentration can be tried from early stage of infestation.

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 2-3 rounds and thereafter in monthly intervals with COC till the disease disappear.

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 @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, if necessary.
- In unprune tea Paraquat for grass or Gluphosinate Ammonium 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.

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. Consult "Quarterly Advisory Bulletin No-2" to establish shade nursery. The established shade nurseries should be monitored regularly to facilitate adequate drainage, protection from pest & disease attack to produce healthy shade sapling to meet the requirement of shade plantation.

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



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



List of CIB-TRA approved Agro-chemicals for use in Tea by the member gardens of TRA(as on 1st April, 2014).

Name of Chemicals	Trade Name	Dose		MRL (ppm)		
		HV	LV	India	EU	Japan
ACARICIDES						
Bifenthrin 8 SC	-	1:1600	1:800	-	5	-
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	0.01
Fenazaquin 10 EC	-	1:400	1:200	3	10	-
Fenpropathrin 30 EC	Meothrin					25
Fenpyroximate 5 EC/SC	Sedna	1:2000	1:1000	-	0.1	-
	Pyromite	Do				
Hexythiazox 5.45 EC	-	1:2500	1:1250	-	4	-
Propergite 57 EC	-	1:400	1:200	10	5	5
Sulphur 80 WG/WP	-	1:200	1:100	-	-	-
Wettable Sulphur 40 WP	Share			-	-	-
Spiromesifen 240 SC (22.9 w/v)	Oberon	1:1000		-	0.02	-
INSECTICIDES						
Azadirachtin 5% EC	-	1:1500			0.01	
Bifenthrin 8% SC	-	1:1600	1:800	-	5	-
Clothianidin 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
Profenofos 50 EC	Celcron	1:1000	1:500	-	0.1	1
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	-	-	-	-	-
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	Do				
Glyphosate 71% SG	-	-		-	2	-
Glufosinate Amonium 13.5 SL	-	1.5 kg/ha for broad leaf - 2.0 kg/ha for mixed population		0.01	0.1	0.5
Oxyfluorfen 23.5 EC	Oxygold	0.25kg a.i./ha				[UL 0.01]
Paraquat Dichloride 24% SL/WSC	Herbucstone	1lit/ha in 200 lit of water		-	0.05	0.3
FUNGICIDES						
Copper hydroxide 77% WP	-	1:400	1:200	-	40	-
Copper oxychloride 50 WP	-	1:400	1:200		40	
Hexaconazole 5 EC	-	1:1000	1:500	-	0.05	0.05
Propiconazole 25 EC	-	1:1000	1:500	-	0.1	0.1

STICKER						
Nonoxynol-10	Activa -80					
Non - ionic surfactant	Intron AE					
MICROBIALS						
<i>Bacillus subtilis</i>	-	5% cfu as foliar spray				
<i>Beauveria bassiana</i>	-	5% cfu suspension as foliar spray				
<i>Chrysoperla carnea</i>	-	2000 larve /ha				
<i>Trichoderma biocide</i>	-	5-10% cfu as spray on pruning cuts				
	-	20% cfu as paint				
	-	30 l/kg per ha during plantation				

N. B. : The above recommendation is in the line of Plant Protection Code issued by Tea Board of India in March, 2014
