



## TEA RESEARCH ASSOCIATION

Arunachal Advisory Centre, Dist. Papum-pare, Itanagar-791111 website-www.tocklai.net

# QUARTERLY ADVISORY BULLETIN

Number 1

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Tea Research Association is more than 100 years old organization of tea research. This organization has contributed in all the segments of tea science like development of quality planting material for both plain & hilly areas, planting spacing & design of tea & shade tree plants, land preparation methodology, drainage design for plain & hilly areas, development of manufacturing technique & tea machineries, plant protection technology, soil management technique and many other wings of modern agricultural science of plantation crop. This organization is enriched with an elite group of expert scientist to carry out various experimental works for the benefit of the big tea industrialist as well as small tea sectors. To transfer the modern technique of tea culture from laboratory to field, there are several Advisory Centres in all over the tea producing belts of north eastern states of India. Recently Arunachal Pradesh has emerged with tea cultivation and find out a prestigious position in Indian tea map. On request of Govt of Arunachal Pradesh, Tea Research Association has established an Advisory Centre in Itanagar at Directorate of Trade & Commerce, APIDFC Building Ltd., C-Sector, Itanagar with the name "Arunachal Advisory Centre". The Advisory Centre has decided to issue Quarterly Advisory Bulletin starting with this issue covering all the cultural practices of each quarter of the year for the benefit of the tea growers of the state to augment the cultivation procedure of tea in absolute scientific ways and means to produce quality tea to thrive in the competitive world tea market.

### Soil sampling method for testing

- Before finalizing the fertilizer program for the ensuing season ensure soil testing to know the fertility status of the soil by undertaking the following method. On the basis of soil testing report and average yield during a 3 or 4 year pruning cycle adopt appropriate fertilizer policy. Optimum use of chemical fertilizer could help in maintaining soil health for long period.
- Demarcate the plot from the surrounding area. Use soil auger (diameter of 1 ½ "size) for soil sample collection. Mark the auger at 15 cm & 30 cm from the pointed mouth to collect soil from 0-15 cm (top) and 15-30 cm (sub).
- Up to 2 ha area collect 1set (top & sub soil) of soil sample.
- Before soil collection clean the surface by hand. Bore the soil up to 6" depth & pull out the auger to collect top soil. Bore on the same hole up to 12" and take out the auger to

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collect sub soil. Keep top & sub soil separately in two poly bags. Ensure proper representation of the plot by the collected soil sample by repeating the same procedure in 10-15 spots.

- Mix the collected top soil sample thoroughly and take approximately 500gm of top soil for testing. Similarly sampled the sub soil. Air dry the samples for 4-5 days spreading on floor with label.
- Label the sample with proper postal address & date of collection, one inside the bag and one outside the bag. Deposit the sample at the nearest TRA station of ASSAM or, any other TBI/Govt. of AP approved soil testing laboratory for testing.
- In existing plantation don't collect soil sample from the drain bank or, below the shade tree or, from the plucking gully. Collect soil sample between the two bushes of planting gully.
- Don't mix the top & sub soil samples. Keep them away from any contact of fertilizers or other agro chemicals.

### **Management of Unpruned Tea:**

- Spraying the fluid of MOP 2 kg + Magnesium Sulfate 1kg + 100 liters water in unpruned tea at 3 week interval till end February.
- Level-off-skiff (LOS) or hand level the table within January to keep the plucking table flat and even.
- If any pests like Helopeltis, Thrips, Green-fly, Red spider etc. are active, spray a round of Thimethoxam 50 g in 200 l of water by using hand sprayer.
- Adopt 7-day round of plucking and pluck close to *janam* from the beginning of the season. Break back all the overgrown shoots at the level of the table to keep the table flat and even. Patches where the plucking tables have pockets, adopt liberal plucking to allow the pockets to fill up at the earliest.

### **Management of Pruned Tea:**

- Apart from young tea all other teas planned for pruning or, skiffing should be completed within mid January.
- Protect the light pruned (LP) teas from wound parasites by applying copper oxychloride (COC) @ 500 gm per 200 liters of water using hand sprayer within 24 hours of pruning. Trichoderma biocide may also be applied as an alternate of COC @ 5kg/5liter in 100 liters of water.
- Remove all the banjhi/ diseased branches from the frame during knife cleaning but ensure not to remove any productive parts from the bushes where LP is imparted. In deep skiffed (DS) teas clean the bushes by hand and no maintenance foliage should detach from the bushes if there is no evidence of mite pest.
- Apply alkaline wash on LP bush frame with the following formulation- Washing soda 6kg + Quick lime 2kg + water 100liters. Prepare the formulation in overnight and filtrate through doubled layered leaf bag. Spray the filtrate on frame using hand sprayer.
- Ensure ground levelling of the pruned/skiffed tea fields to avoid the chance of localised water-logging.

- Re-grade the field, collector and contour drains for free flow of excess water in pick season. Spread the drain bed soil evenly in the ground to keep the drain sides free for easy flow of water.
- Monitor the pruned/skiffed tea fields regularly to protect from any incidence of sucking pest. If requires, apply a round of TRA & CIB approved systemic insecticide.

### **Tipping of Pruned/Skiffed Tea:**

- The recommended tipping measures for different types of pruned and skiffed teas are as mentioned below.

<u>Type of Prune/Skiff</u>	<u>Tipping allowance</u>
1. Light prune (LP)	20-25 cm above the cut mark (depending upon growth & vigour of tea).
2. Deep skiff	2 full leaves (8-10 cm) above skiffing mark.
3. Medium skiff	1 full leaf (4-5cm) above skiffing mark.
4. Level off Skiff/Unprune	no allowance, pluck close to <i>janam</i> .

- Tip only full grown two and a bud from the newly growing primaries at the pre-determined tipping height.
- Tip the peripheral shoots about 1cm above the predetermined height for better ground coverage.

### **Management of Young Tea:**

- Mulch the newly planted saplings (0 year) & +1 yr old teas with any green matters leaving 6" area vacant around the collar region of the saplings.
- Teas planted during last October-November should be de-centred at 20 cm from the ground level by February if 3-4 laterals below that height were formed or thumb break at 20cm, if devoid of such laterals but have good number of healthy foliage above that height. In case of having no such condition the operations may be delayed to April-May. De-centring or Thumb pruning should be done as and when the plants are at dormant stage.
- The +2 year plants should be pruned at 35 cm - 40 cm (FFP-I) in end January to early February if most of the branches of the bushes attain pencil thickness. No defoliation should be done at the time of this operation. Only twiggy banjhi branches should be removed.
- The +4 year plants should be pruned at 40 cm - 45 cm (FFP-II) in end January. At the time of this operation bushes should be cleaned properly but not to remove the central branches excessively so that the central portion does not become hollow.

### **Management of VP & Seed Nursery:**

- In hilly areas if raising of nursery is planned then the site should be at low elevation and within the slope of 30%. Satisfactory results could be obtained from nurseries

situated on north facing slopes. The nursery site should be well drained and protected by contour drains to check the flow of surface and sub-surface water.

- The Nursery beds of 120 cm width should be prepared along the contour line to ensure protection from soil erosion.
- In plains well drained areas with natural water resources nearby should be selected for nursery site.
- Use sandy loam top soil for sleeve filling. Soil having high organic carbon percentage should not be used in sleeve filling. The pH range of the soil should be 4.5-5.5 and eelworm count per 10 gm soil should not be more than 6. Ensure soil testing before filling up of sleeves to know the suitability status.
- The soil collected for sleeve filling should be sieved through 4 mesh sieve and the sieved soil should be incorporated with 500 gm SSP per cubic meter of soil.
- Filled up sleeves should be allowed to settled down before planting of cuttings or sowing seed.
- Sowing of seed should be completed within January. Seed should be sown at 1 cm depth by placing the eye facing the bottom of the sleeve. Following sowing of seed avoid over watering to avoid the infection of *Fusarium solani*. No overhead shade is necessary for seed nursery.
- Protect the raised mother bushes from any attack of pest and disease. Planting of cuttings should be completed within April to June.
- If nylon net is used as overhead shade material it should cut 75% sun light. The frame of the overhead shade should be made with adequate height and slope to avoid drip and heat damage. It should be 1.8 cm and 2.7 cm along lower and higher side of a roof covering two beds.

### **Pest management:**

During the cold weather tea pests remain dormant but if any residual population exist on the plantation then they could build up rapidly in cropping period. Keep strict vigil on residual pest population.

#### **Helopeltis**

- If any infestation persists after LOS removes the infested shoots. Apply a round of Thiamethoxam @ 50 g in 200 liters of water by using hand sprayer.
- Adopt barrier spraying on the peripheral bushes of the infected area and then spray the inside bushes. Clean the nearby jungle to eradicate the secondary host of the pest.

#### **Red spider**

- Less shaded tea area is prone to red spider infestation. Take necessary steps to provide adequate shade in such areas.
- Apply a round of Propergite @ 500 ml in 200 l water followed by Fenazaquin @ 500 ml in 200 l water. Bio garden can apply Sulfur 80WG formulations @ 1kg in 200 liters water.

## Thrips and Green fly

- In thrips and green fly infested sections apply a round of Thiomethoxam 25% WG @ 50gm in 200 liters of water by using hand sprayer.
- Pluck hard if these pests are active at beginning of the season. Protect the newly emerged buds of LP & DS bushes by applying a round of Thiomethoxam 25% WG.

## Termite

- In termite infested LP and DS tea areas remove the mud run from the bush frame. Apply Chlorpyrifos 50% EC @ 1lit in 300 litres of water on moist ground around the collar region of the infested bushes. Destroy the hives of the termite and apply the above solution in the termite nest.

### Drainage management:

- Clean and re-grade the field and collector drains in plain areas and spread the soil inside the section to ensure free flow of surface water to the drain. In hilly areas clean the contour drains and maintain the depth of 30 cm. The excavated soil should be put on lower side.
- The recommended drain spacing and depth should be maintained as mentioned below but at the same time the main drain system should be fully functional.

<u>Type of drain</u>	<u>Spacing</u>	<u>Width x Depth</u>
Field drain	15 - 25 meter (Depending upon soil texture)	30cm x 90-105cm
Collector drain	45 –55 meter (Depending upon soil texture)	45 cm x 120cm

### Management of Shade Nursery:

- Preparation of seed bed should be completed within January. The area selected for seed nursery should be well drained and there should be water sources nearby.
- Incorporate slaked lime @ 2 t/ha & Organic manure 25t/ha at the time of land preparation. At the time of final bed preparation apply 125 gm SSP/Sq. Meter area.
- Depth of sowing seed : 0.5 – 1.0cm
- Spacing from seed to seed : 20cm
- Interline spacing : 30cm
- Drain depth between two beds : 60cm
- Lightly mulch the seed bed after seed sowing with green matter treated with Chlorpyrifos 50% EC @ 1liter in 300liters of water. Ensure watering in timely interval.

• List of CIB approved Agro-chemicals for use in Tea by the member gardens of TRA (as on 1<sup>st</sup> January, 2014).

Name of Chemicals	Trade Name	Dose		MRL (ppm)		
		HV	LV	India	EU	Japan
<b>ACARICIDES</b>						
Bifenthrin 8% SC	Brigade	1:1600	1:800	-	5	-
Dicofol 18.5 EC	Diumite	1:400	1:200	5	20	3
	Dacomain					
	Colonel-S					
Ethion 50 EC	Ethion	1:400	1:200	5	3	0.01
Fenazaquin 10% EC	-	1:400	1:200	3	10	-
Fenpyroximate 5% EC/SC	Mitigate5% EC	1:2000	1:1000	-	0.1	-
	Fenpyroximate	1:2000	1:1000	-	-	-
	Pyromite					
Hexythiazox 5.45% EC	-	1:2500	1:1250	-	0.01	-
Paraffinic Oil	Servo Agrospray T. Oil	2-3%		-	-	-
Propergite 57 EC	Mastamite	1:400	1:200	10	5	5
Sulphur 80 WG/WP	-	1:200	1:100	-	5	-
Sulphur 40% WP	Share			-	-	-
Spiromesifen 240 SC (22.9% w/v)	Oberon	1:1000		-	0.02	-
<b>INSECTICIDES</b>						
Azadirachtin 5% EC	Nimbion 50000	1:1500		-	0.01	-
	Ecotin 5% EC			-	-	-
Bifenthrin 8% SC	Brigade	1:1600	1:800	-	5	-
Fenpropathrin 30EC	-	1:1600	1:800	-	-	-
Carbofuran 3% CG	-					
Chlorpyrifos 50% EC	-					
Deltamethrin 2.8 EC	Decis	1:2000	1:1000	-	5	5
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	0.10	-
Quinalphos 20 AF	-	1:400	1:200	0.01	0.10	-
Thiacloprid 21.7% SC	Alanto					
Thiomethoxam 25% WG	Slayer					
	Thiomex	1:4000	1:2000	-	20	20
<b>HERBICIDES</b>						
Glyphosate 41% SL	Glycel	0.8kg a.i. /ha -1.2kg a.i. /ha		1	0.2	1
	Clinton					
	Run Out					
	Round – up					
	Clean up					
Glyphosate 71% SG	Excel Mera	1.5kg/ha for broad leaf - 2.0kg/ha for mix population		1	0.2	1
Glufosinate Amonium 13.5 SL	-	1kg a.i./ha				
2,4-D Amine Salt 58% SL		0.5kg a.i./ha				
2,4-D Sodium Salt 80% SL		0.75kg a.i./ha				
Oxyfluorfen 23.5 EC	Oxygold	0.25kg a.i./ha				
Paraquat Dichloride 24% SL/WSC	Herbucstone	1lit/ha in 200 lit of water				
<b>FUNGICIDES</b>						
Copper hydroxide 77% WP	-	1:400	1:200			
Copper oxychloride 50 WP	-	1:400	1:200			
Hexaconazole 5 EC	-	1:1000	1:500	-	0.05	0.05
Propiconazole 25 EC	-	1:1000	1:500	-	0.1	0.1
<b>STICKER</b>						
Nonoxynol -10	APSA -80	100ml/200 lit of water				
	Activa -80					
Non – ionic surfactant	Dhanuvit	120ml/200 lit of water				
<b>MICROBIALS</b>						
<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				