



## **TEA RESEARCH ASSOCIATION**

### **Arunachal Advisory Centre**

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## **QUARTERLY ADVISORY BULLETIN**

**Number 4**

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The tea growers of the state of Arunachal Pradesh are well aware that the cold weather is putting its steps forward and the growers should be well equipped to implement all the necessary cold weather management practices for getting a better managed tea field in the next cropping season. Management of un-prune and young tea, adoption of proper pruning policies for good crop distribution throughout the cropping season, integrated pest management packages and practices based on current plant protection code (PPC), adequate drainage development, conservation of soil moisture, ground cleaning and leveling without losing top soil, these are all necessary component of best cold weather management practices. Good quantity of autumn crop always bears high cash inflow for the growers. Plucking of the backend crop should receive utmost care in this period of time. The Arunachal Advisory Centre, Tea Research Association, Itanagar(AP) has been issuing this "Quarterly Advisory Bulletin, No-4,2015" addressing all the scientific cultural practices to be imparted in the tea fields within this quarter of the season for achieving best result in high quality backend crop harvesting as well as better prepared tea fields for the coming season. We hope the tea growers of the state shall go through this issue of the bulletin and implement the advices in their tea fields with good spirit. 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, Govt. of AP, APIDFC Building Ltd, C-sector, Itanagar-791111", e-mail ID- [b.bordoloi@tocklai.net](mailto:b.bordoloi@tocklai.net), Mobile – 08471948330.

### **A. Plucking & management of unprune tea:**

- Pluck close to janam in 7days interval removing all the ready two and a bud and soft single or, double banjhi shoots maintaining the plucking table flat & even. Retaining of small shoots on the table is necessary to stimulate new growth.
- In conventional tea plantations, apply two rounds of Urea 4kg + Zinc sulfate 2kg + water 200 liters (High Volume) formulation in fortnightly intervals after 2days of plucking targeting the under surface of top 10-15 cm foliage within the month of October to maximize the quantity of back end crop.
- Proposed unprune sections for coming season should be plucked with at most care to keep the table flat & even leaving no exposed stubs on the plucking table. If foliage status of these sections is become weak or thin due to pest attack, add a fresh layer of foliage within 3-4 rounds of plucking during mid October- end November.
- Proposed unprune sections of conventional plantations should be treated with the formulation MOP 2kg + Magnesium sulfate 2kg + water 200 liters (HV) in monthly intervals starting from mid November - February targeting the undersurface of the top 10-15 cm foliage to withstand drought.
- Necessary steps should be taken to mulch the unprune sections of both organic and inorganic plantations with any green matter within November for better management of Moisture stress in cold weather.

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## **B. Pruning & Skiffing :**

Pruning, the periodical cut back operation of mature tea bushes is necessary to activate the vegetative phase of growth for crop maximization. In tea plantation a definite pruning cycle like LP-UP-DS or, LP-UP-UP in young tea and LP-UP-DS-UP/MS in mature tea has to be adopted for excellent crop distribution throughout the cropping season. Adoption of appropriate pruning cycle with 25% LP, 25% DS, 10% MS and 40% unprune teas in 4 year pruning cycle (LP-UP-DS-MS) and in 3 year pruning cycle (LP-UP-DS) with 25%LP, 25%DS & 50%UP ensures not only steady production but also reduces the chances of pest/disease occurrence and ill effects of adverse climatic condition.

### **Light Prune (LP):**

- Impart this pruning operation by providing adequate clean new wood of 5cm (2") above the last light pruned (LP) mark maintaining equal frame height. In hilly areas pruning should be done along the natural slope.
- A breather at the centre should be retained in each pruned bush to maintain the water pull. The breather should be removed as and when bud break emerges.
- A round of knife cleaning operation is necessary to remove the unproductive branches and 1-2 central knots from the pruned bushes. Apply a round of Trichoderma suspension of 5% strength or, COC (1:400 HV) within 48 hours of pruning.
- Apply a round of lime wash (Quick lime 6kg + washing soda 12 kg + water 200 litres) on the frame using conventional sprayer. Clean the bushes after 7days of applying lime wash with a hessian cloth.
- Protect the bushes from any incidence of sucking pest at the time of bud breaking.

### **Deep Skiff (DS):**

- Complete this skiff operation within mid November – mid December at 13-15 cm above the last light pruned mark leaving the fork of at least 1.5 cm long formed at that level.
- Don't remove the left over foliage from the skiffed bush if there is no severe infestation of Red spider mite. Clean the bushes by hand to remove the unproductive twiggy branches.

### **Medium Skiff (MS):**

- Medium skiff should be done within December by removing all the plucking points with the current year's 'crow's feet'.
- No follow up cleaning operation is necessary after MS.

### **Level-off Skiff (LOS):**

- Execute this skiff operation on proposed unprune teas if the plucking table is uneven and required to be made flat and even by knife to remove 50-60% plucking points of the current year.
- Time of this skiffing operation is early January, when the teas attain total dormancy and the soil has sufficient moisture to prevent dieback of left over plucking points.

## **C. Management of Young tea:**

- Mulch the young tea in the age group of +2 years with any green matter within mid October-November leaving 10-15 cm gap around the collar region to restrict evaporation loss of soil moisture.
- Foliar nutrition of MOP @ 2% (4kg in 200litres, HV) in fortnightly interval starting from the month of November - February is necessary to eliminate the ill effect of moisture stress.
- Keep strict vigil to arrest the chance of building up of any pest population in young tea in back end cropping season.
- Adopt liberal plucking in the month of November to fill up the existing pockets on the plucking table and to improve the foliage status of proposed unprune young tea sections.

- Keep the ground flat and even and remove the collar depressions by a round of cheeling operation before building up moisture stress in soil. If necessary improve the drainage system within November-December.
- Allow building up of adequate starch in root zone of young teas by avoiding plucking from the month of November where FFP-I or, FFP-II has to be imparted in January.
- If not done, prune the +2 or, +3 years plants (FFP-I) at the height of 35-40 cm from ground level and +4 years plants (FFP-II) at the height of 40-45 cm within January.

## **D. Integrated Pest Management (IPM) & Plant Protection Code(PPC):**

Adoption of proper scientific cultural practices, early detection of pest/disease emergence, use of botanicals and other effective tools, in unavoidable situation application of chemical pesticides at right time in recommended dilution, adequate time gap between spraying of chemicals and harvesting are the components of integrated pest management (IPM) practices introduced by Tocklai Tea Research Institute, TRA. Tea board of India introduces stringent regulation through Plant Protection Code (PPC) based on the approved chemicals of Central Insecticidal Board (CIB) to use in tea with the fixed maximum residue level (MRL) in made tea against each chemical. The tea growers should abide by the guide lines of TRA/PPC for pest management practices to thrive in the world consumer market of tea.

### **Salient points on IPM & PPC:**

- Follow Good Agricultural Practices (GAP) to maintain good health of your tea.
- Apply all possible and safer methods of pest management like cultural, mechanical, physical, botanicals, biological etc as recommended under IPM for each pest to minimize load on inorganic toxic pesticides.
- Confine with application of TRA/CIB/PPC approved pesticides in appropriate dilution and maintain adequate time gap of minimum 7 days between spraying and plucking. 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. Keep strict vigil on plantation for early detection of pest/disease occurrence and apply pesticide in infested spot only.
- Always wear protective gear at the time of pesticide application. Store the pesticide in safe ventilated places away from child, livestock, fire, water resources etc.
- Dispose the empty container by burying at least 50cm depth in barren soil which is no use for cultivation purpose.
- Use naturally available and TRA approved effective crude water extract of native plants as alternate of chemical pesticides for controlling pest & disease.

### **Helopeltis management:**

Helopeltis, one of the major sucking pests in tea cultivation could build up rapidly in this quarter of the season. Keep strict vigil against this pest and if any infestation noticed take necessary measures as elaborated below.

- Pluck the infested shoots before taking up chemical control measure. Adopt black plucking during the period of Helopeltis infestation.
- Keep the ground and the surrounding areas weed free taking special removal measures of the secondary host plants.
- Thin out the heavy shade and hanging shade tree branches on the plucking table. Remove the 'matidals' of the tea bushes. Keep the drainage system free flows by removing all the restricting points during cold weather. Spread the dig out soil evenly inside the planting ground.
- Application of insecticide by adopting barrier spraying technique should be taken up immediate after plucking either in the morning or, in the late afternoon hours.
- At the time of Pruning or Deep skiffing, leave some tea patches having succulence to trap the left over population of Helopeltis. Treat these bushes after one week with Thiamethoxam @ 50 g in 200 liters of water (HV). Prune/skiff these treated bushes after a week of the treatment at the level of other pruned/skiffed bush.
- If the infestation is noticed in back end cropping season apply high MRL chemical like Thiamethoxam 25 WG @ 50gm in 200 l of water or, Thiocloprid @ 67 ml in 200 l of water in spot. Organic garden should apply neem formulation like Azadiractin 5% @ 135 ml in 200 l of water.

- Application of 5-10% water extract from leaves and succulent stem of common weeds like *Clerodendrum viscosum*, *Polygonum hydropiper*, *Cassia alata*, *Xanthium strumarium*, *Vitex negundo* etc are quite effective against this pest. 20 kg of the fresh leaves and succulent stems of these plants should be crushed and soaked in adequate water for around 36 hours. The filtrate of the soaked solution should be increased to 200 liters to get 10 % concentration of the original raw material in ultimate spray fluid. Apply this spray fluid immediate after plucking adopting barrier spraying technique at the morning/evening hours.

### **Red spider management:**

Red spider is another major tea pest which attacks the maintenance foliage causing notable crop loss. The following measures should be taken to control this pest.

- Take appropriate measure to improve the shade status in plain areas and low elevation of hilly plantation.
- Erect hedge plant like *Phlogacanthus thyrsoiflorus* (Titaphool) to protect the road side plant from accumulating dust on the tea leaves.
- Uproot the alternate host weeds *Borreria hispida*, *Scoparia dulcis*, *Melochia corchorifolia*, *Fussiala suffruticosa* etc from the plantations to reduce the chance of building up of spider mites.
- If infestation is noticed in patches apply a round of high MRL acaricide Fenazaquin 10% EC @ 500 ml in 200 l of water or, Hexythiazox @ 80 ml in 200 l water at 15 days interval. Alternate acaricide should be sprayed in each round covering both surfaces of foliage.
- In organic tea plantations spray with Neem formulation like Azadiractin 5% @ 135 ml in 200 l of water.
- Crude water extracts of native plants as suggested for *Helopeltis* can be applied.

### **Termite management:**

- Infested tea bushes and shade tree trunks should be properly cleaned by removing the earth run. Fork the soil around the collar region before taking any chemical measure. Destroy termite mounds and queens.
- If the infested section is due for pruning, treat the bushes with Thiamethoxam 25 WG @ 50gm in 200 l of water (250-300ml/bush) in October- November and after completion of pruning 2<sup>nd</sup> round should be applied in January- February. A round of light irrigation is effective before taking up the chemical treatment for better penetration of the formulation in soil.
- Application of *Matarhizium anisopliae*, a fungal formulation is quite effective in termite management. Apply the 5% suspension of the formulation @ 250-300 ml/bush in collar region on wet soil within January- February.

### **Black rot disease management:**

Black rot the fungal disease infects the mature leaves of the tea bushes. In cold weather this fungal pathogen reaches its dormancy and reappears in flushing period. The following measures should be taken up in black rot infected area in cold weather.

- Apply COC @ 500 gm in 200 l of water targeting the under surface of the infected leaves and cracks and crevices to eradicate the chance of sclerotia formation (winter dormancy of the pathogen) in cold weather.
- Application of COC on pruning litter is advisable to get good control over the pathogen of black rot. Apply lime wash on the pruned bush frame.

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

*(Prepared in the line with the list of approved PPFs for Plant Protection Code (PPC): version 4.0 by Tea Board)*

Name of Chemicals	Trade Name	Dose		MRL (ppm)		
		HV	LV	India	EU	Japan
<b>ACARICIDES</b>						
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	–	–	–
Wettable Sulphur 40 WP	Share	1:200	1:100	–	–	–
Spiromesifen 240 SC (22.9 w/v)	Oberon	1:1000	1:500	–	50	30
Etoxazole 10 SC						
<b>INSECTICIDES</b>						
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
<b>HERBICIDES</b>						
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
Glufosinate Amonium 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	1 lit/ha in 200 lit of water		–	0.05	0.3
<b>FUNGICIDES</b>						
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						
Copper Oxochloride						