



## 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 4**

**October - December, 2014**

The tea growers of the state of Arunachal Pradesh should be well equipped for the ensuing cold weather to prepare their tea fields in best possible scientific manner for the next cropping season. Whatever measures had been taken up during the cold weather, the results would be reflected in the coming plucking season. Adequate measures on un-prune and young tea management, proper pruning policies, adequate measure on integrated pest management packages and practices based on current plant protection code, drainage system development and maintenance, ground cleaning and leveling etc. should be carried out in best suitable manner to harvest maximum crop in the coming season as well as to avert the chance of finding any unwanted residue of chemical pesticide beyond Maximum Residue Limit (MRL) fixed in made tea against respective pesticide. Moreover, autumn crop always bear high cash inflow for the growers. Hence, along with the aforesaid measures in cold weather, plucking of the backend crop should receive utmost care. The Arunachal Advisory Centre, Tea Research Association, Itanagar(AP) has been issuing this “Quarterly Advisory Bulletin, No-4” 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 also highlight some salient features in plant protection segment of this bulletin based on Integrated Pest Management practices which are the most important points to be noted and implement in the tea fields to thrive at this critical juncture of the tea industry. We hope the tea growers of the state shall go through this issue of the bulletin and implement the advices in their tea fields. 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), phone – 08471948330.

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

- Pluck close to janam in 7-day round removing all the ready two and a bud and soft single or, double banjhi shoots maintaining the plucking table flat & even. Small growing shoots should be retained on the table to build up constant sink for new growth.
- In inorganic tea plantations, if all sort of pest population is under control, apply two rounds of the formulation Urea 4kg + Zinc sulfate 2kg + water 200 liters (High Volume, HV) in fortnightly intervals after plucking targeting the under surface of top 10-15 cm foliage within the month of October.
- Light pruned (LP) and deep skiffed (DS) sections proposed to be kept unprune in coming season should be plucked carefully leaving no exposed stubs on the plucking table. Exposed stubs should be broken back to make the table flat and even. Existing pockets should be allowed to fill up by plucking uniformly at highest level of the table. If the maintenance foliage status of these sections is become weak or thin due to pest attack add up a fresh layer of foliage within 3-4 rounds of plucking within mid October- end November.
- In conventional plantations, proposed unprune sections should be treated with the formulation MOP 4kg + 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. Organic plantation may apply Sulfur of potash (SOP) @ 4 kg in 200 (HV) liters of water.
- Necessary steps should be taken to mulch the unprune sections of both organic and inorganic plantations with any green matter within November to avoid building up of Moisture stress in non-flushing period which eventually affects the first flush crop.

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

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

Pruning, the periodical cut back operation of mature tea bushes is a requirement to keep the vegetative phase of growth in active form for harvesting maximum crop with good crop distribution throughout the pruning cycle. In youngish mature tea within 20 years 3-year pruning cycle like LP-UP-DS/MS or, LP-UP-UP and in older teas 4-year cycle of LP-UP-DS- UP/MS will be ideal. Judicious mixture of pruning and skiffing keeping around 45-50 % as unprune, 23-25 % as DS and 23-25 % as LP ensures not only steady production of tea leaves but also reduces the chances of pest/disease occurrence and ill effects of adverse climatic condition. In mature tea all the pruning and skiffing operations must be completed within December and in young tea (within 5-6 year) within January to insure the next cropping season. Some important tips on LP, DS, MS and LOS operations are elaborated below for the benefit of the tea growers.

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

- In this pruning operation provide adequate allowance of 5cm (2") clean new wood above the last light pruned mark and as much as possible maintain equal frame height.
- In sloppy areas LP should be done as per the slope of the land.
- Leave a breather at the centre at the time of pruning & remove the breather as and when bud break emerges.
- After pruning remove all the foliage & unproductive branches from the bush by imparting knife cleaning operation (KCO) before bud breaking. During KCO judiciously remove 1-2 knot from the mid portion of the frame.
- 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 sprayer. Clean the bushes after 7days of applying lime wash with a hessian cloth.
- Keep strict vigil at the time of bud breaking to restrict any incidence of sucking pest.

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

- Impart 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):**

- Finish this operation within December by taking appropriate measure to remove all the plucking points with the present year's 'crow's feet'.
- If it is done after DS done earlier, the operation should be done at 4-5 cm above last DS mark.
- No further cleaning operation is required 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 by removing 50-60% plucking points of the current year.
- Impart this skiffing operation at early January, when the teas attain total dormancy and the soil has sufficient moisture to prevent dieback of left over plucking points.
- It should be avoided under dry conditions.

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

- Mulch all the young tea within +2 years of age with any green matter leaving 10-15 cm gap around the collar region to save them from dry conditions.
- Foliar application of MOP @ 2% (for organic plantation 2% SOP) in fortnightly interval starting from the month of November - February is necessary to avert the effect of moisture stress.

- Keep strict vigil to arrest the chance of building up of any pest population in young tea areas by taking TRA approved appropriate protective measure.
- Improve the foliage status and fill up the existing pockets on the plucking table of proposed unprune young tea sections by adopting liberal plucking in the month of November.
- Maintain the ground flat and even and remove the collar depressions by a round of cheeling operation within November-December. If necessary upgrade the drainage system.
- Young teas where FFP-I or, FFP-II has to be imparted, stop plucking from the month of November for building up of adequate starch in root zone.
- Prune the +2 year 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 from ground level within January.

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

Plant protection is an important issue in modern agricultural practices of the world and tea culture is not an exception. Due to the change in environmental factors the incidence of pest and diseases in plantation crop are increasing day by day. Moreover, indiscriminate use of chemical pesticides to control pest and disease in plantation crop like tea not only creates serious threat to the balance of natural flora and fauna but also causes a serious health concern for the consumer of this beverage. Tea Research Association (TRA) introduces the Integrated Pest Management (IPM) practices based on the regulation of tea board of India 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. Adoption of proper scientific cultural practices, use of botanicals and other effective tools, least application of chemical pesticides at right time in approved dilution, adequate time gap between spraying of chemicals and harvesting, early detection of pest/disease emergence are the components of integrated pest management (IPM) practices. The tea growers should abide by the guide lines of TRA 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.
- Procure and use only TRA/CIB approved pesticides and apply in appropriate dilution and maintain appropriate interval (minimum 7 days) between spraying and plucking to achieve 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. Keep strict vigil on plantation for early detection of pest/disease occurrence and apply pesticide in infested spot only.
- 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.
- 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 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.

- 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 in cold weather the drainage should be upgraded properly to drain off the rain water in quick time to eradicate the moist condition of the tea field.
- Application of insecticide should be taken up immediately 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.
- At the time of Pruning or Deep skiffing, leave some trap bushes in few patches to trap the left over population of *Helopeltis* and treat these bushes after one week with Thiamethoxam @ 50 g in 200 liters of water (HV) and prune/skiff after a week of the treatment.
- If the infestation is noticed in patches apply high MRL chemical like Thiamethoxam 25 WG @ 50gm in 200 l of water or, Thiacloprid @ 67 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.
- 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 immediately 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 thyrsiflorus* (Titaphool) to protect the road side plant from accumulating dust on the leaves which invites infestation of Red spider.
- 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.

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

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 June-July. However in cold weather the 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 Agro-chemicals for use in Tea by the member gardens of TRA (as on 1<sup>st</sup> July, 2014).**

Name of Chemicals	Trade Name	Dose		MRL (ppm)		
ACARICIDES		HV	LV	India	EU	Japan
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	0.3
Fenazaquin 10 EC	–	1:400	1:200	3	10	[UL 0.01]
Fenpropathrin 30 EC	Meothrin				2	25
Fenpyroximate 5 EC/SC	Sedna	1:2000	1:1000	–	0.1	10
	Pyromite	Do		–		
Hexythiazox 5.45 EC	–	1:2500	1:1250	–	4	–
Propargite 57 EC	–	1:400	1:200	10	5	5
Sulphur 80 WG	–	1:200	1:100	–	–	–
Wettable Sulphur 40 WP	Share			–	–	–
Spiromesifen 240 SC (22.9 w/v)	Oberon	1:1000		–	50	30
INSECTICIDES						
Azadirachtin 5% EC	–	1:1500		–	0.01	–
Bifenthrin 8% SC	–	1:1600	1:800	–	5	25
Clothianidin 50 WDG	Dantasu 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
Profenophos 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	–	–	–	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	Do				
Glyphosate 71% SG	–	–		–	2	1
2,4-D Sodium Salt 80% SL						[UL 0.01]
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	[UL 0.01]
Paraquat Dichloride 24% SL/WSC	Herbucstone	1 lit/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

***N. B. Prepared in the line of Plant Protection Code (PPC) issued by Tea Board of India in March, 2014 and the decision of the technical committee meeting of PPC held on 13.06.2014***

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



### **Photographs of few indigenous weed plants having pesticide properties:**

Scientific name: *Clerodendrum viscosum*, Common name: Hill glory bower,  
Hindi name: Titabhamt, Assamese name: Dhapat tita.  
This is a perennial shrub grows everywhere in India.



Scientific name: *Polygonum hydropiper*, Common name: Water-pepper,  
Assamese name-Pothorua Bihlongoni. This is an annual weed grows in swamp areas.



Scientific name: *Cassia alata*, Common name: Candle bush, Hindi name: Dadmurdan  
This is a small shrub found in all places of north east India.



Scientific name: *Xanthium strumarium*, Common name: Cocklebur,  
Hindi name: Chota dhatura, Assamese name: Agora.  
This is a small herb grow nearby wet lands.



Scientific name: *Vitex negundo*, Common name: Chaste tree,  
Hindi name: Nirgundi, Assamese name: Pasutica.  
This is an aromatic shrub grows in all over India.



\*\*\*\*\*