

# The systematics distribution of lac insect

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## **ABSTRACT**

Lac has been in use in india since vedic period. Atharvaveda contains a complete chapter on lac (v-sukla v-book) with detailed description of lac and medical properties of lac.The word lac is derieved from the sanskrit word laksha meaning one hundred thoushand. Lakshagriha constructed by Kausarvas in the epic Mahabharat was made up lac to kill the Pandavas by conspiracy. Ever since lac being used for many other purpose but its application has been changing with times. Lac beside resin yield other usef products such as lac dye amd lac wax. Lac imsect are distributed in all zoogeographical region expert paleartic. They,however are concentrated in tropical and sub trapical region between 40° latitude above the equatot on both hemishpheres (varshney,1976). At present lac insect of the world are represented by nine genera and 87 species (Sharma and Ramani 1999) of which two genera and 19 species are reported from India.

Lac insects belong to the family tachardiidae ( kerriidae) which constitutes a specialised and isolated group in the super family coccoidea of the order homoptera. The present paper include the in depth of systematics of lac insects.

**Keywords:- Lac insects, lacciferlacca, resin, lac dye kerria.**

## **INTRODUCTION**

Lac is a versatilc material and is of considerable commercial importance,especially to our country india alone accounts for almost 70% of the total world production of lac,which is estimated to be 20,000 tons per years in which the state of jharkhand alone constibutes about 58%. In the absence of a fair level of enternal consumption lac trade has no cushion to absorb the sheck of fluctution of demand and supply.

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## **The Systematics and Geographical Distribution of Lac insect**

Lac insects belong to the family Tachardiidae (Kerriidae) which constitutes a specialized and isolated group in the super family Coccoidea of the order Homoptera. Tachard (1710) published the first report on lac growth on plants in India, assuming it to be a vegetative matter assembled by ants. Kerr (1782) made first detailed study of lac insect from India and named it as Coccus lacca, which is now known as Kerrialacca (Ker). Fabricius (1787) described the Indian lac insect as C. ficus, which was later synonymized with K. lacca by Blanchard (1883). A separate identity to lac insects was given by Oken (1815) who placed them under genus Laccifer present knowledge on the taxonomy of lac insects is mainly based on a systematic Monograph by Chamberlin (1923) and its supplement (Chamberrlin, 1925). It included seven species under two genera. Misra (1930) proposed of six new species from North India. Then Kapur (1958) prepared a catalogue of lac insects and Varshney (1977) described all the oriental species in detail. The latter (Varshney, 1990) also published a brief catalogue of lac insects, reporting eight genera and 77 species as well as a world list of lac insects (Varshney, 1993).At present lac insects of the world are represented by nine genera and 87 species (Sharma and Ramani, 1999) of which two genera and 19 species are reported from India.

**Distribution of Lac insect**

Lac insects are distributed in all zoogeographical regions except Palearctic. They, however, are concentrated in tropical and sub tropical regions between 40° latitude above and below the equator on both Hemispheres (Varshney, 1976). Genera-inse distribution of all the recorded lac insect species is shown in Table-1

**Table-1. Distribution of lac insect in different zoogeographical regions.**

Sub family Genus	Total No. Of species recorded.			Number of species recorded		
	Australian	Ethiopian	Oriental	Nearctic	Neotropical	
<b>Tachardiidae</b>						
Austrotachardia	5	5	..	..	..	
Austrotachardiella	7	..	..	..	7	
Kerria	21	1	20	..	..	
Metatachardia	6	..	6	..	..	
Tachardiella	15	..	..	7	8	
<b>Sub total</b>	<b>54</b>	<b>6</b>	<b>26</b>	<b>7</b>	<b>15</b>	
<b>Tachardininae</b>						
Afrotachardina	2	..	2	..	..	
Albotachardina	2	..	..	..	..	
Paratachardina	9	2	..	7	..	
Tachardina	20	..	19	1	..	..
Sub total	33	2	21	10	..	..
<b>Total</b>	<b>87</b>	<b>8</b>	<b>21</b>	<b>36</b>	<b>7</b>	<b>15</b>

**Classification of the family: Chamberlin (1923) treated the group as subfamily Tachardiinae**

and classified it into two tribes Tachardiini and Tachardinini. In a supplement (1925) he raised the subfamily to family Lacciferidae, his earlier tribes to subfamilies Lacciferinae and Tachardininae. Balachowsky (1950). However, classified lac insects as a subfamily Luciferina under the family Canidae. Varshney and Ganguly (1968) included lac insects under family Tachardiidae and the classification adopted is given in Table - 2.

**2. Classification of lac insects upto generic level**

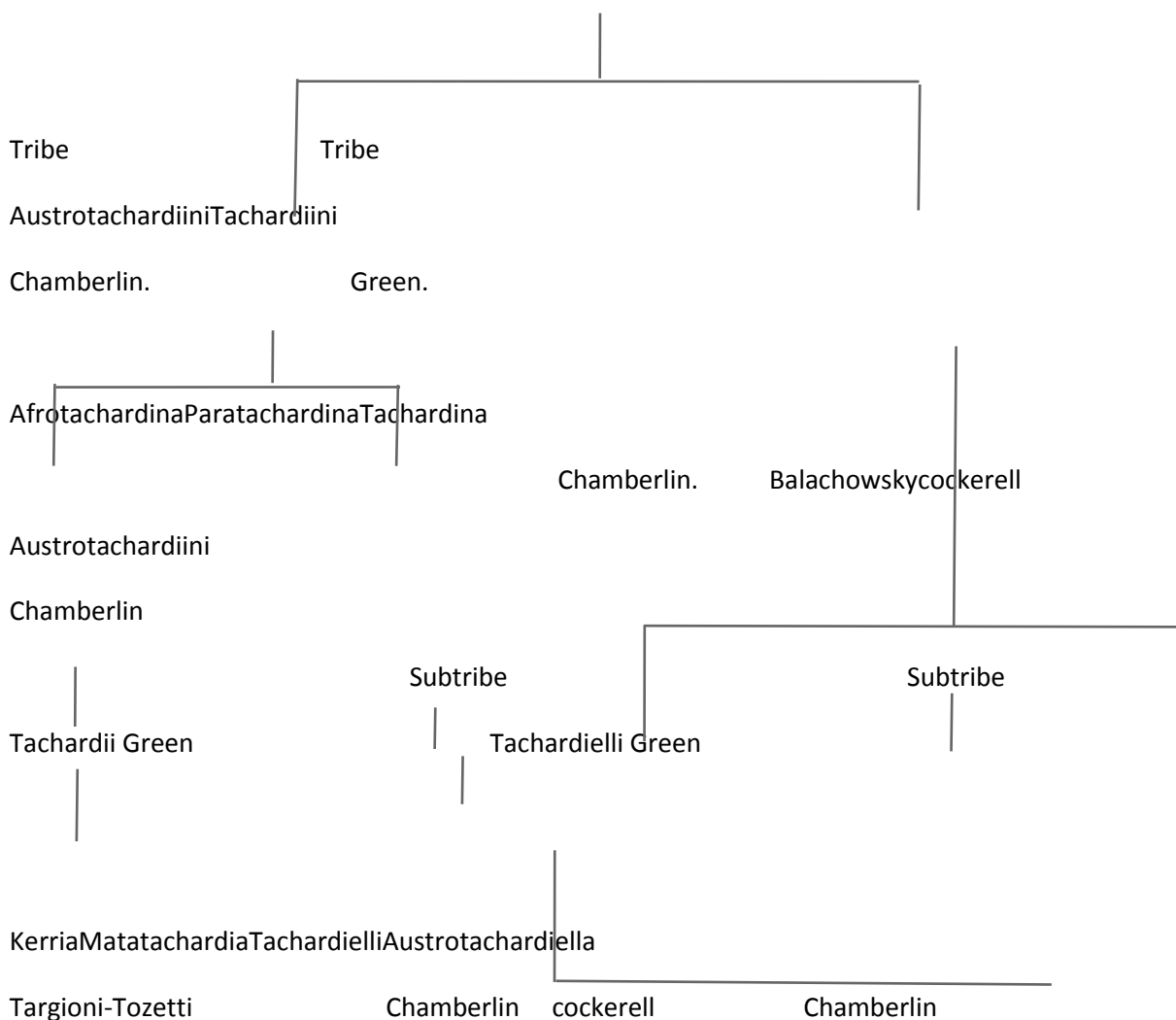
Family tachardiidae Green

Subfamily Tachardininae Green

subfamily Tachardininae Chamberline

Lac is resinous & alcohol soluble

lac is hard, horny & insoluble in alcohol



**Key of Subfamilies**



Females with pores and dimples, not pseudospines, on the branchial plate; ceriferous pores by the side of anterior spiracles, without median spine; marginal duct clusters not more than six pairs

...Tachycardia

Females with pores, on which arise pseudo spines, on the branchial plate/branchial pores, by the side of anterior spiracles, possess a median spine, more than six pairs of marginal duct clusters

....Tachardininae

### Key to Genera [Key to Genera (Zhang, 1992)]

1. With distinct perivaginal pore clusters in the adult female.....2

without perivaginal pore clusters.....4

2. Usually with four perivaginal pore clusters.....8

with more than four perivaginal pore clusters, usually with 18-

50, anal fringes in the form of sharply acute lobes.....3

3. Branchia very heavily sclerotized, with a distinct terminal

behind crater-rim; anterior spiracle distinctly anterior to the posterior spiracle, antennae of long type, usually with 4-5 segments .....Metatachardia Chamberlain, 1925

Branchia never with such a constriction; spiracles reversed so the anterior spiracle is nearly always located at least a little posterior to the posterior spiracle (in some cases they may be almost in a line); antennae of short type, without pronounced indication of segmentation

### Kerrai Targioni-Tozzetti, 1884

1. Branchial plates with a very deep invaginated crater or with a distinct tubercle ..... 5

Branchial plates usually flat, occasionally with a shallow crater ....6

2 Branchial plates always with a very deep invaginated crater, the crater

rim fringe like Austrotachardia Chamberlin, 1923

Branchial plates always with a very distinct tubercle, the tubercle ray like Albotachardina Zhang, 1992

3. Anal fringe of the ligulate type Tachardinacockerell, 1901 Anal

fringe not ligulate

4. Marginal duct clusters with two closely associated small clusters of

ducts; anal fringe not of usual ligulate type Afrotachardin

Chamberlin, 1925

Marginal duct clusters without such auxiliary clusters Paratachardina Balachowsky. 1950

5. Anal fringe short, never as long as anal ring setae, marginal duct clusters simplex or duplex never triplex  
Tachardiella cockerell, 1923 Anal fringe long, nearly as long as anal ring setae, marginal duct clusters triplex, never simplex or duplex Austrotachardiella Chamberlin, 1923

### Check-List of Lac insects of the world

The updated systematic list given here provides: Name of species, Author, synonym(s), if any and country (state/region) of their occurrence in that order.

Family Tachardiidae Green (Syns, Lacciferidae Cockerell, Kerriidae Lingdinger)

Subfamily Tachardiinae (Syns. Lacciferidae Chamberlin)

Tribe Austrotachardiini Balachowsky)

#### I. Austrotachardia Chamberlin (Type species: Tachardia angulata Froggatt)

A. acaciae (Maskell). Australis (Central Australia and New south wales)

A. angulata (Froggatt). Australia (New south wales) 2 4, australis (Froggatt). Australis (Queensland)

A. convexa (Fuller). Australia (Western Australia)

4. A. melaleuca (Maskell). Australia (New south wales, victoria and western Australia)

#### Tribe Tachycardia (Syn Laccifer Nina Balachowski)

##### Sub tribe Tachardielli Chamberlin (Syn. Tachardiellina Williams)

#### II. Austrotachardiella Chamberlin (Type species rotundata cockerell)

5. A. bodikini (Newstead). Guyana

6. A. cydonia (Hempel) (Syns. Tachardiarosae Hempel;) Tachardiacaerulea Hempel. Brazil

7. A. gemmifera (Cockerell). Jamaica

8. A. nigra (Townsend & cockrell). (Mexico Vera cruz and jalisco)

9. A. rotundata (Cockerell). Mexico

10. A. rubra (Hempel). Brazil

11. *A. Trilobata* (Mendes.) Brazil

### **III Tachardiellacockerell (Type species: Tachardiacornutacockerell)**

12. *T. Argentina* (Dominguez). Argentina

13. *T. artocarpi* (Hempel). Brazil

14. *T. Condaliae* (Leonardi) (Syn. *Tachycardia cordeliaLeonardi*). Argentina

15. *T-cornuta* (Cockrell). USA (New Mexico and Texas ) and Mexico

16. *T-ferrisi* Chamberlin. Mexico

17. *T. fulgens* (Cockerell). USA (Arizona) and Mexico

18. *T. Glomerella* (Cockerell) (Syn. *T. Glomorella* var.)

*Baccharidischamberlin*. USA (California, New Mexico and Texas)

19. *T. ingae* (Hempel). Brazil

20. *T. laeae* (Comstock) (Syn. *T. laeae* var. *californicachamberlini*). USA (Arizona, California and Nevada) and Mexico

21. *T. lycii* (Leonardi). Argentina

22. *T. mexicana* (Comstock) (Syns. *Tachardiafulvoradiatacockerell*; *Tachardiellatexanachamberlin*). USA (Texas) and Mexico

23. *T. nigra* Fonseca. Brazil (Sao Paulo)

24. *T. ourinhensis* Hempel. Brazil

25. *T. parva* (Hempel) Brazil

26. *T. Pustulata* (Cockerell). USA (Arizona and California)

### **IV Sub-tribe Tachardii (Syn. Laccifer Chamberlin)**

*Kerria*Targioni-Tozzetti (Syns. *Laccifer*Oken; *Carteria*Signoret;

*Tachardia* Blanchard; *Lakshadia*Mahjdi Hassan) (Type species

*lacca* Kerr)

(i) Subgenus *Kerria*

27. *K. albizia* (Green), India (Bihar)

28. *K. branches* Varshney, India (Bihar)

29. *K. Chamberlin* Varshney, India (Rajasthan)

30. a *K. chinensis* (Madi Hassan)
- (Syn. *Laccifer longispina* Misra; *Laccifer siamensis* Takahashi). Bhutan, China (South China), Cambodia, India (N.E. India), Myanmar (Burma), Nepal Thailand and Vietnam
31. b *K. chiensis* (Misra). India (Assam)
32. *K. communis* (Mehdi Hassan). India (Andhra Pradesh, Goa, Karnataka, Kerala, Maharashtra and Tamil Nadu)
33. *K. ebracheata* (Chamberlin). India (Bihar, Karnataka) and Pakistan
34. a *K. ficifici* (Green), China, India (Bihar, Delhi, Jammu & Kashmir, Rajasthan, Uttar Pradesh, and West Bengal), Pakistan and Thailand
34. b *K. ficijhansiensis* (Misra), (India Uttar Pradesh)
35. *K. indica* (Kanpur) (Syn. *Laccifer indica* Misra). India (Bihar)
36. *K. lacalacca* (Kerr) (Syns. *Coccus ficus* Fabricius, *Lakshadivi indica* Mehdi Hasan). Bangladesh, China, Georgia, India Malaysia, Myanmar. Nepal, Pakistan, Sri Lanka, Taiwan and Thailand
- 36b. *K. lacca ambigua* (Misra). India (Uttar Pradesh)
- 36c. *K. lacca mysorensis* (Karnataka)
- 36d. *K. Jacket takashashii* Varshney, Thailand
37. *K. mengdingensis* Zhang, China (Yunnan).
38. *K. nepalensis* Varshney, India (Bihar) and Nepal
40. *K. prasanna* (Misra), India (Bihar)
41. *K. ruralis* (Wang, Yao, Teui & Liang). China (Yunnan).
42. *K. Sharda* Mishra Sushil. India (Orissa & West Bengal)
43. *K. indica* (Mehdi Hassan). Pakistan (Sind)
44. *K. yunnanensis* Ou & Hong, China (Yunnan)
- iii. Subgenus *Chamberliniella* Varshney, (Syn. *Chamberlinia* Varshney) (Type species: *Tachardiagreco* Chamberlin)
45. *K. greeni* (Chamberlain). Philippines, Taiwan and Thailand
46. *K. javana* (Chamberlin). Indonesia (Java) and Malaysia
47. *K. meridionalis* (Chamberlin). India (Assam) and Myanmar
- V. *Metatachardia* Chamberline (Type species: *Tachycardia conchifera* Green)**
49. *M. conchifera* (Green) Sri Lanka
50. *M. fukienensis* Zhang, China (Fukien)
51. *M. hunanensis* Zhang, China (Hunan)

52. *M. myrica* Tang. China (Chekiang)  
 53. *M. sinensis* Zhang, China (Changyan-Yunnan)  
 54. *M. yunnanensis* Zhang. China (Changyan-Yunnan)

Subfamily Tachardiniinae Chamberlin (Syns. Tachardini

Tachardiniina of Balachowsky; Type genus: *Tachardina* Cockerell)

**VI. Afrotachardina Chamberlin (Type species: *Tachycardia setosa* Newstead)**

55. *A. brachysetosa* Chamberlin. Uganda  
 56. *A. longisetosa* (Newstead). Uganda

**VII. Albotachardina Zhang (Type species: *Albotachardinayunnanensis* Zhang)**

57. *A. sinensis* Zhang. China (Yunnan)  
 58. *A. yunnanensis* Zhang. China (Yunnan)

**VIII. Paratachardina Balachowsky (Type species: *Carteriadecorella***

**Maskell)**

59. *P. Capsella* Wang, China (Yunnan)  
 60. *P. decorella* (Maskell). Australia (New South Wales and species: *Albotachardina Victoria*)  
 61a. *P. lobata* (Green) (Syn. *Tachycardia minuta* Green (nec Morrison), India (Andhra Pradesh), Karnataka and Tamil Nadu and Sri Lanka.  
 61b. *P. lobata* var. *schmidti* (Mehdi Hasan). India (Karnataka)  
 61c. *P. lobata* var. *walczuch* (Mehdi Hasan). India (Karnataka)  
 62. *P. minute* (Morrison). Philippines  
 63. *P. mithila* Varshney, India (Meghalaya)  
 64. *P. morobensis* sp. Nov. New Papua Guinea  
 65. *P. silvestrii* (Mehdi Hasan). India (Karnataka)  
 66. *P. ternate* (Chamberlin), India (Kerala)  
 67. *P. theale* (Green in Green & Mann). India (Sikkim and west Bengal ) and Taiwan  
 IX. *Tachardina* Cockerell. (Type species: *Tachardina albidacockerell*)  
 68. *T. actinella* (Cockerell & King) (Syn. *Tachardina digitata*)



Munting). Mozambique, South Africa and Zimbabwe.

69a. *T. affluens* (Brain). Saudi Arabia and South Africa

69b. *T. affluens* Var. *coagulate* Hall. South Africa (Transvaal)

69c. *T. affluens* var. *natalensis* Hall. South Africa (Natal)

70. *T. Africana* Hall. Mozambique, South Africa and Zimbabwe

71. *T. albida* (Cockerell). Indonesia (Java), Singapore and

Thailand. Varshney (1990 and 1993) has cast doubt over

its taxonomical placing

73. *T. bernardi* Balachowsky, Central Sahara' (Algeria)

74. *T. brachystegia* Hall. Zimbabwe

75. *T. dicliptera* Hall. Zimbabwe

76. *T. grip* Munting. South Africa

77. *T. karoo* (Basin), South Africa (Cape)

78. *T. leredei* Balachowsky. Central Sahara (Algeria)

79. *T. minor* (Brain), South Africa (Cape)

80. *T. oligopora* Munting, South Africa

81. *T. perplexa* Munting, South Africa

82. *T. proturdens* Munting South Africa

83. *T. psiadia* Mamet. Madagascar

84. *T. recurve* Munting, South Africa (Cape)

85. *T. selerosa* Munting South Africa

86. *Tsimbazaza* Mamet. Mada

### **Conclusion:-**

It seems necessary to state that the identity of some of the Indian lac insects discuss species in doubtful and has been questioned by some of the common species like *K. lacca* or because of alleged inadequate description of certain species (Kapur , 1962).

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