= Aleeta curvicosta =

Aleeta curvicosta ( commonly the floury baker or floury miller , known until 2003 as Abricta curvicosta ) is a species of cicada , one of Australia 's most familiar insects . Native to the continent 's eastern coastline , it was described in 1834 by Ernst Friedrich Germar . As of 2014 the floury baker is the only described species in the genus Aleeta .

The floury baker 's distinctive appearance and loud call make it popular with children . Both the common and genus name are derived from the white , flour @-@ like filaments covering the adult body . Its body and eyes are generally brown with pale patterns including a light @-@ coloured line along the midline of the pronotum . Its forewings have distinctive dark brown patches at the base of two of their apical cells . The female is larger than the male , although species size overall varies geographically , with larger animals associated with regions of higher rainfall . The male has distinctive genitalia and a loud and complex call generated by the frequent buckling of ribbed tymbals and amplified by abdominal air sacs .

The floury baker is solitary and occurs in low densities . Individuals typically emerge from the soil through a three @-@ month period from late November to late February , and can be encountered until May . The floury baker is found on a wide variety of trees , with some preference for species of paperbark ( Melaleuca ) . It is a relatively poor flier , preyed upon by cicada killer wasps and a wide variety of birds , and can succumb to a cicada @-@ specific fungal disease .

= = Taxonomy = =

German naturalist Ernst Friedrich Germar described the floury baker in 1834 as Cicada curvicosta . Germar based the description on two specimens now in the Hope Entomological Collections , Oxford , but did not designate a type specimen and their exact locations were not recorded . In 2003 , one of the original specimens was designated the lectotype and the other the paralectotype .

Prominent Swedish entomologist Carl Stål named the genus Abricta in 1866 , and it was either treated as a subgenus of the genus Tibicen or a genus in its own right . Thus it became known as Tibicen curvicostus , and Abricta curvicosta from 1906 . French entomologist Jean Baptiste Boisduval described two specimens collected from Port Jackson as Cicada tephrogaster ( later Tibicen tephrogaster ) in 1835 ; this has long been considered a junior synonym . However , a review of the genus in 2003 showed Abricta to be a disparate group of species , and the Australian members were moved to other genera . Max Moulds conducted a morphological analysis of the genus and found the cicadas split naturally into clades according to biogeographical region . Of the 15 Australian species , the floury baker was the earliest offshoot . Unpublished data confirmed it was quite genetically distant from the other 14 species , and so it was classified in a new monotypic genus Aleeta , while most of the others were placed in the genus Tryella . The morphological distinction between Aleeta and Tryella is based on two factors : A. curvicosta has a larger forewing size ? rarely less than 3 @.@ 2 cm ( 1 @.@ 3 in ) and usually over 4 cm ( 1 @.@ 6 in ) , whereas Tryella is never above 3 @.@ 2 cm ( 1 @.@ 3 in ) ; the uncal lobes of Aleeta 's distinctive male genitalia are downturned at their distal ends , whereas those of Tryella are upturned . The name Aleeta is derived from the Greek aleton meaning flour or meal .

The floury baker gains its common name from the appearance of having been dusted with flour , and both the vernacular terms baker and miller were in use by 1860 . The name is sometimes corrupted as " flowery baker " . As of 1905 the same name " floury baker " was also in use for another species of Australian cicada ( Altria perulata , now Arunta perulata ) , which has white " sacks " as sounding boxes . That species is now commonly referred to as the " white drummer " .

= = Description = =

With a body length of 2 @.@ 9 cm ( 1 @.@ 1 in ) , forewings between 3 and 5 @.@ 1 cm ( 1 @.@ 4 ? 2 in ) long , a wingspan of 9 ? 10 cm ( 3 @.@ 5 ? 4 in ) and weighing around 1 @.@ 02 g ( 0 @.@ 036 oz ) , the floury baker is a medium @-@ sized cicada . Individuals markedly vary in size

by region depending on local rainfall . Areas with an average annual rainfall of over 1000 mm ( 40 in ) ? mostly coastal ? have much larger individuals , with average forewing lengths about 1 cm ( 0 @.@ 4 in ) longer than those in low @-@ rainfall areas .

The adult is brown with a white dusted appearance ; white downy filaments cover much of the body , legs and some wing veins , but this silver body fur is easily rubbed off , and so is often substantially diminished in older adults and museum specimens . Individuals have a variety of body markings , but all have a pale midline on their pronotum . Their legs are brown , sometimes yellowish , but with no distinct markings . Their dry mass is on average 36 @.@ 2 % of their total bodymass , higher than most Australian cicadas , which suggests strong exoskeletal armour . Their eyes are dark brown . They have yellowish opercula that extend laterally well beyond the body . The female is slightly larger than the male , She has generally similar colour and markings , though can be slightly paler in some areas . Her ninth abdominal segment is long and dark reddish @-@ brown , sometimes partly tending toward black . Her ovipositor is long , with a downward tilt , and the ovipositor sheath is black or dark reddish @-@ brown .

The wings are transparent with black or brown veins and a brown @-@ black patch at the base of apical cells 2 and 3 . These patches are sometimes fused into a continuous zigzag of dark brown to black discolouration . The basal cell is often opaque and amber @-@ coloured . As on many insects , the wing membranes are coated on either side by a repeating pattern of cuticular nanostructures , about 200 nm in height , separated by about 180 nm . These are thought to aid in anti @-@ reflective camouflage , anti @-@ wetting and self @-@ cleaning .

The male call can be heard at any time of day and consists of an unusual hissing @-@ type sound , starting as a series of one @-@ second sibilant bursts about a second apart repeated more rapidly until they become a constant hiss lasting 7 ? 10 s . Described as " rp , rp , rp , rp , rrrrrp " , the sound is produced when single muscular contractions click the tymbal inward , buckling 7 ? 9 of the tymbal ribs , each of which produces a pulse . This occurs alternately on the two tymbals and is rapidly repeated at a frequency of about 143 Hz ( in groups of four except when the cicada is in distress ? when they are ungrouped and at a lower frequency ) , giving a pulse repetition frequency of around 1050 per second , with a relatively broad sound frequency range of 7 @.@ 5 ? 10 @.@ 5 kHz , that has a dominant frequency ( at which the peak energy is observed ) of 9 @.@ 5 ? 9 @.@ 6 kHz .

The abdominal tracheal air sacs surround the sound muscles and extend into the abdomen , acting as resonant chambers to amplify sound . The floury baker rapidly extends or raises its abdomen , thus modulating the influence of the air sacs on the sound to change its volume , pitch or tune during the introduction to the free song . This can be heard when a cicada is undisturbed in its natural environment , while male cicadas use these calls to attract females . The species is one of Australia 's loudest cicadas and has been termed " the best musician of them all " .

The floury baker is distinguished from a similar undescribed species A. sp. nr curvicosta ( the little floury baker ) by the structure of the male genitalia and an audibly distinct call . Members of Aleeta and Tryella are easily distinguished from other Australian cicadas as they lack tymbal covers , while the costal margin of their forewings gets larger toward the point where the wing is attached to the body . In these genera it is clearly wider than the costal vein .

= = Life cycle = =

Eggs are laid in a series of slits usually cut by the mother 's ovipositor in live branches or twigs of their food plants . On average about sixteen eggs , among a total batch of a few hundred , are laid in each slit . The batch all hatch around 70 days later ? usually within a day or two of one another ? but take longer in cold or dry conditions . Oviposition has been observed on a wide range of native and introduced plant species and can weaken the branches of young orchard trees such that they cannot sustain the load of their fruit .

After hatching , the nymphs fall from the branches to seek a crack in the soil where they can burrow , often to a depth of 10 ? 40 cm ( 4 ? 16 in ) , by digging with their large forelegs . Larger species of cicada like A. curvicosta are thought to spend 2 ? 8 years underground , during which time they grow and feed through their rostrum on the sap from tree roots . They moult five times before

emerging from the ground to shed their final shell . Although consistently taking place at night , the emergence of the population is diffusely spread over the season in comparison to the more high @-@ density Australian species . The sex ratio is about 1 @.@ 15 males to every female , consistent throughout the emergence . The metabolic rate over a period of about 6 @.@ 5 hours during emergence of A. curvicosta is about 1 @.@ 8 times the resting metabolic rate of the adult . A South East Queensland study reported nymphs would emerge on most tree species but avoid Norfolk pine ( Araucaria heterophylla ) and broad @-@ leaved paperbark ( Melaleuca quinquenervia ) . The adults are usually found between November and May but are sometimes observed as early as September and until as late as June . They were recorded as appearing every year , mainly in December and January in western Sydney , with a similar 92 @-@ day emergence period from late November until late February recorded in South East Queensland . This makes it one of the last Australian cicadas to emerge each season . The nymph grips onto the tree bark with all of its legs , swallows air and redistributes haemolymph to split the cast down the center of its back . It then extracts its head and clypeus by hunching its body , and when these have emerged , arches back to draw the legs out of their casing . It then slowly unfolds its wings , finally bending forward and gripping onto the front of the shell to free its abdomen . Once free it hangs for hours more as the wings harden .

Once they reach adulthood most adult cicada species live for around another two to four weeks . During this time they feed on flowing sap from tree branches , and mating and egg laying occurs .

= = Distribution and habitat = =

The floury baker is found from the Daintree River in North Queensland to Bendalong in southern New South Wales . It is a highland species in the northern part of its range , restricted to the Atherton Tableland and Eungella National Park to the west of Mackay , but more a lowland species in the remainder of its range . It may be found in varied habitats , from rainforest margins to suburbs , even in the centre of Sydney .

= = Behaviour = =

Individuals are usually solitary , with a South @-@ East Queensland study estimating densities of only 50 per hectare ( compared to some other Australian species nearly two orders of magnitude more dense ) . The adult floury baker normally perches facing downwards and on branches of trees rather than trunks . It is found on a wide variety of plants , most commonly on species in the family Myrtaceae , more specifically various species of Melaleuca and Callistemon plants , as well as brown hazelwood ( Lysicarpus angustifolius ) and pegunny ( Bauhinia hookeri ) . These are expected to also be nymphal food plants . The species was associated with white feather honeymyrtle ( Melaleuca decora ) in a study at three sites in western Sydney . The broad @-@ leaved paperbark has been confirmed as a nymphal food plant .

Floury bakers are not proficient fliers compared with other Australian cicadas . They are slow , with a typical speed of 2 @.@ 1 metres per second ( 6 @.@ 9 ft / s ) , which rises to around 3 @.@ 9 metres per second ( 13 ft / s ) ( 14 km / hr ) when they are pursued or provoked . They are only able to generate low aerodynamic power and their flights are relatively short , lasting around 3 @.@ 4 s , with an average of 3 @.@ 3 changes in direction . Nor are they adept at landing . The distance at which they react to an approaching observer is moderate , both when stationary and when in flight .

= = Predation = =

Bird predation of the adult cicada is common , with wrens and grey fantails , noisy miners , blue @-@ faced honeyeaters , little wattlebirds , grey and pied butcherbirds , magpie @-@ larks , Torresian crows , white @-@ faced herons and even the nocturnal tawny frogmouth , all reported as significant predators . The frogmouths and bearded dragons have been observed feeding on emerging nymphs , however total nymphal mortality is estimated at under 10 % .

The adults of some Australian cicada are subject to a cicada @-@ specific fungus from the genus Massospora , which grows on their genitalia and abdominal cavity , eventually causing the tail end to drop off . Australian cicadas are further preyed on by the cicada killer wasp ( Exeirus lateritius ) , which stings and paralyses cicadas high in the trees . Their victims drop to the ground where the cicada @-@ hunter mounts and carries them , pushing with its hind legs , sometimes over a distance of 100 m ( 330 ft ) . They are then shoved into the hunter 's burrow , where the helpless cicada is placed on a shelf in an often extensive ' catacomb ' , to form food @-@ stock for the wasp grub growing from the eggs deposited within .

= = In popular culture = =

The shells shed by the nymph , as with those of other cicada species , are often collected by children and sometimes attached to their clothing . Schoolchildren have been known to bring live adults into classrooms to startle the class with their " strident shrieking " , typically to the observable displeasure of teachers . Children often climb trees to collect them , and keep them temporarily as pets in shoeboxes . They cannot easily be kept for longer than a day or two , given that they need flowing sap for food . A poem dedicated to the floury baker appeared in the Catholic Press in 1930 , describing its life cycle to children .