

LETTERS TO THE EDITOR

To: The Editor, Mosquito Systematics

Dear Sir:

Distribution patterns in the *Anopheles maculipennis* Group

I have long been puzzled by the marked difference between the distribution pattern of the North American species of the *Anopheles maculipennis* group, compared to that of the Eurasian species of the group. The latter (*atroparvus*, *becklemishevi*, *labranchiae*, *maculipennis*, *martinius*, *melanoon*, *messeae*, *sacharovi*, *sicaulti*) are mostly sympatric, each species overlapping widely with one or more other species of the group (White 1978). The same is true of the southeast Asian species groups of *Anopheles* with which I have worked, e.g., the *aitkenii*, *barbirostris*, *hyrcanus* and *umbrosus* groups, and in subgenus *Cellia* the *annularis*, *leucosphyrus* and *subpictus* groups (Reid 1968), also the *minimus* group (Harrison 1980). In contrast, the four North American '*maculipennis*' (*aztecus*, *earlei*, *freeborni*, *occidentalis* Pratt 1952, Kitzmiller 1977) show no overlap, though their ranges abut in places (Mattingly 1969, p. 159, White 1978).

Recently, I read of similar abutting but non-overlapping distributions (parapatric) in a group of tropical American forest birds, the Manakins, *Pipra* species (Trustees B. M. (N. H.) 1981). Among the fifty or so species of Manakins over two-thirds are parapatric with closely related species, and such distributions are said to be "rather common in American tropical forest birds." These parapatric distributions are explained by supposing fragmentation of the range of an ancestral form during a past arid period which broke up the forest into small isolated refuges. Such arid periods seem to have coincided with glacial periods in the north. Later, when the forest refuges spread and joined up again the isolated populations of the birds had become different enough, especially in male plumage and courtship behavior, to prevent inter-breeding, but had not developed different ecological requirements and so could not penetrate each others ranges. This is thought to have happened in only a few thousand years.

Is something like this the explanation of the parapatric distribution of the North American '*maculipennis*' species? Did glaciation drive an ancestral form into four isolated refuges? Certainly the morphological differences between them are much more marked than between the Eurasian '*maculipennis*', but these show pronounced ecological differences (Bates and Hackett 1939).

If true, this would appear to support the view that the North American '*maculipennis*' came from Eurasia via the Bering strait land bridge and are younger than some of the Eurasian species, instead of the other way around as suggested by Mattingly (1969) and others.

Can readers better informed than I am, correct or comment on this letter?

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