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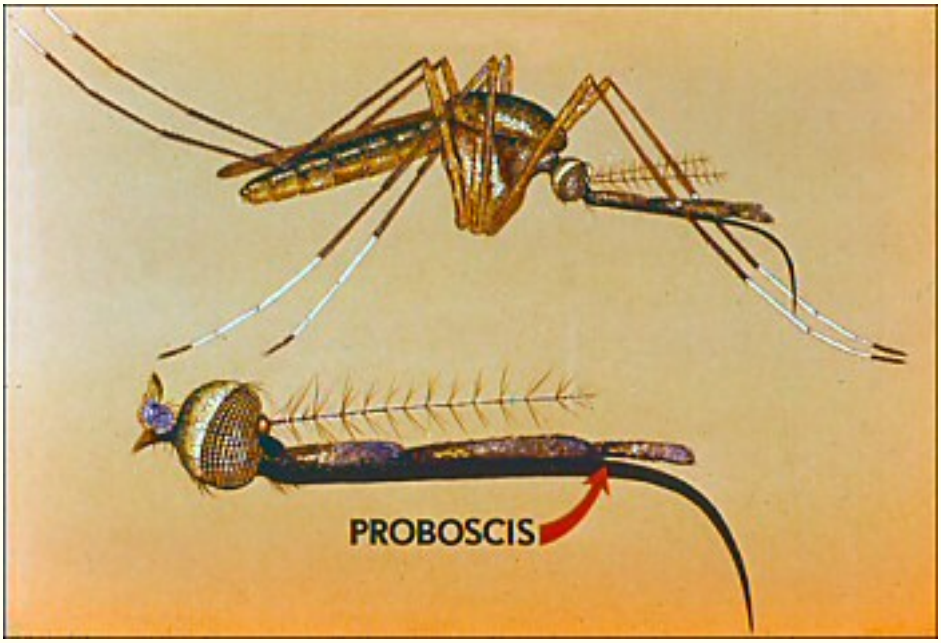
Team Mosquito

Mosquito Identification: Adults



With the increasing importance of mosquito-borne diseases in the United States, identification becomes even more important than in the past. However, identification guides are difficult to come by. These pages offer a set of images and accompanying text produced by the Centers for Disease Control for the generic identification of mosquito adults. The images have been digitized by the Laboratory for Environmental Biology from slides originally produced by the CDC in the 1970s.

Users may view the slides and text online. Eventually, you will be able to access it as a PDF file.

The slide set is designed to be presented in a specific order to allow the building of the identification process: Slide 1. A link at the bottom of each page will advance you to the next slide. If,

however, you wish to return directly to the section testing your knowledge, you may go to slide 67.

Last update: 17 Oct 2004

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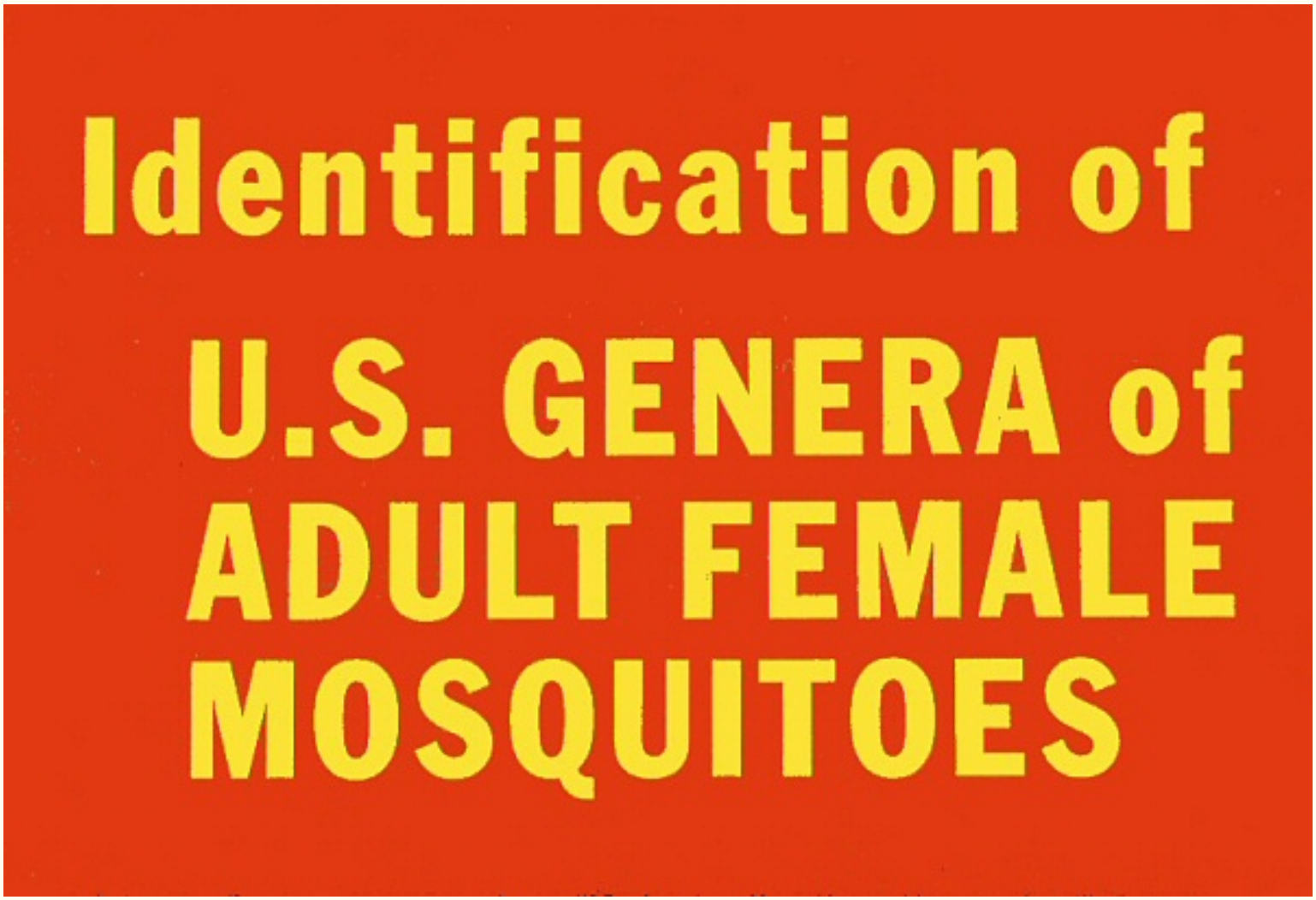
Slide 1



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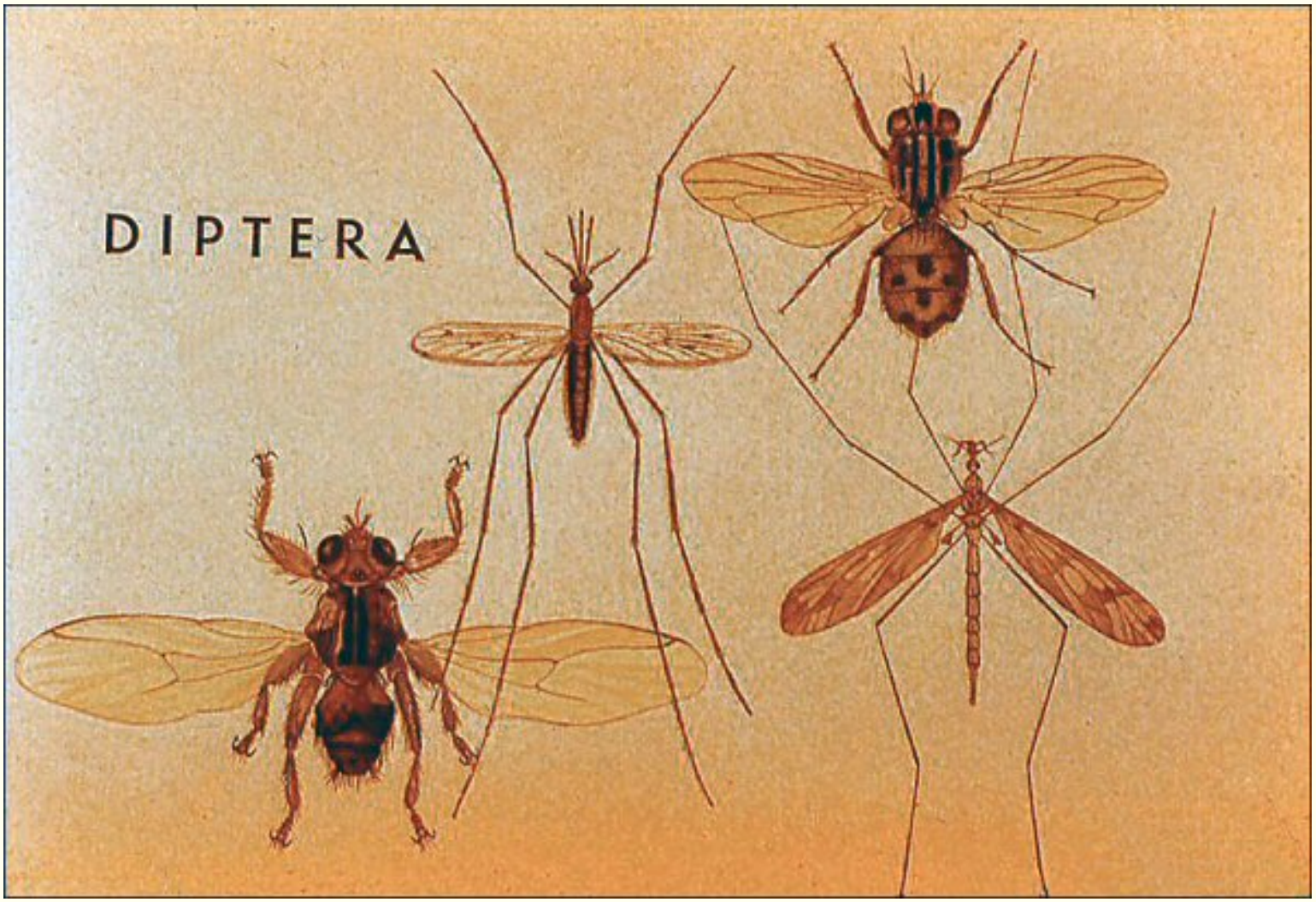
Slide 2



Mosquitoes are insects belonging to the order Diptera - the true flies.

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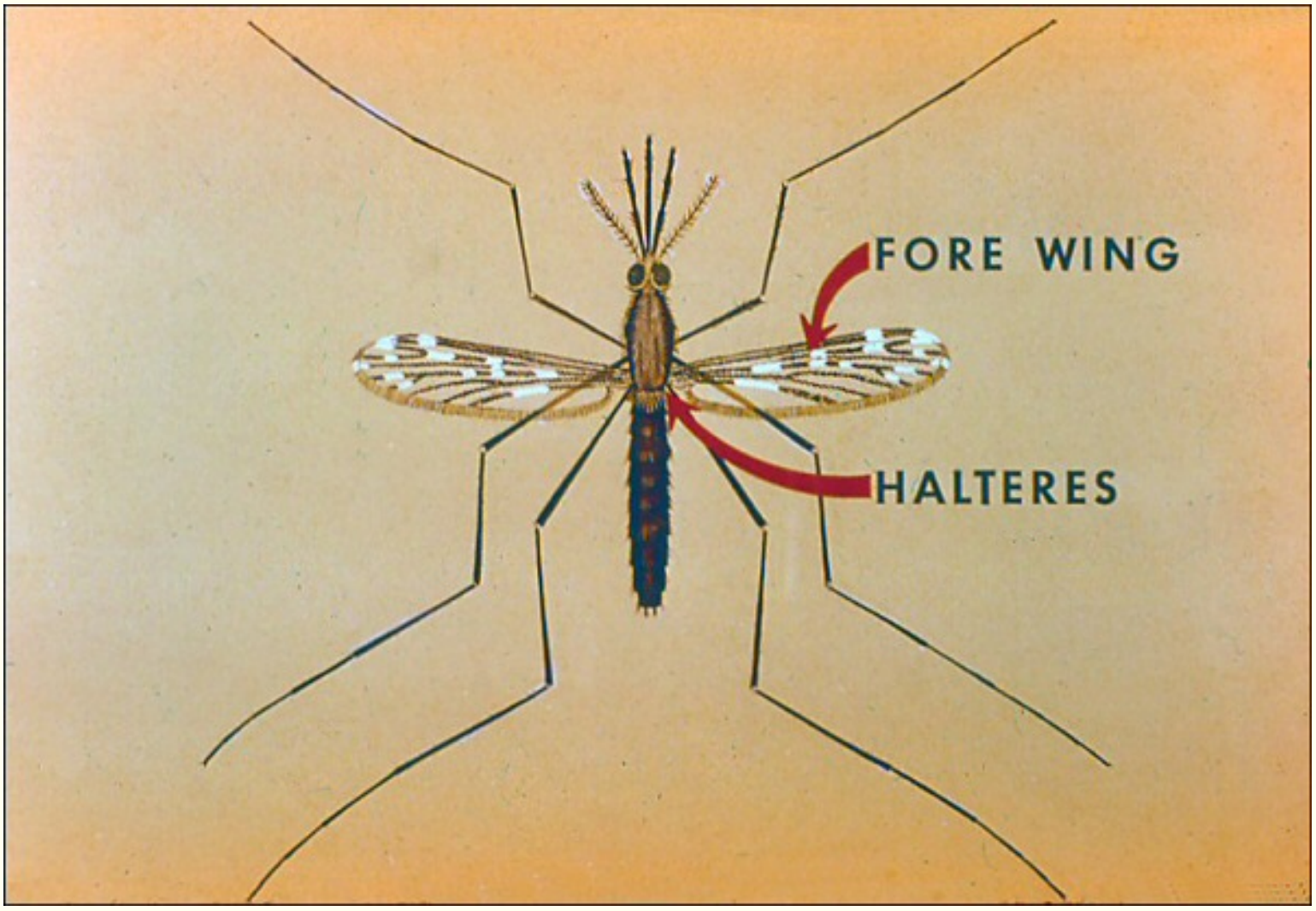
Slide 3



Diptera are characterized by the presence of well developed fore wings. Hind wings are vestigial being represented by short, knobed halteres.

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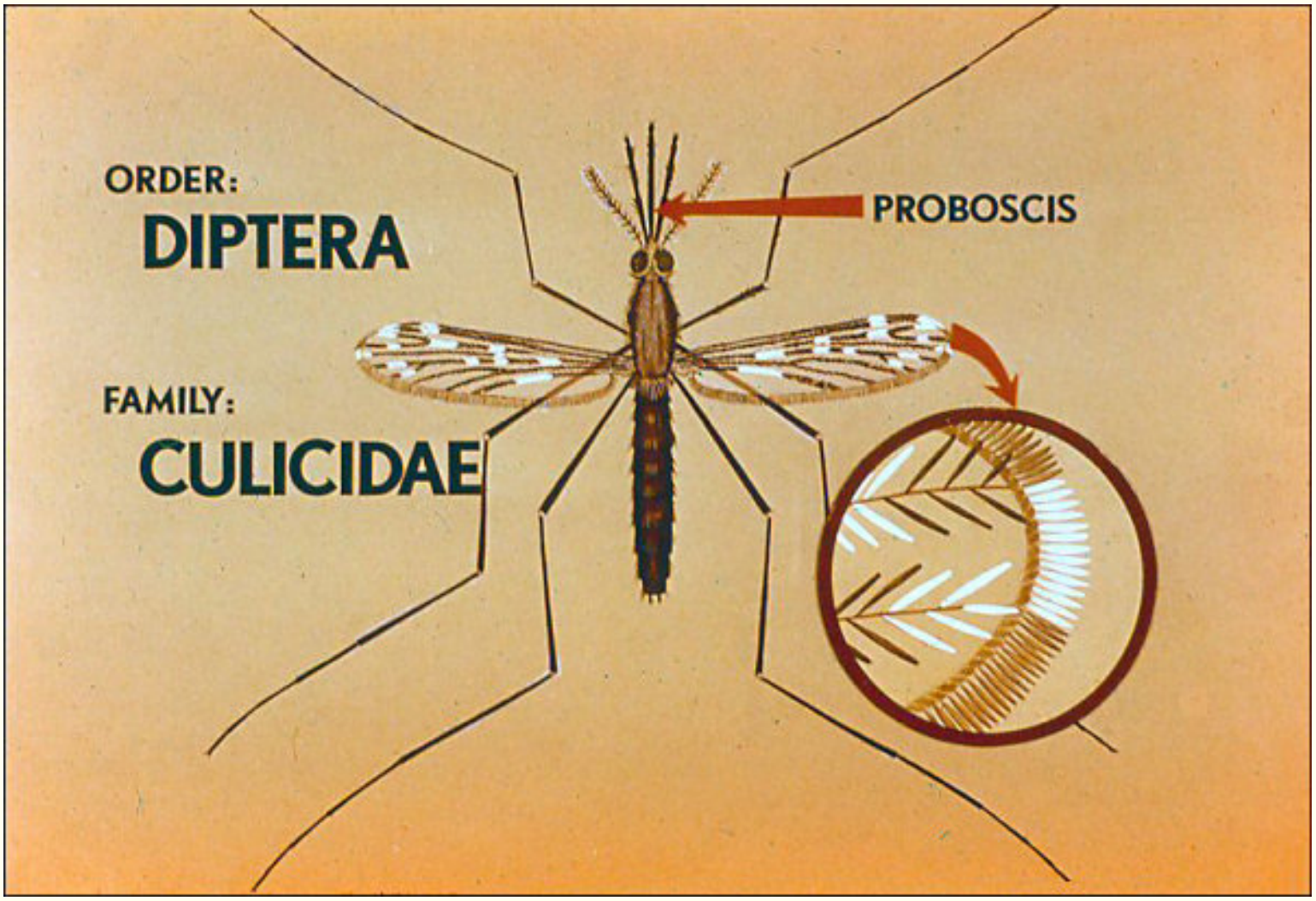
Slide 4



Mosquitoes are included in the family Culicidae. The elongated proboscis extending forward from the head and presence of scales on the veins and borders of the wings distinguish mosquitoes from other true flies

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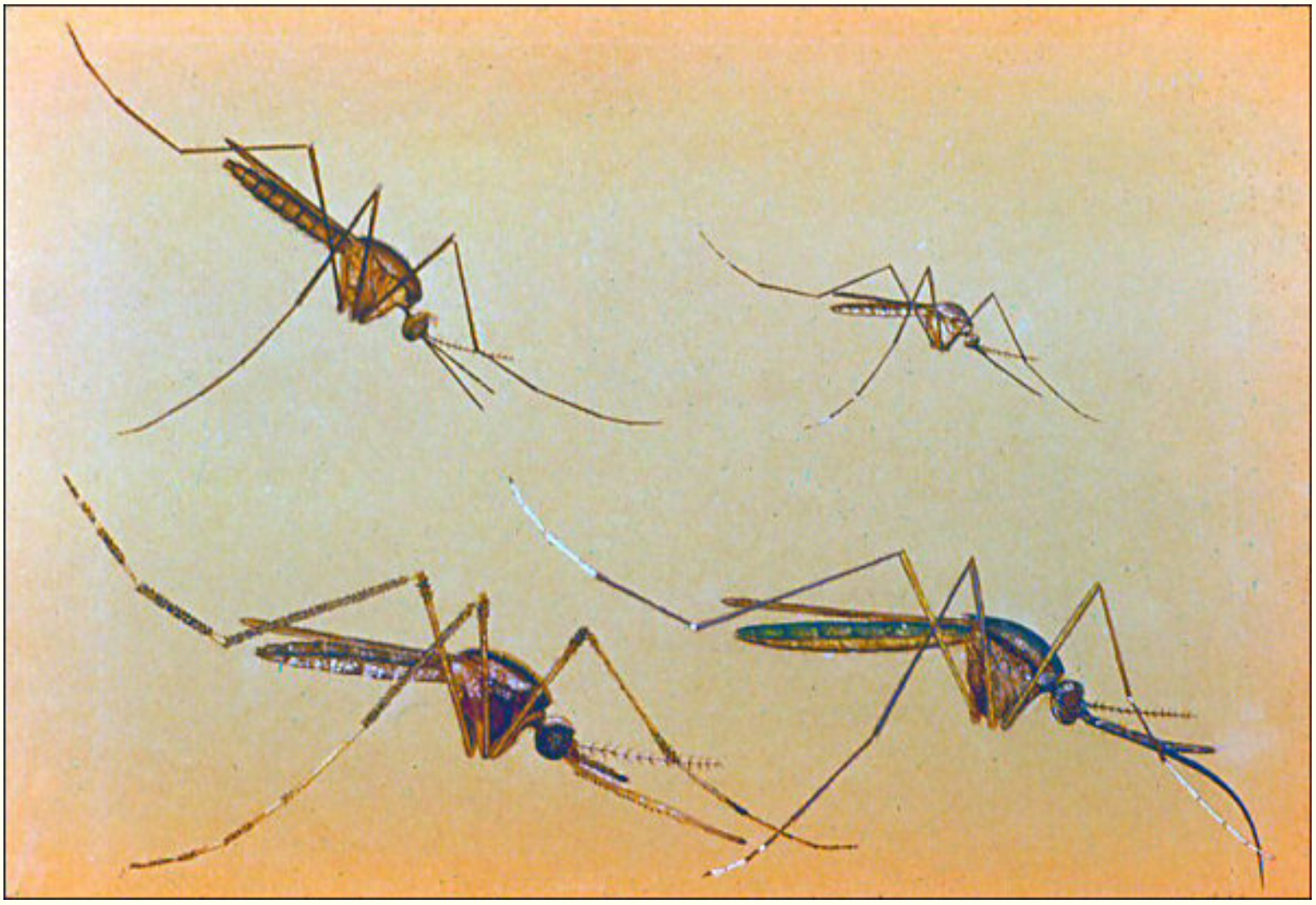

The size of mosquitoes varies widely among different genera. Do not overlook those which seem to be "too large" or "too small" for mosquitoes.

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Slide 6

Genera of mosquitoes may be identified by observation of external characters under low power magnification.

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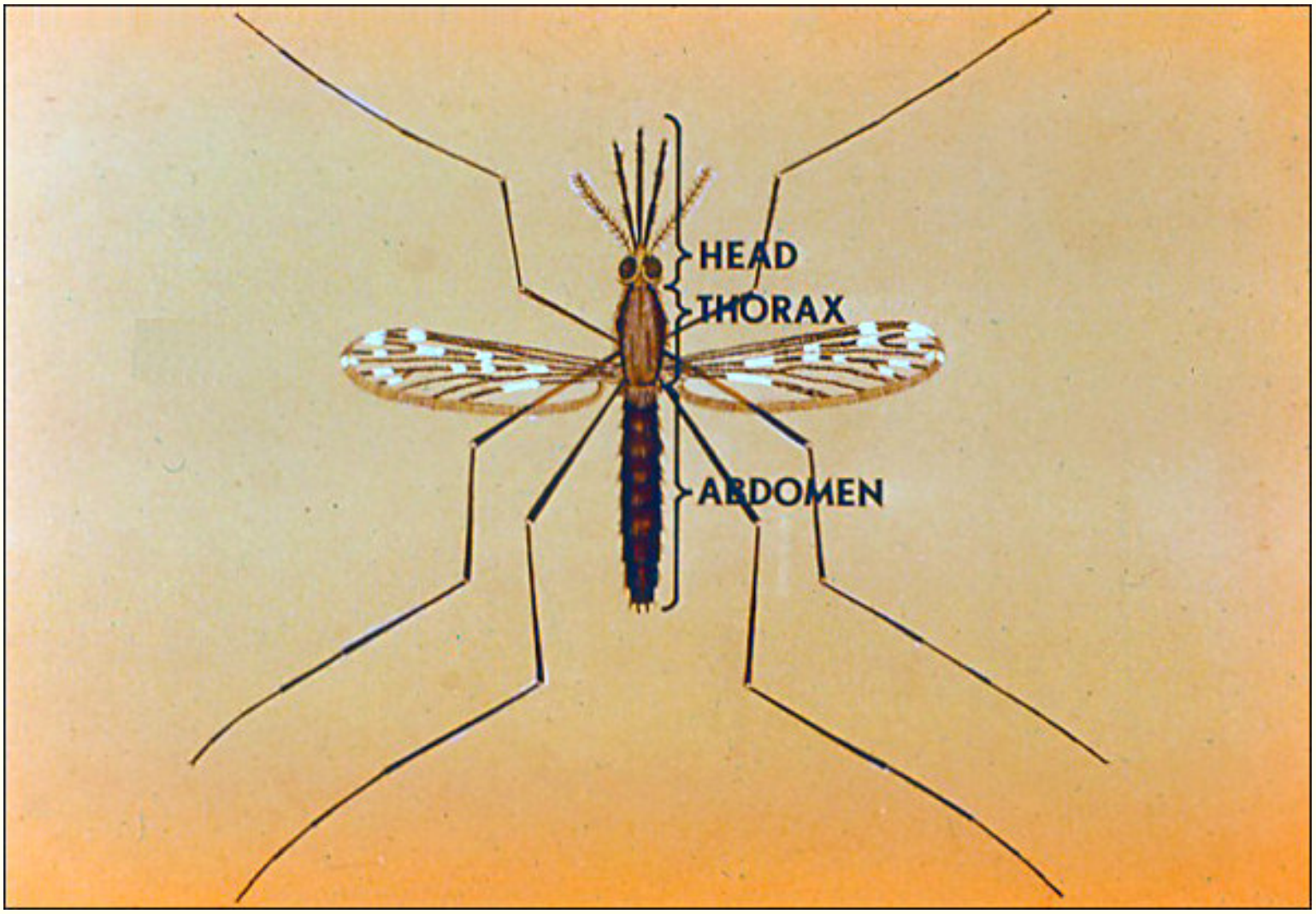
Slide 7



Genera of mosquitoes may be identified by observation of external characters under low power magnification.

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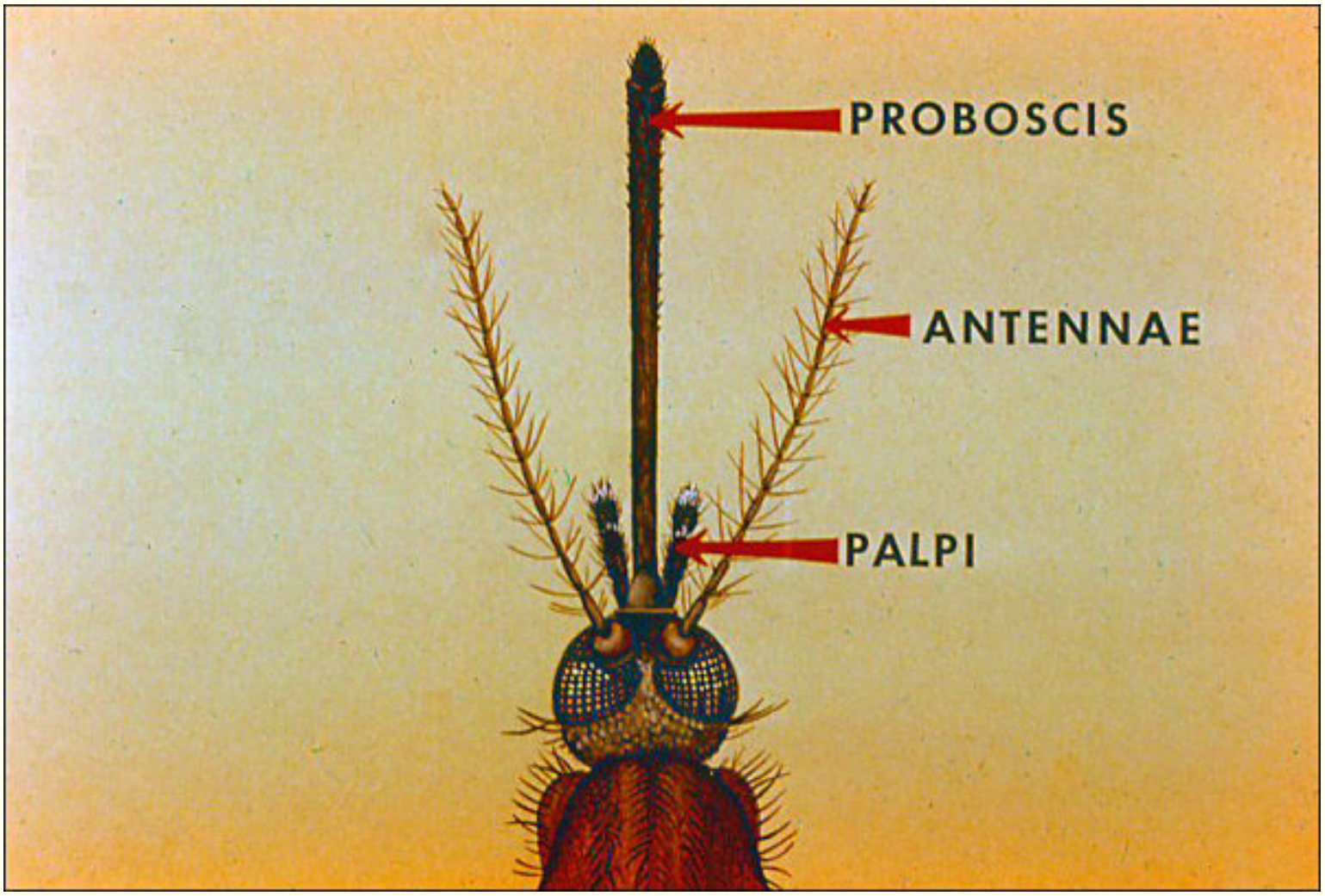
Slide 8



Extending forward from the head arc: the elongated proboscis, a pair of maxillary palpi, and a pair of antennae.

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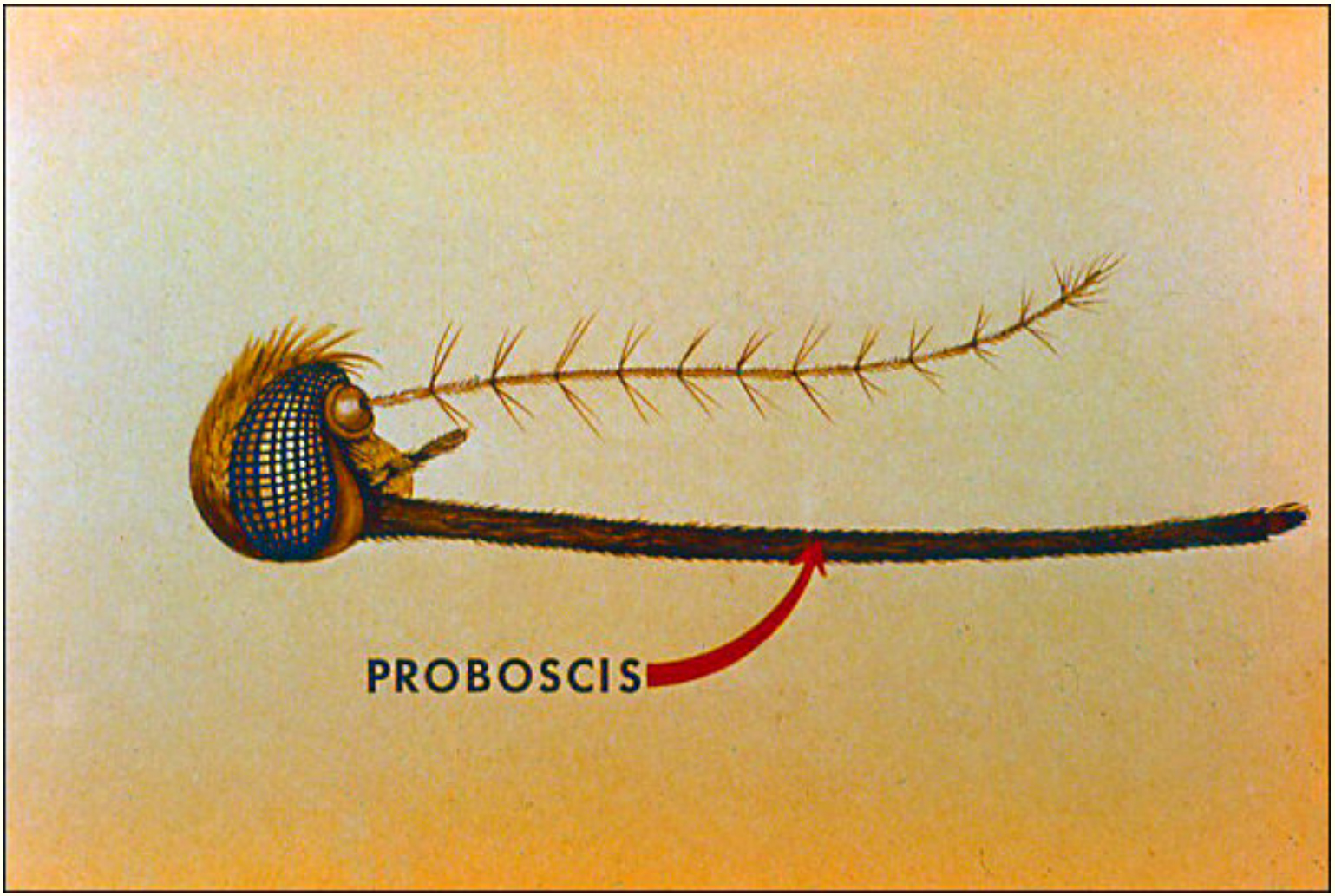

The proboscis of the female, in all but one genus of mosquitoes, is adapted for piercing and sucking blood.

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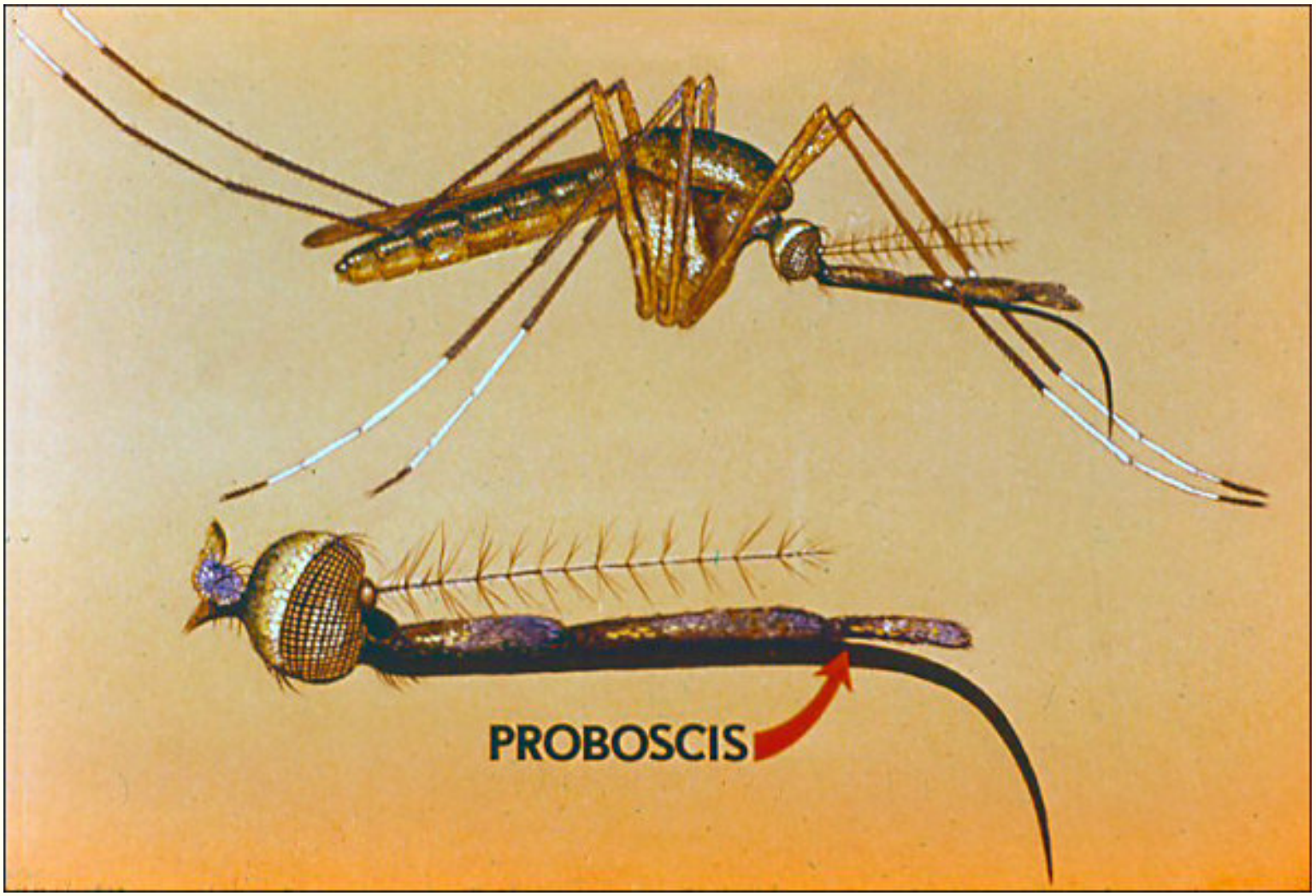
Slide 10



In the one genus in which females do not suck blood, the proboscis is strongly curved downward.

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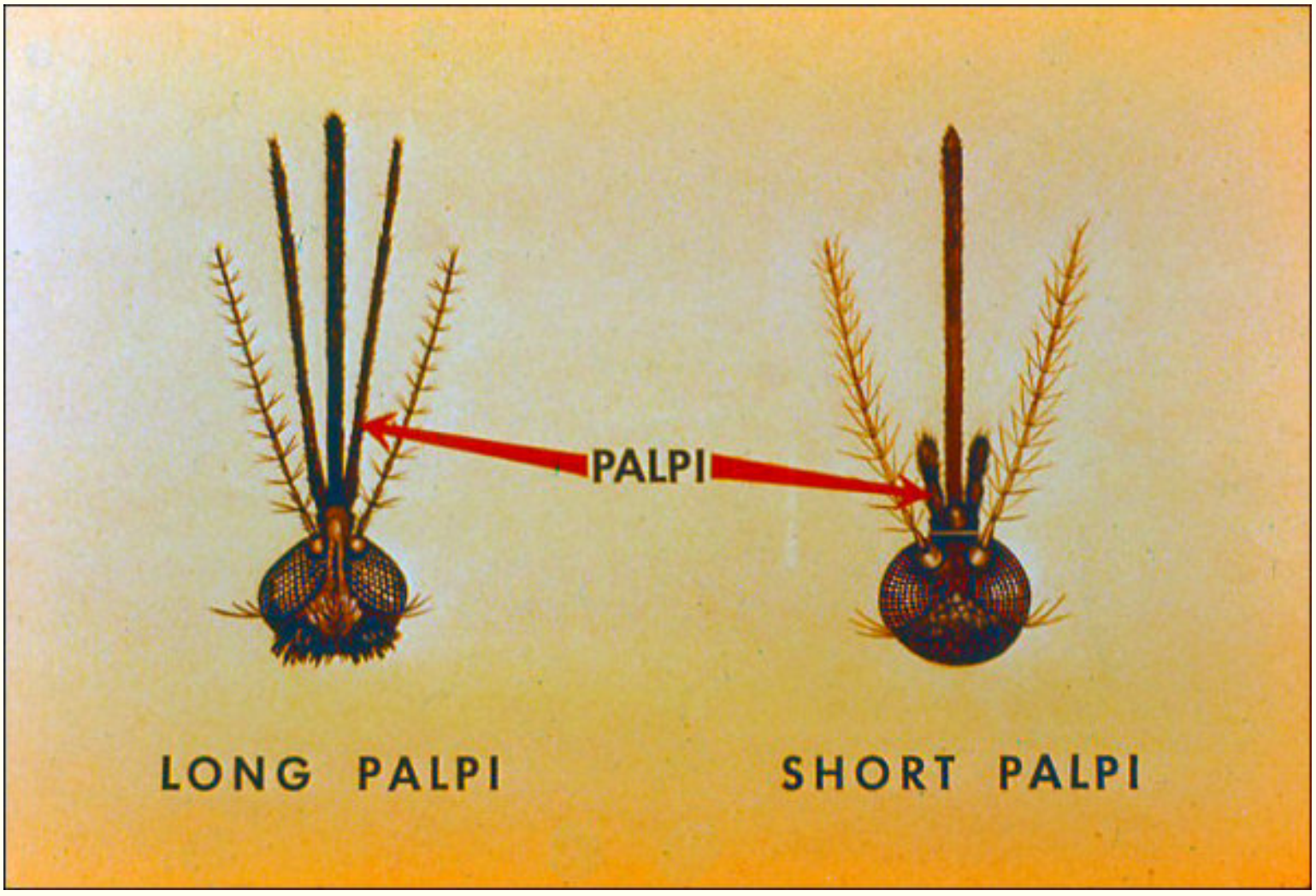
Slide 11



Maxillary palpi occur on either side of the proboscis. The palpi of female mosquitoes in all but one genus are very short; in that genus the palpi are about as long as the proboscis.

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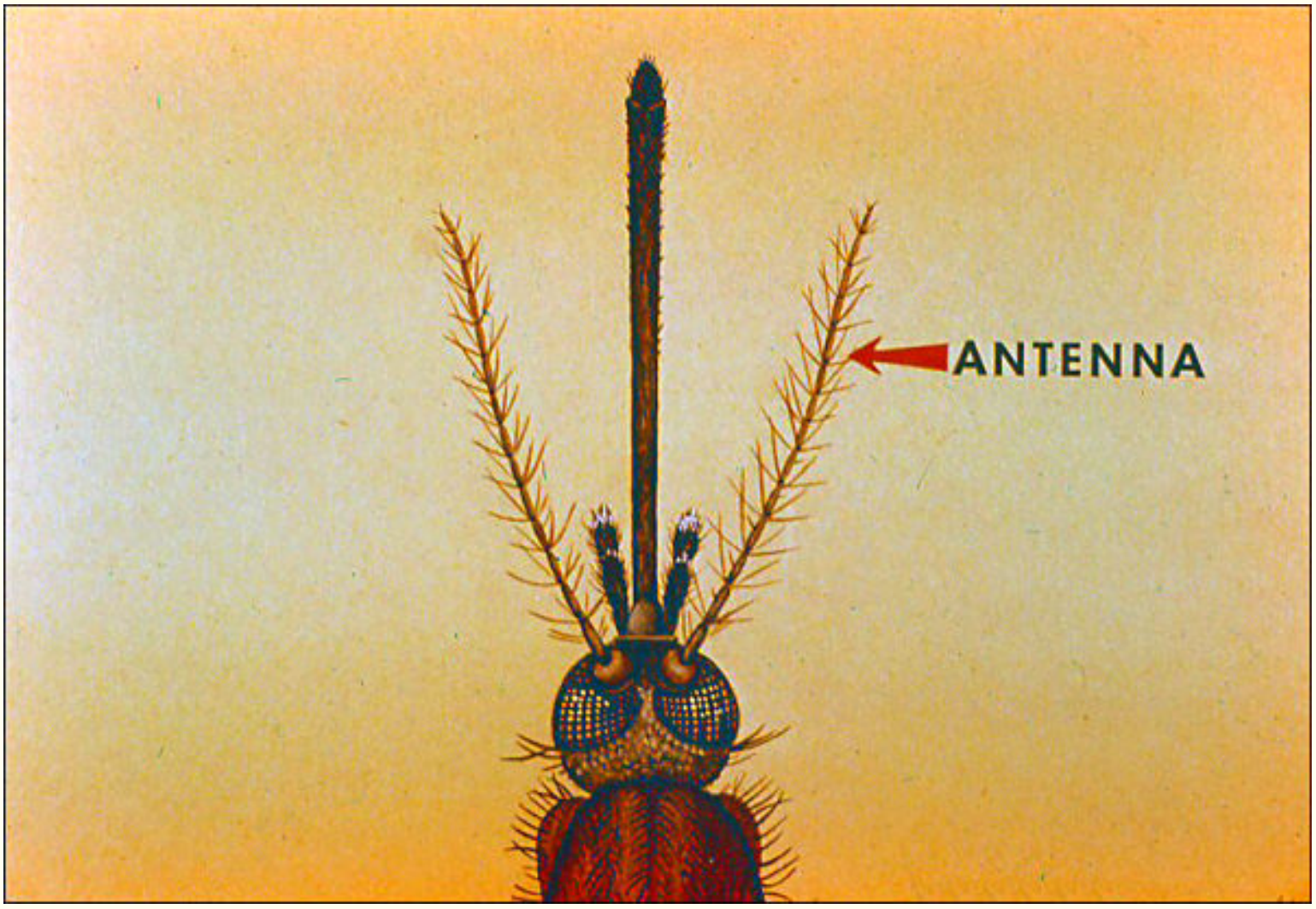
Slide 12



Antennae are covered with whorls of hairs. Each antenna is composed of 15 segments. The first is inconspicuous and is usually disregarded. The second segment is a cup-like receptacle for the next. A whorl of hairs is located at the base of each of the last 13 segments. In one genus, the antennae are much longer than the

proboscis. In the others, they are about the same length or shorter than the proboscis.

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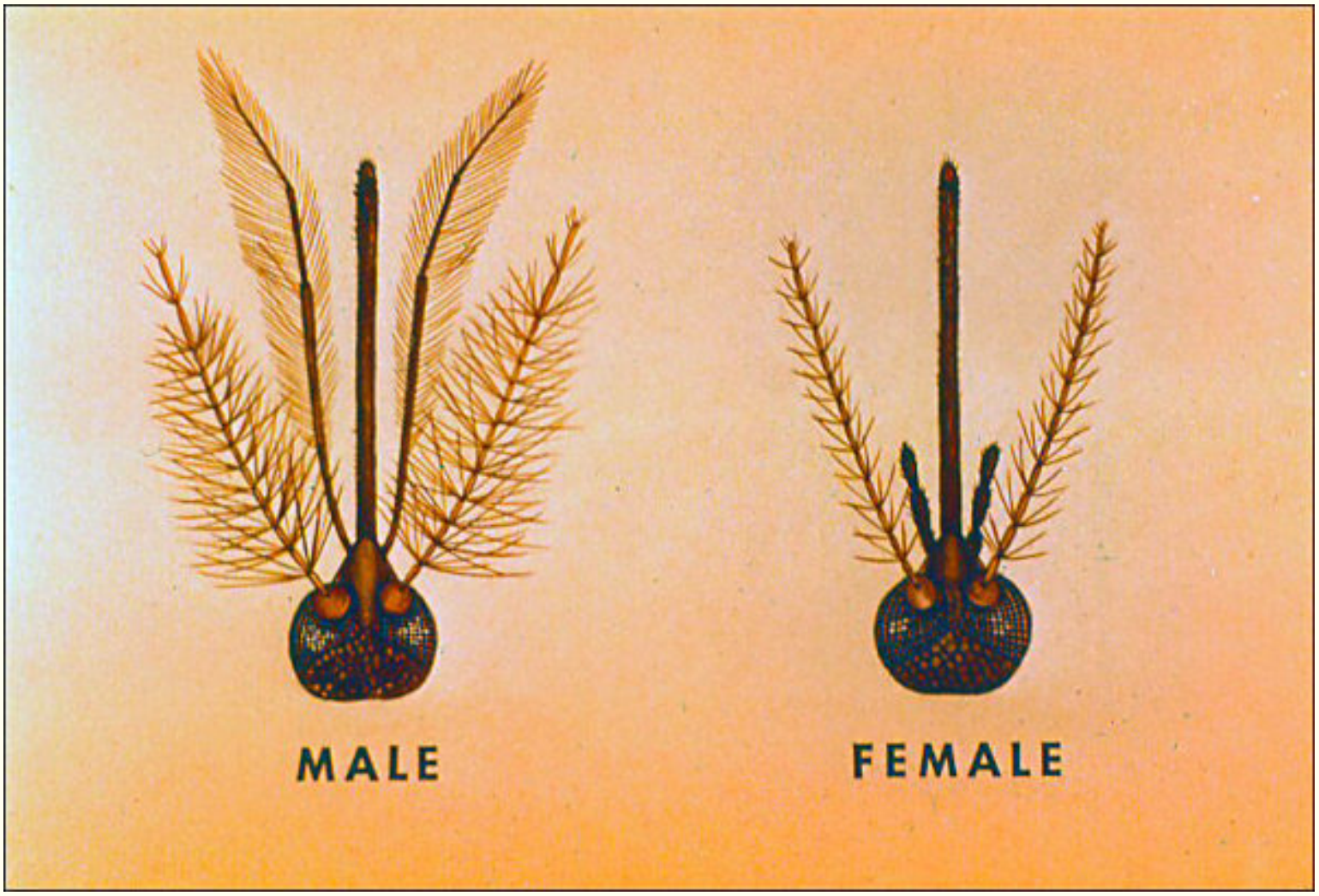

Sexes of mosquitoes are distinguished by the antennae. Those of the males are quite bushy. Female mosquitoes have slender, almost bare antennae by comparison. The identifying character described in this slide set apply only to female mosquitoes.

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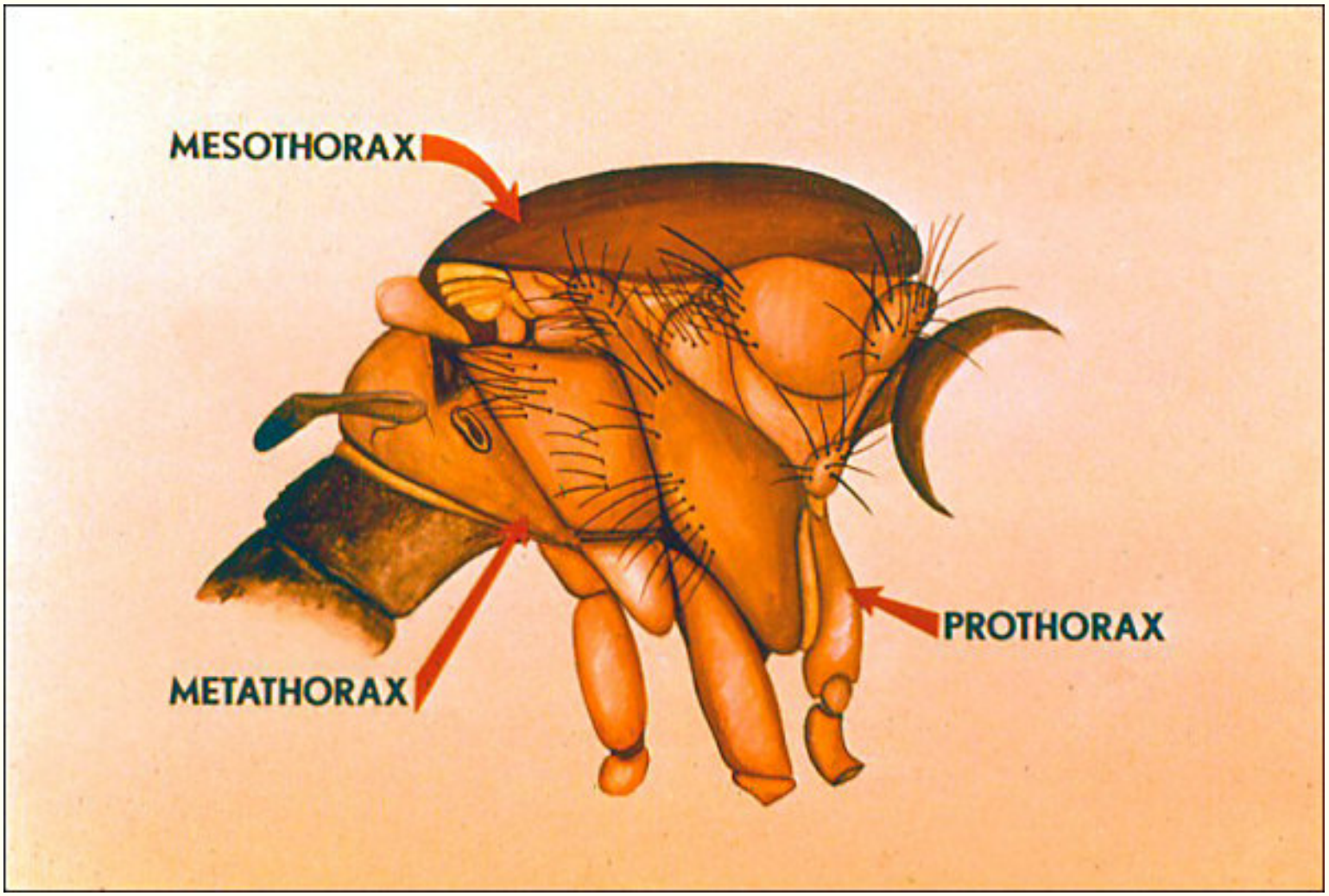

Three main dlvlsions of the thorax are recognized: the prothorax to which the front legs are attached, the mesothorax bearing the wings and middle legs, and the metathorax bearing the hind legs and halteres.

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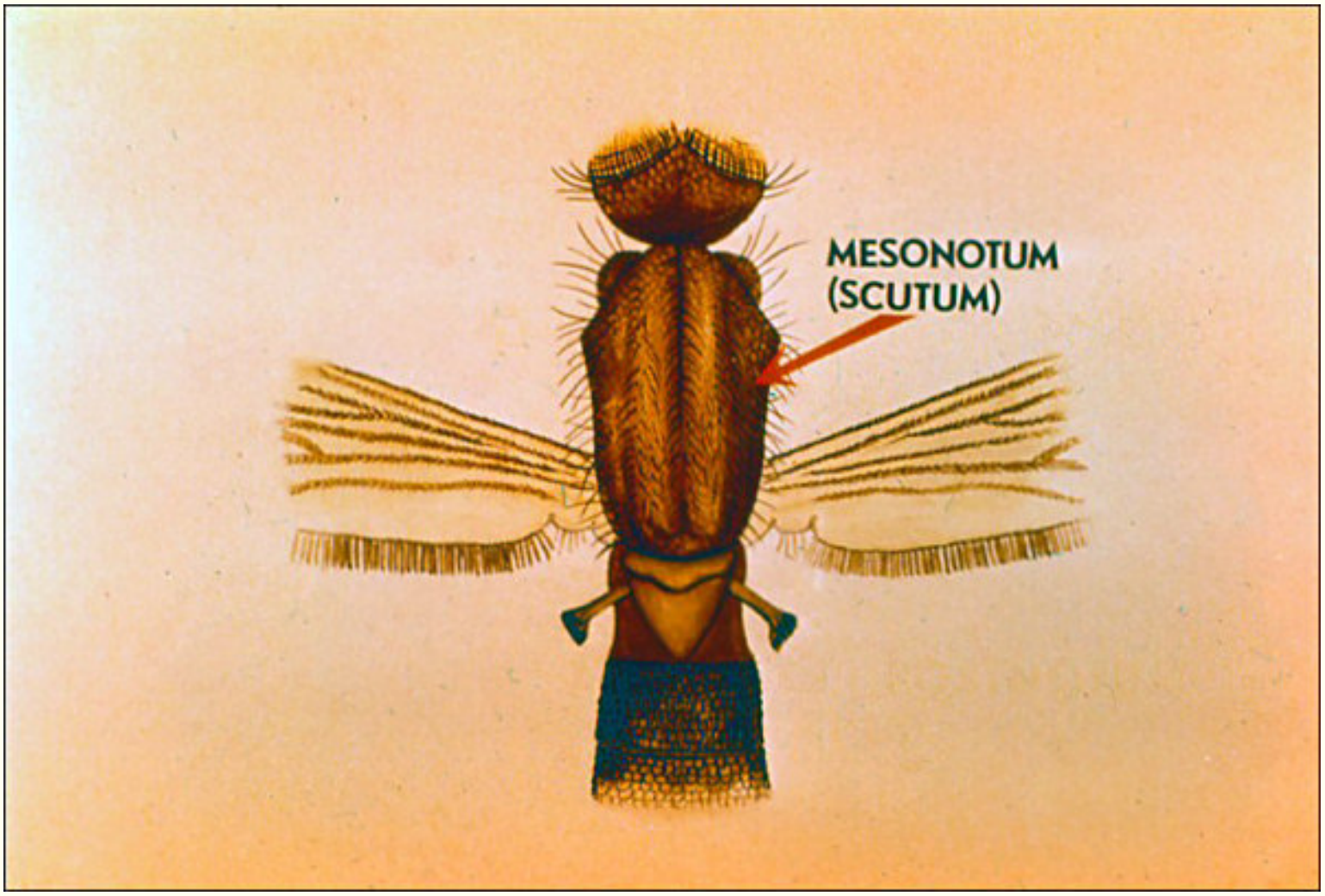

When examining the dorsal surface of the thorax these structures are seen in different perspective. The upper surface of the mesothorax is most prominent. It is composed of three parts, the largest and most anterior of which is the mesonotum or scutum.

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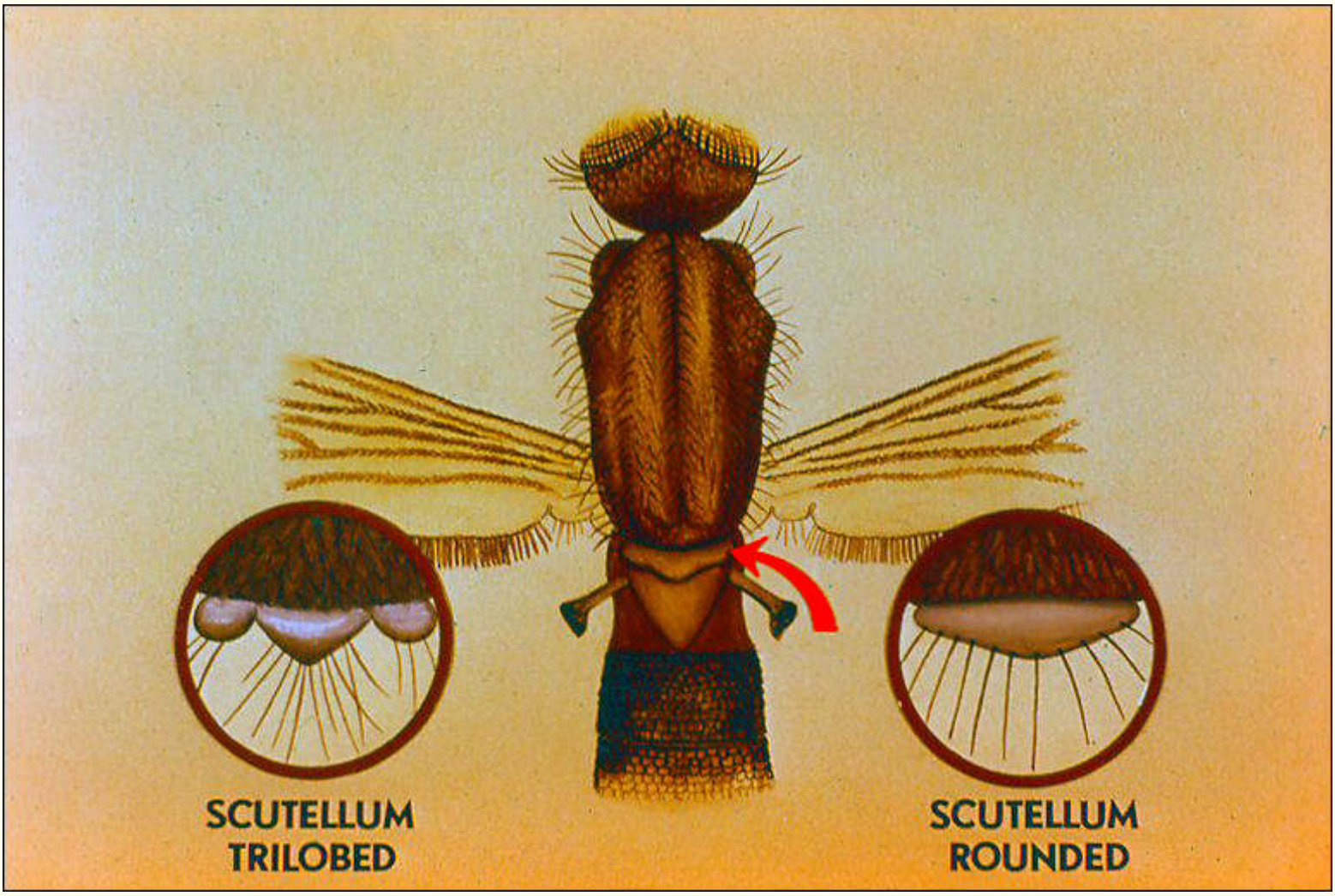

The narrow portion forming the posterior edge of the mesonotum is the scutellum. This structure is either tri-lobed or has an evenly rounded shape.

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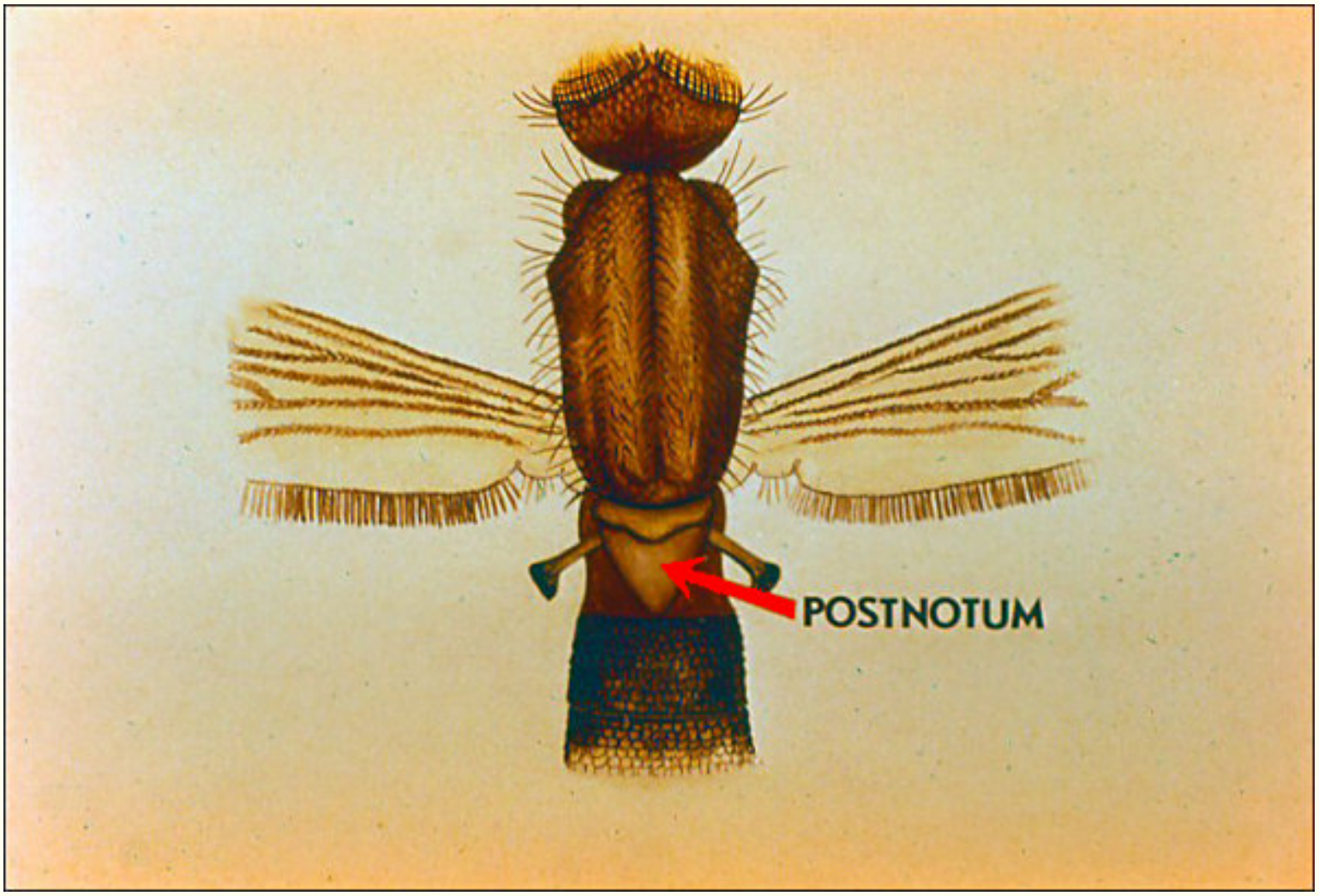

Immediately behind the scutellum is the postnotum. This appears to be attached to the abdomen but actually is situated between sclerites of the metathorax and is part of the mesothorax.

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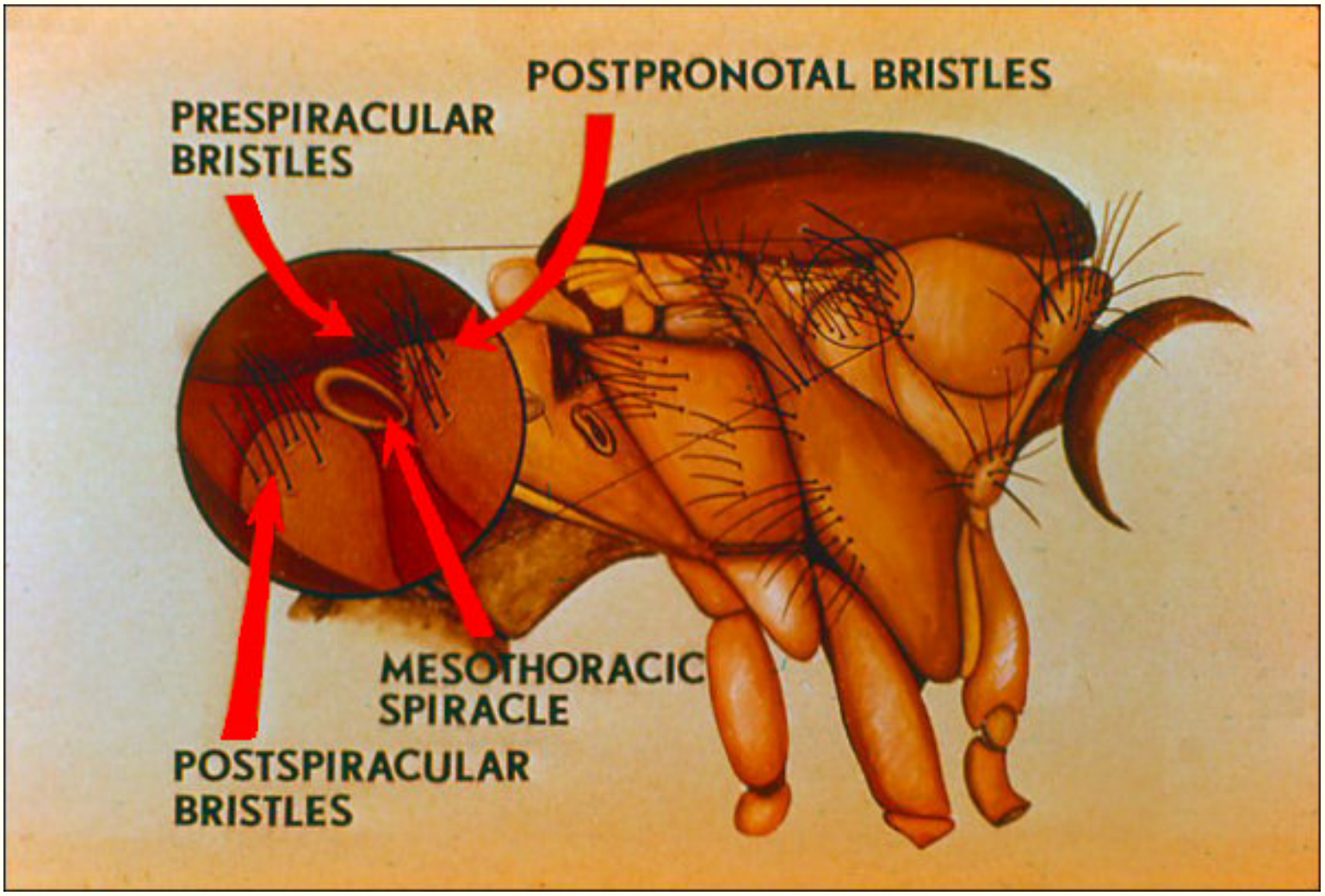

The thorax has many characters used in mosquito identification. Presence or absence, and arrangement, of hairs or bristles on the sides of the thorax are important taxonomic characters. The prespiracular bristles in front of the mesothoracic spiracle and the post-spiracular bristles behind it are especially important. The prespiracula bristles are sometimes called spiracula bristles.

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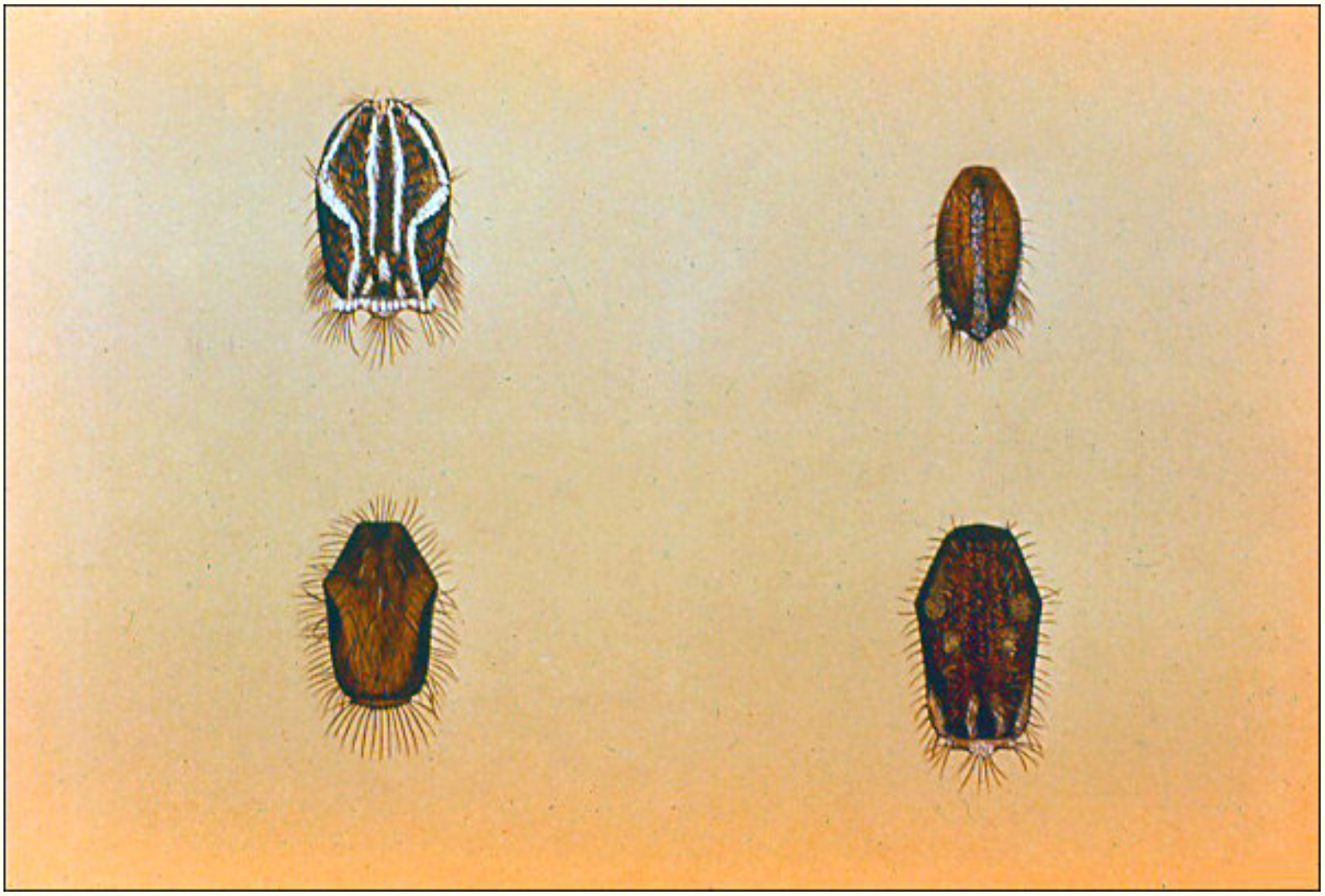

The color of scales on the thorax and the patterns formed by them are helpful in identifying some genera and species of mosquitoes.

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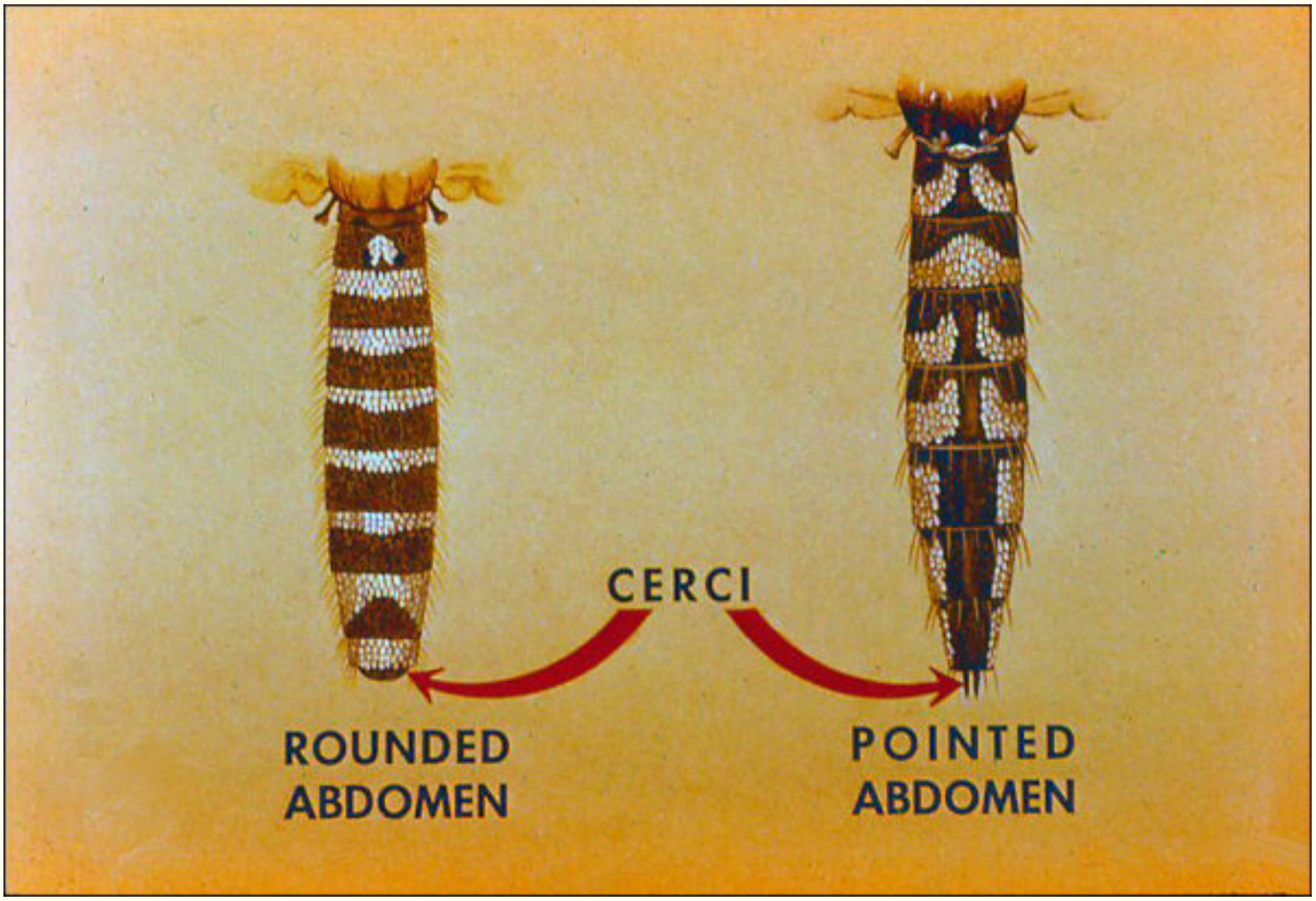

The abdomen of female mosquitoes has eight visible segments. The tip of the abdomen may be either pointed, or rounded and blunt. The paired cerci projecting beyond the last segment are part of the female terminalia, more noticeable in the pointed abdomens.

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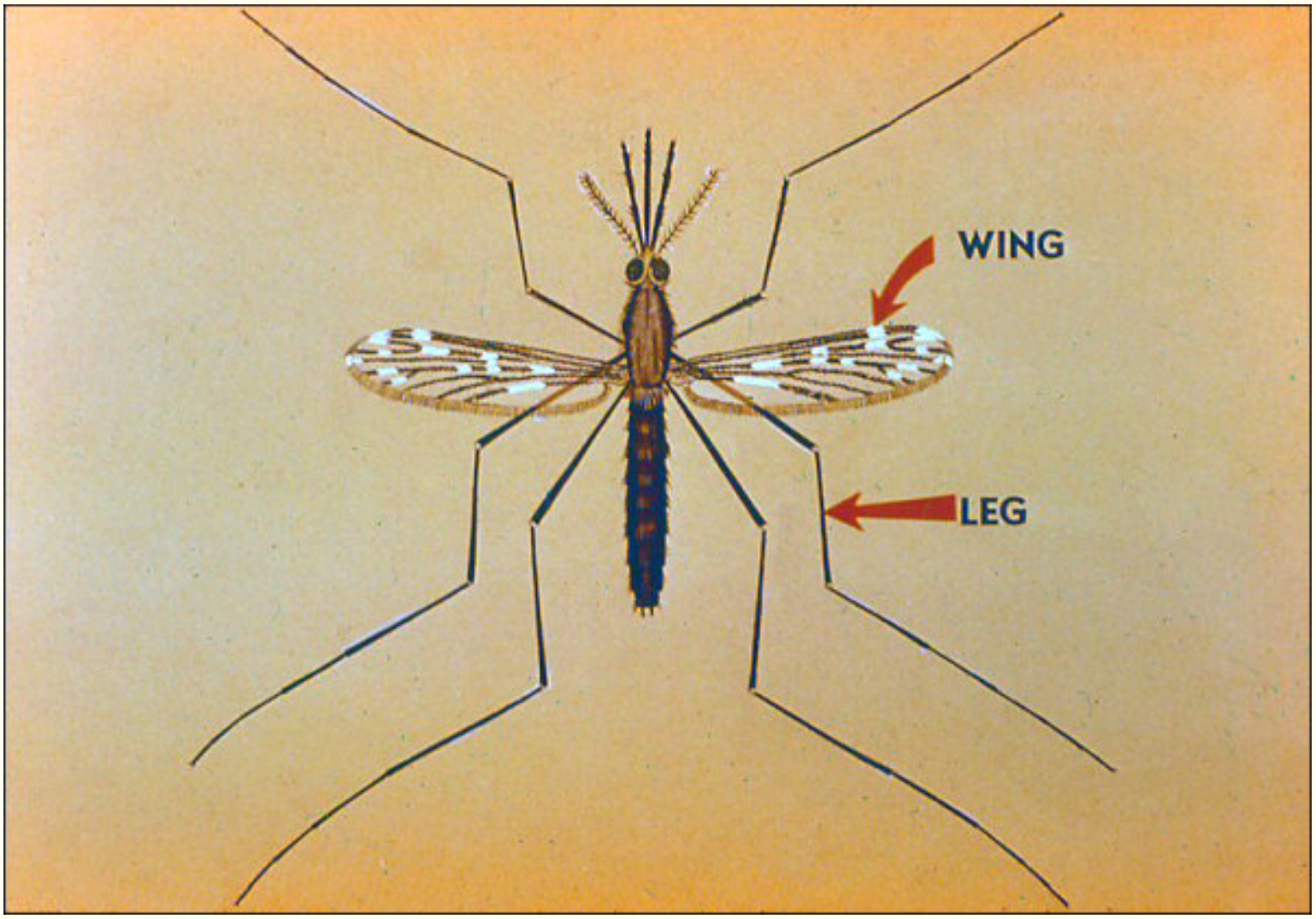

Characters on wings and legs are important in identifying mosquitoes.

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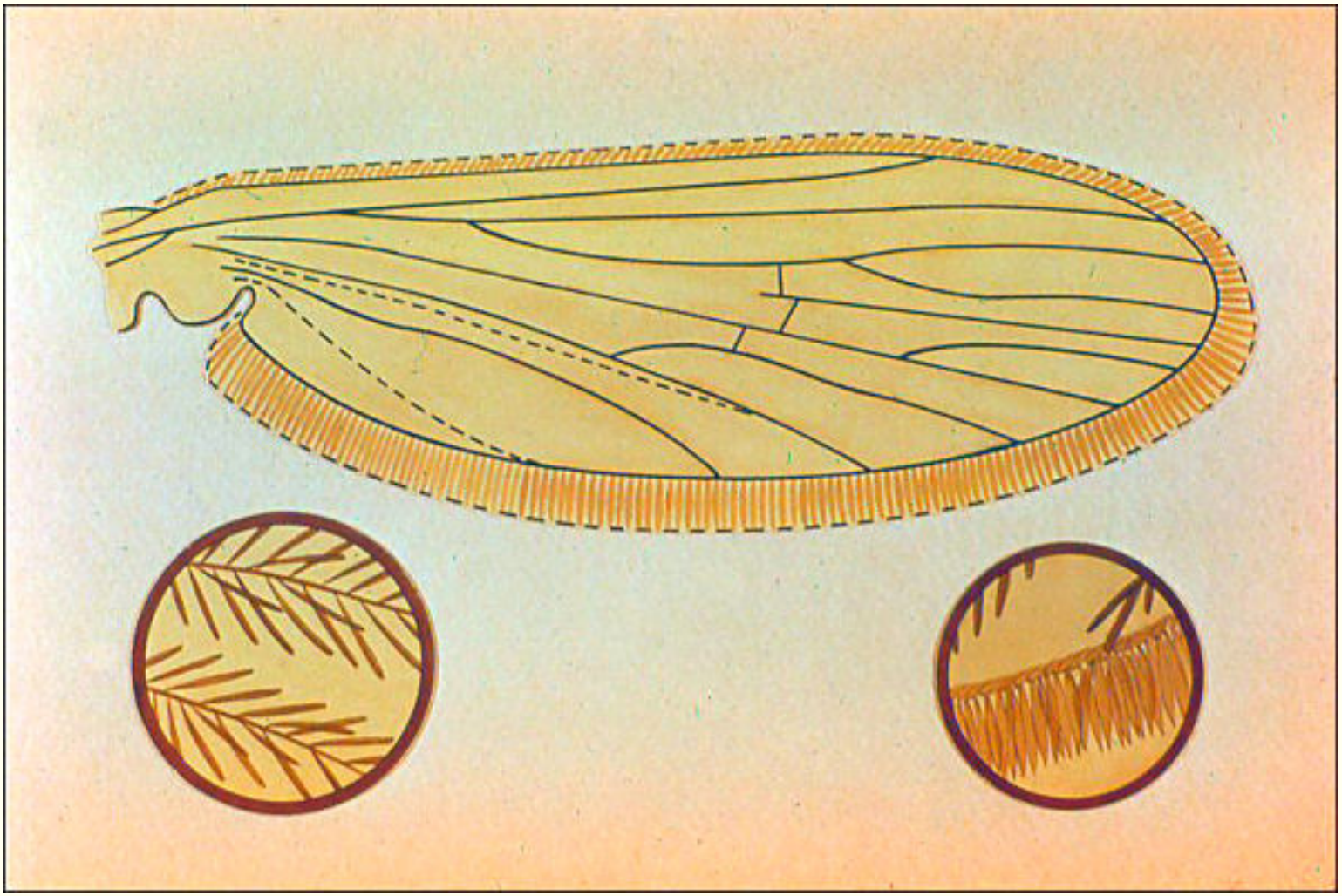

Study the venation and nomenclature of the mosquito wing in the material given. Note that the veins and morg of the wings are covered by scales which sometimes form characteristic patterns. The longitudinal and cross-veins have specific names. In one genus, the second or subcostal wing vein has a row of bristles near its base on the ventral side.

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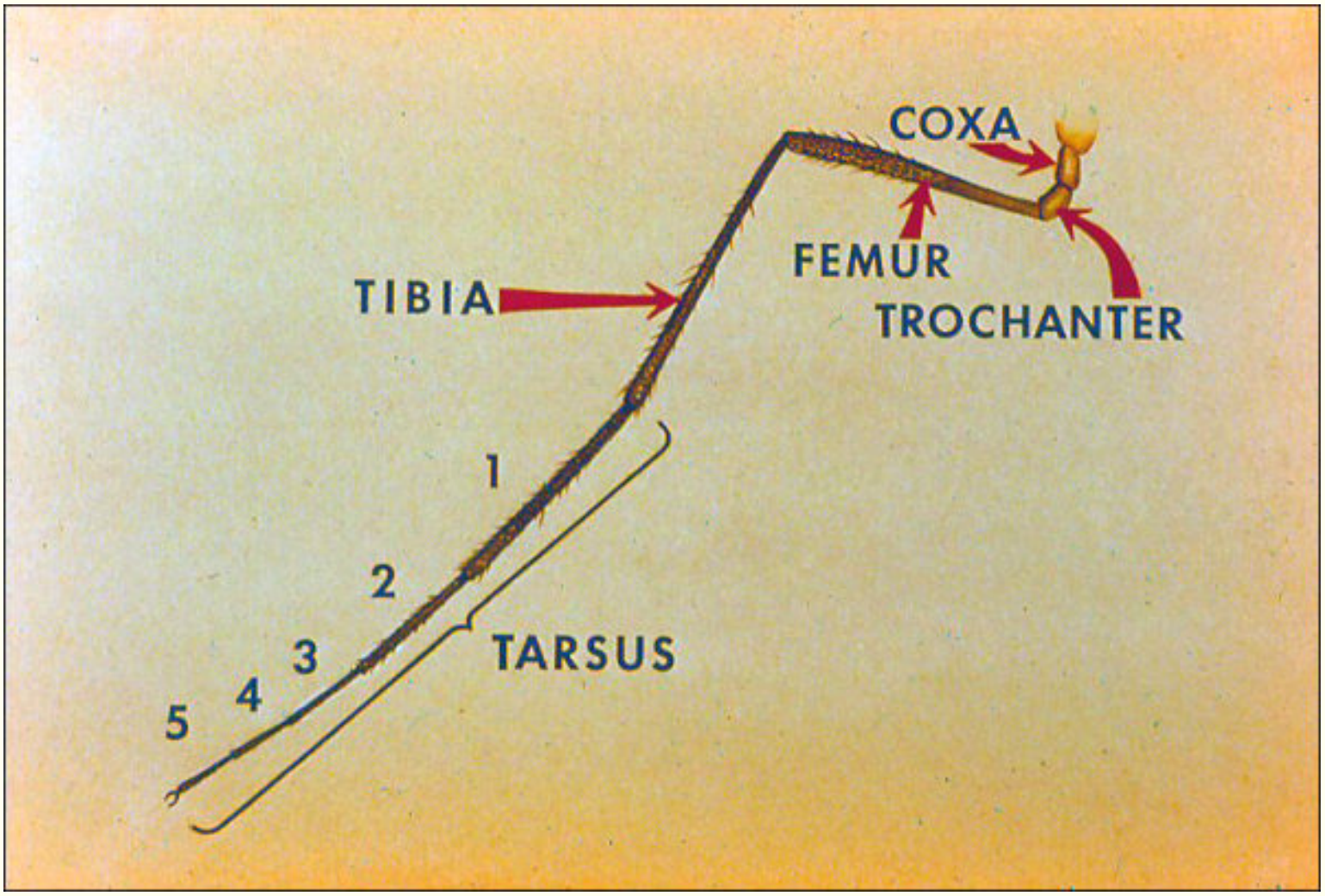

Mosquito legs are composed of five parts: the coxa, which is attached to the thorax; the trochanter; femur; tibia; and tarsus. The tarsus, or foot, consists of five segments. The relative size of the tarsal segments and the presence of long erect scales on the hind tibiae are sometimes used in identification.

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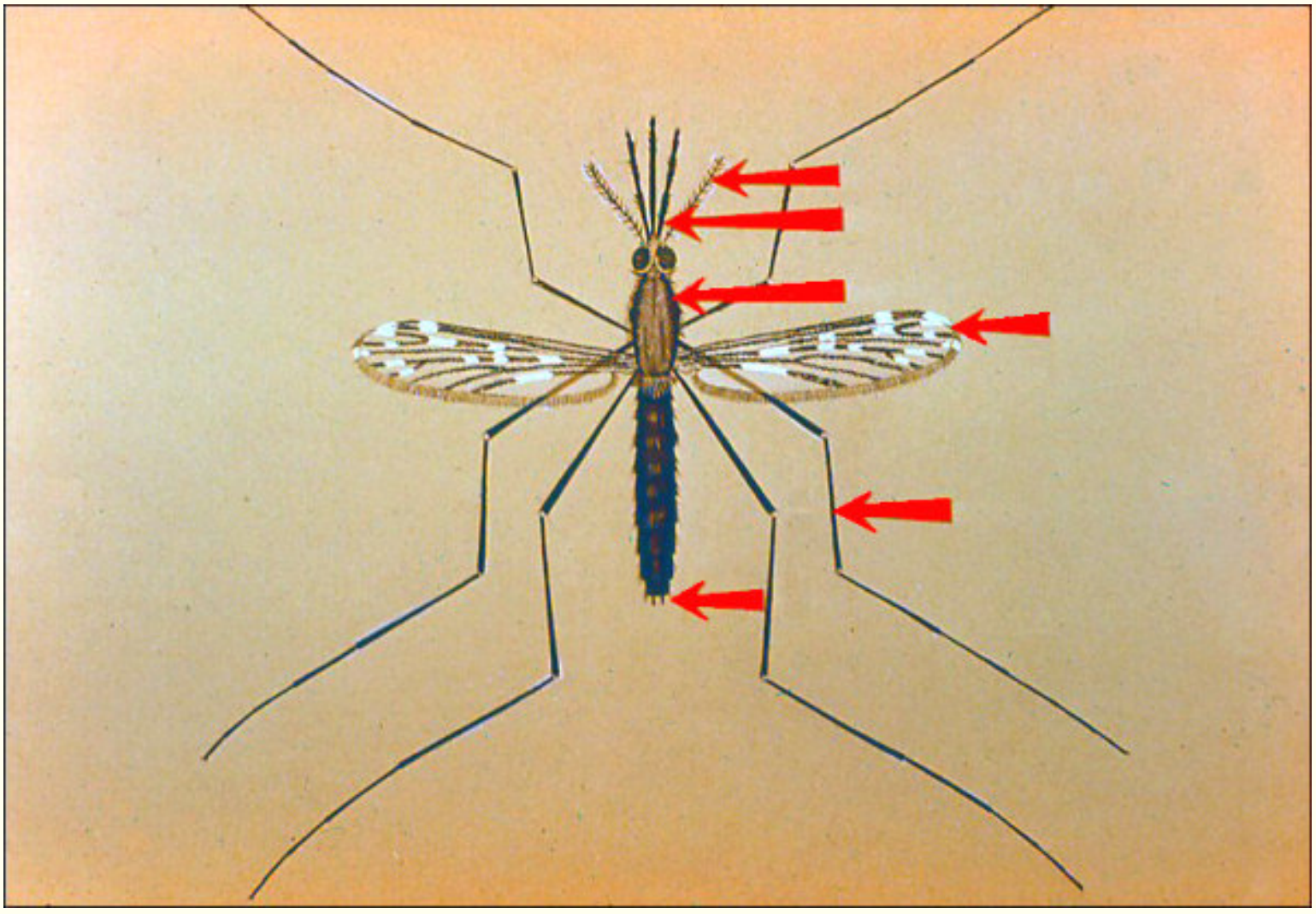

Learn all of these basic morphological characters well. Correct identification of mosquito genera depends upon thorough familiarity with them.

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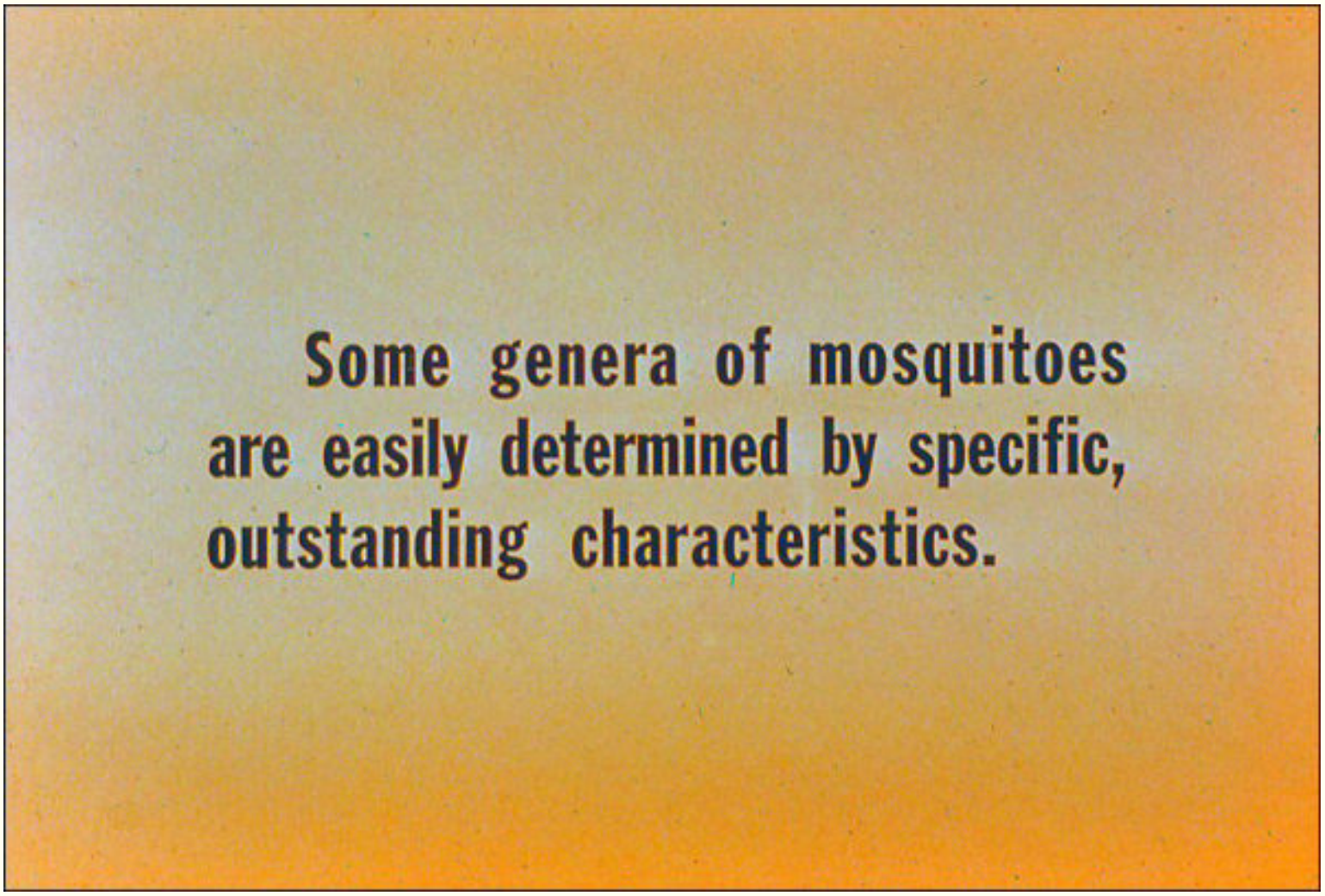

Some genera of mosquitoes are easily determined by specific, outstanding characteristics.

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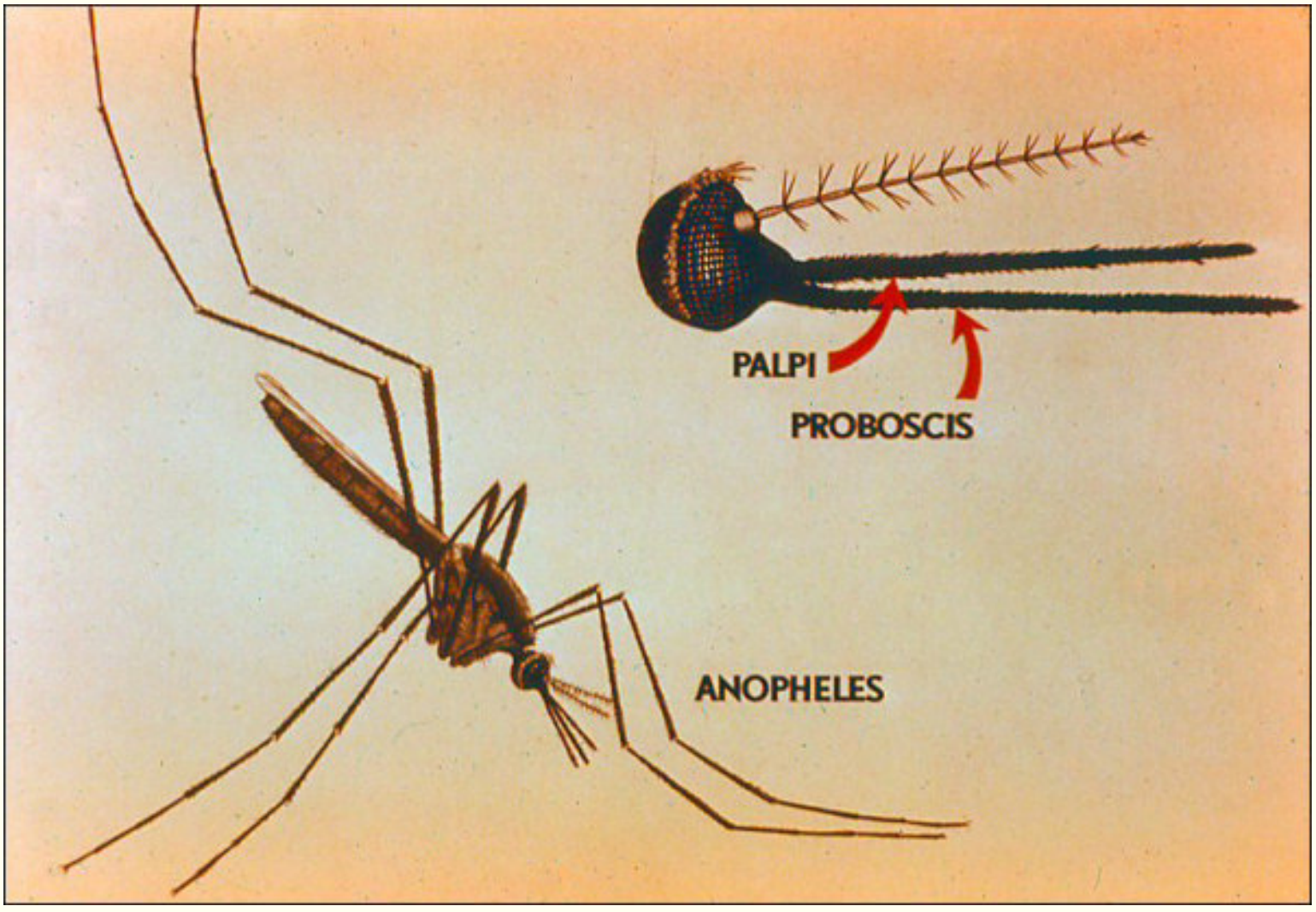

Females of the genus *Anopheles*, unlike all other genera of mosquitoes, have palpi as long as the proboscis. They also have an evenly rounded scutellum, a structure which is trilobed in most of the other genera.

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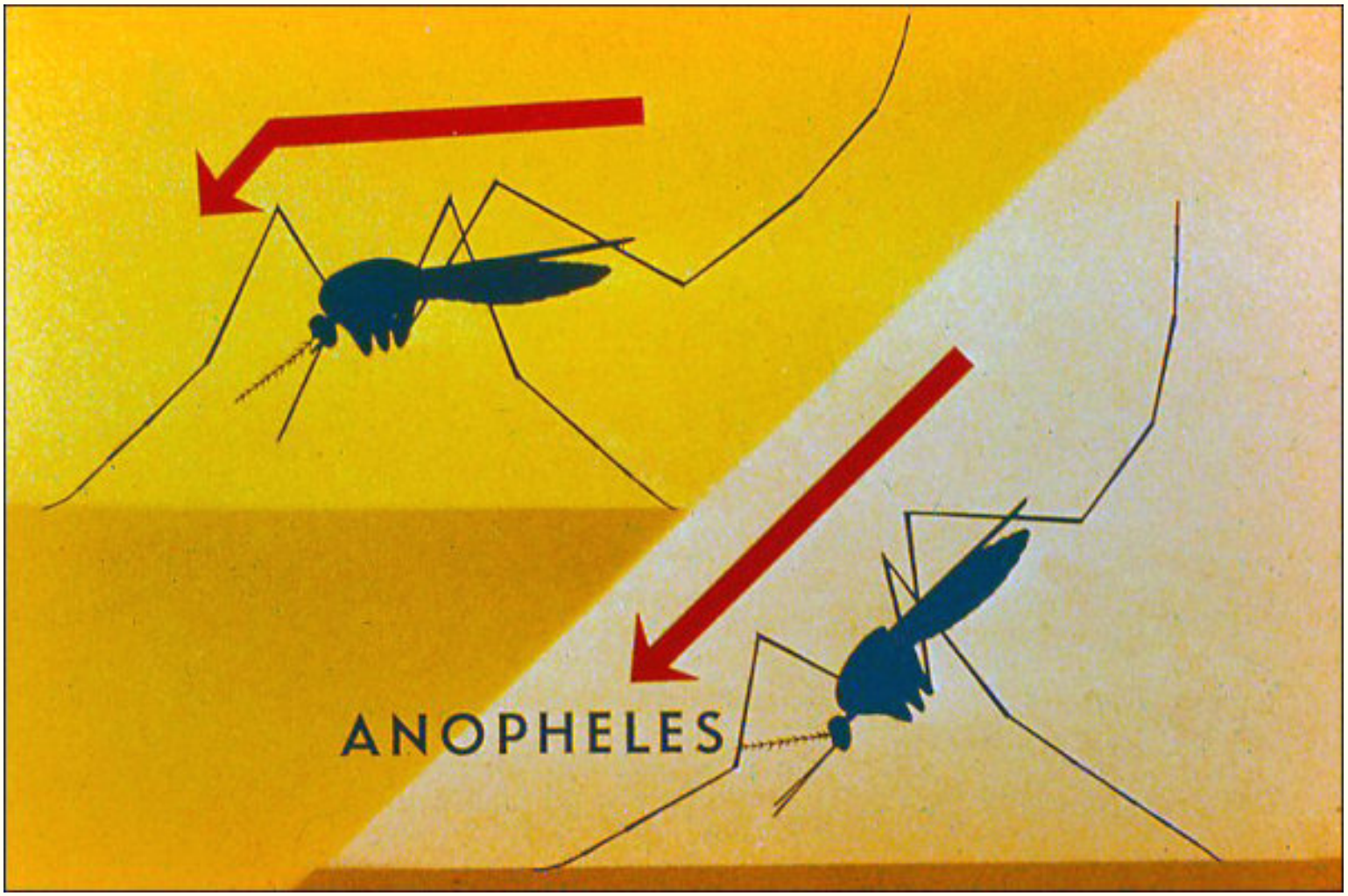

In life, the resting position of *Anopheles* is characteristic. Note that *Anopheles* rest with the head, thorax, and abdomen in a straight line. Other mosquitoes assume a position with the head at an angle to the rest of the body.

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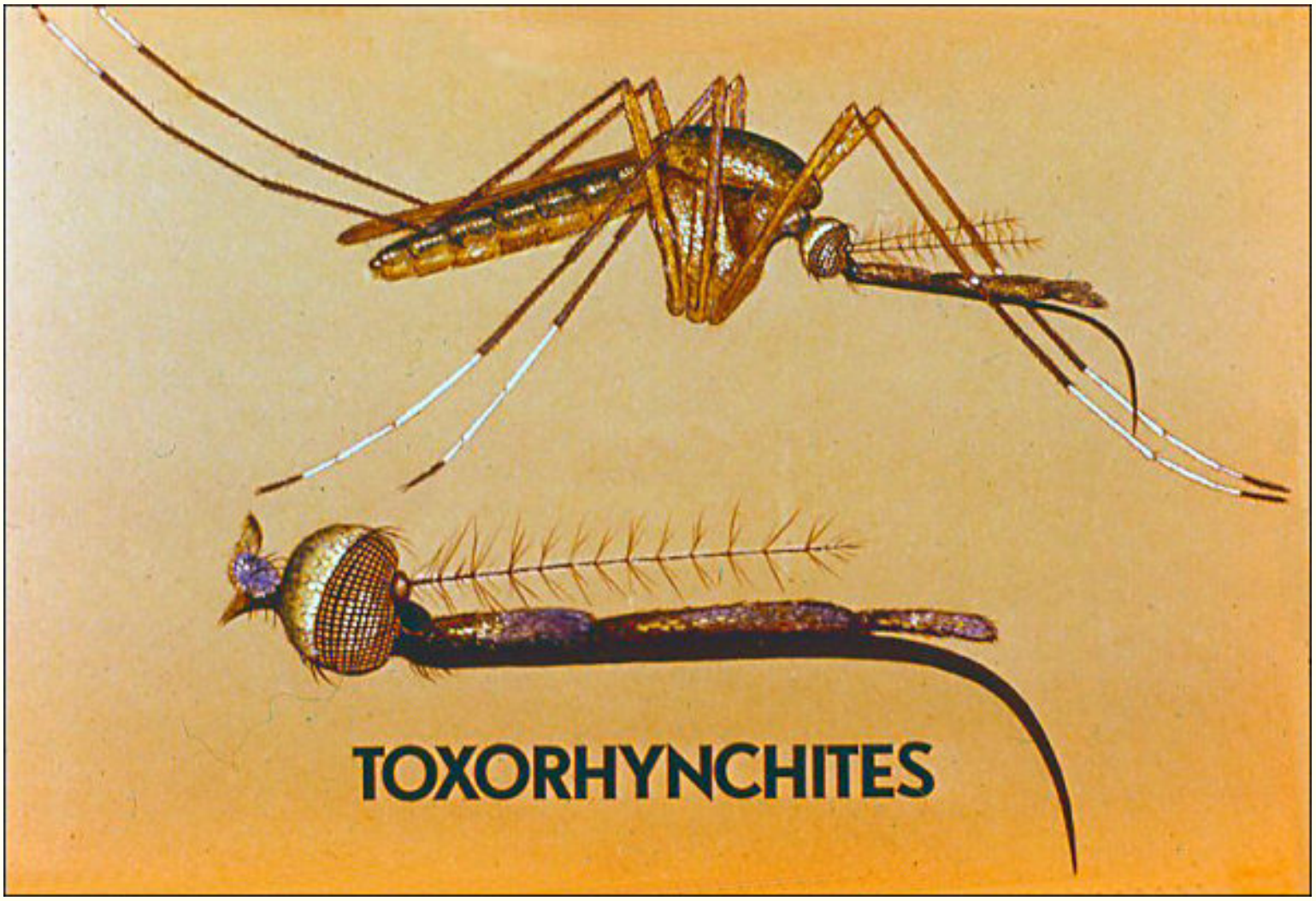

Toxorhynchites has a very bizarre appearance. Members of this genus are larger and more brilliantly colored than any other mosquitoes.

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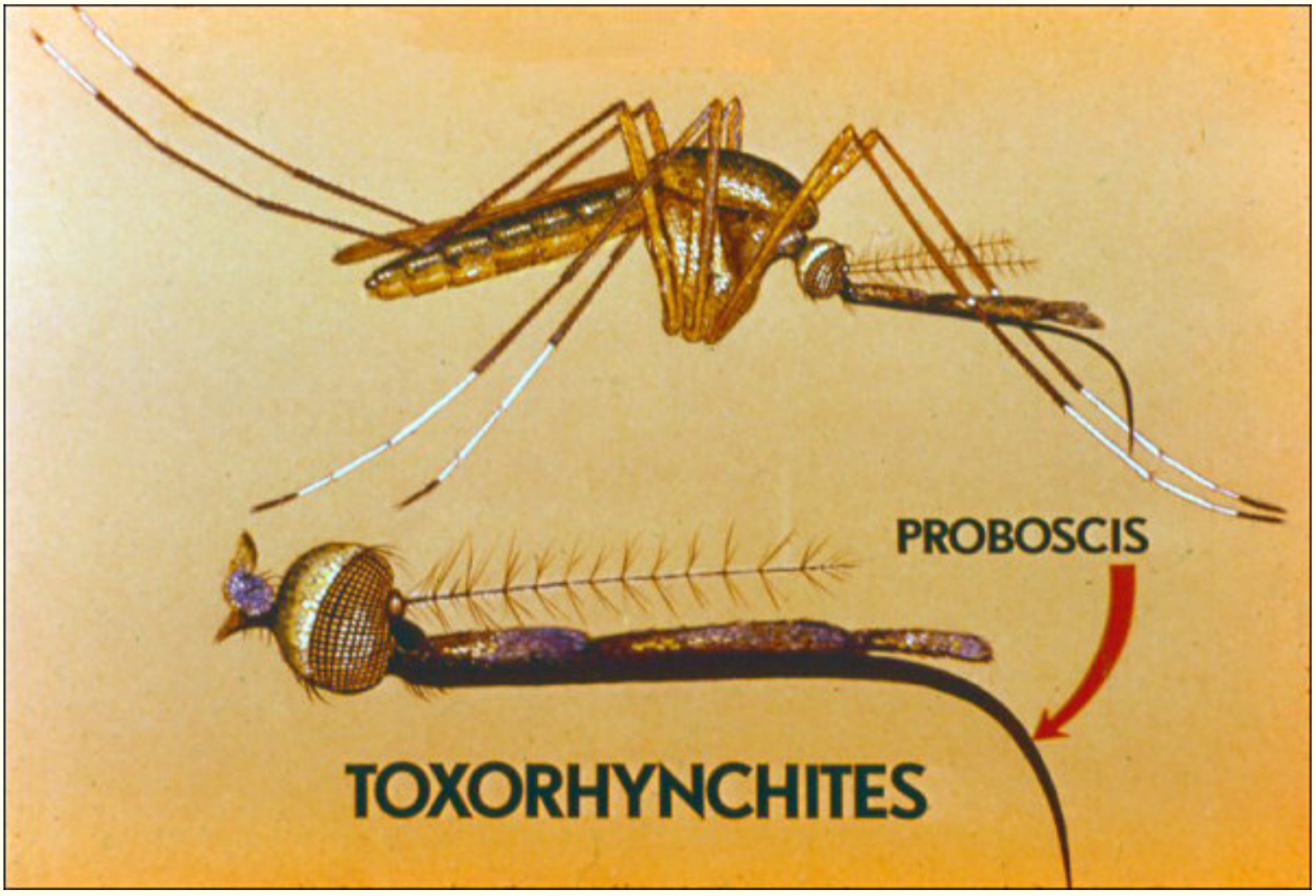

In this genus, mosquitoes have a proboscis which curves downward sharply, unlike all other mosquitoes.

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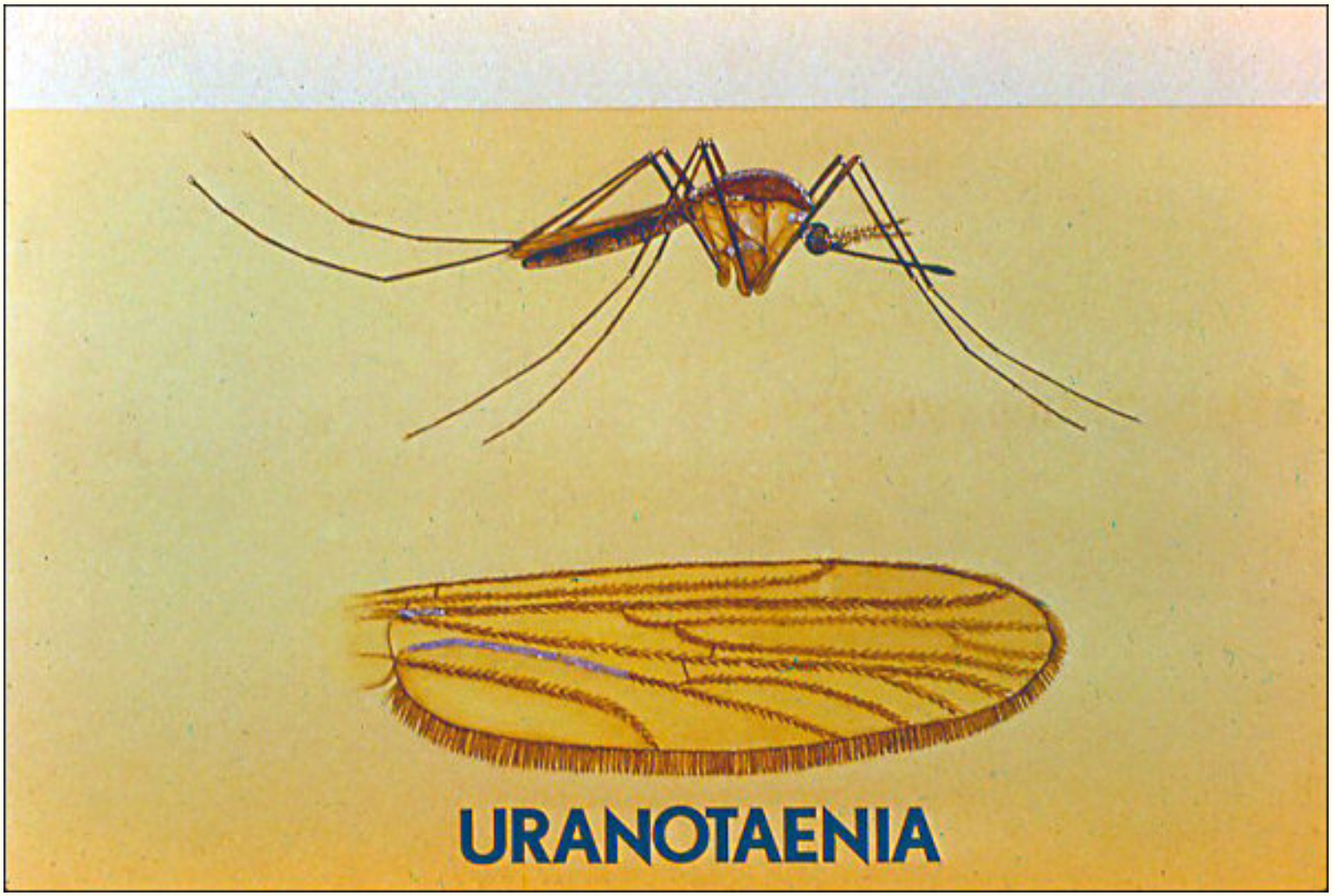

Uranotaenia, by contrast, are very small mosquitoes with bluish iridescent scales in rows or patches.

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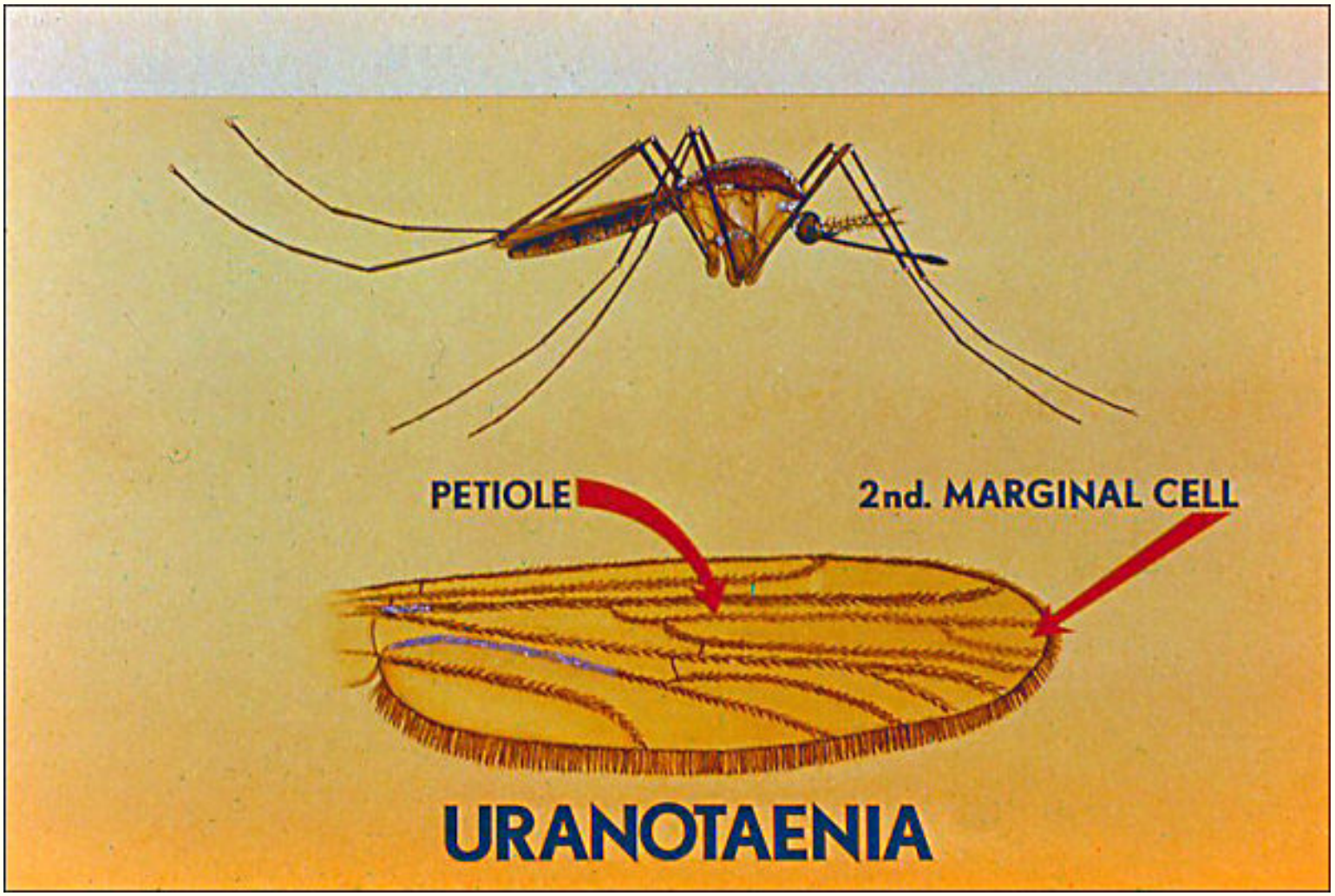

Uranotaenia may be distinguished from all other genera of mosquitoes by the very short second marginal wing cell. Note that it: is less than half as long as its stem. Such a stem, or stalk, is called a petiole.

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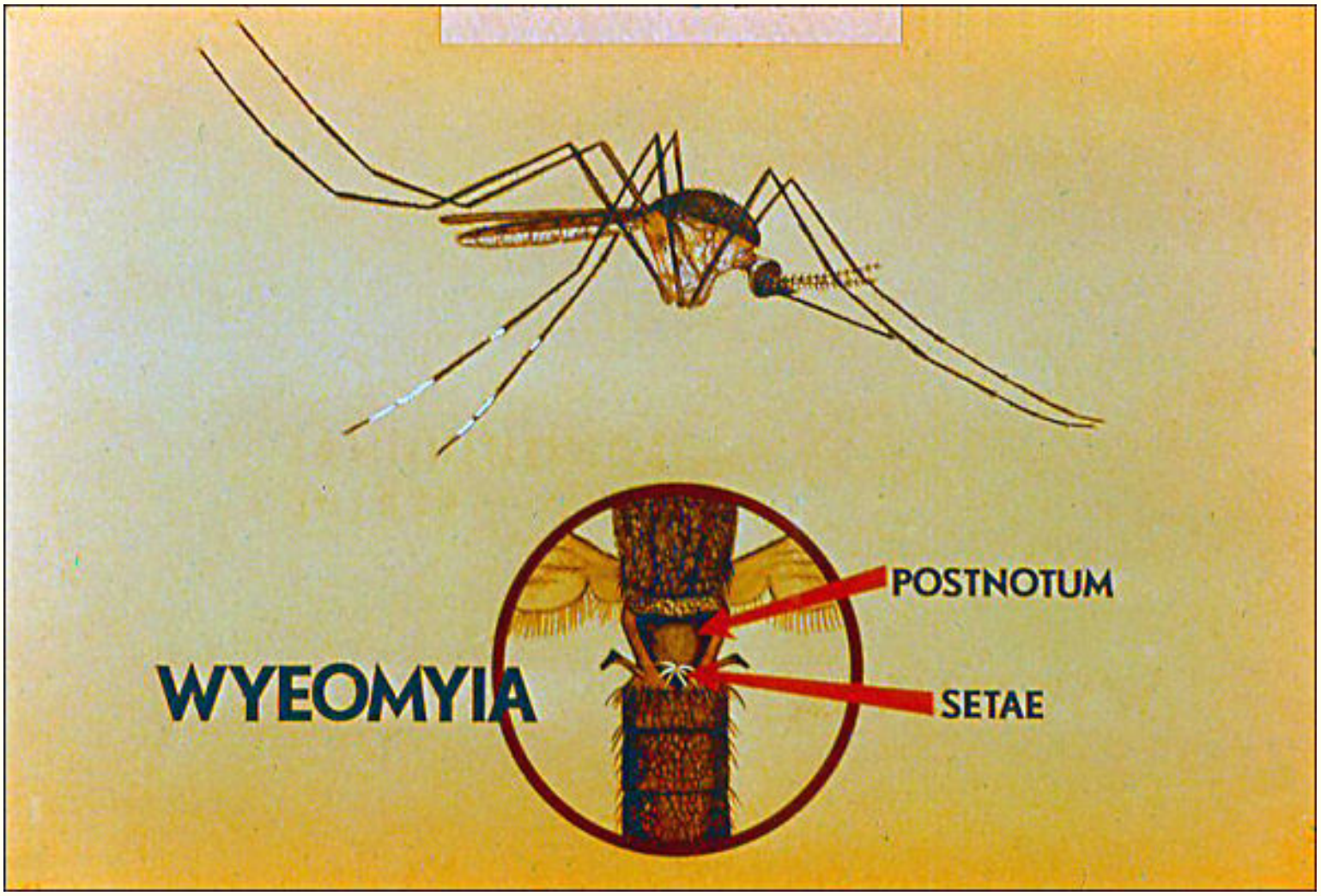

Wyeomyia may be recognized by the tuft of hairs or setae on the postnotum.

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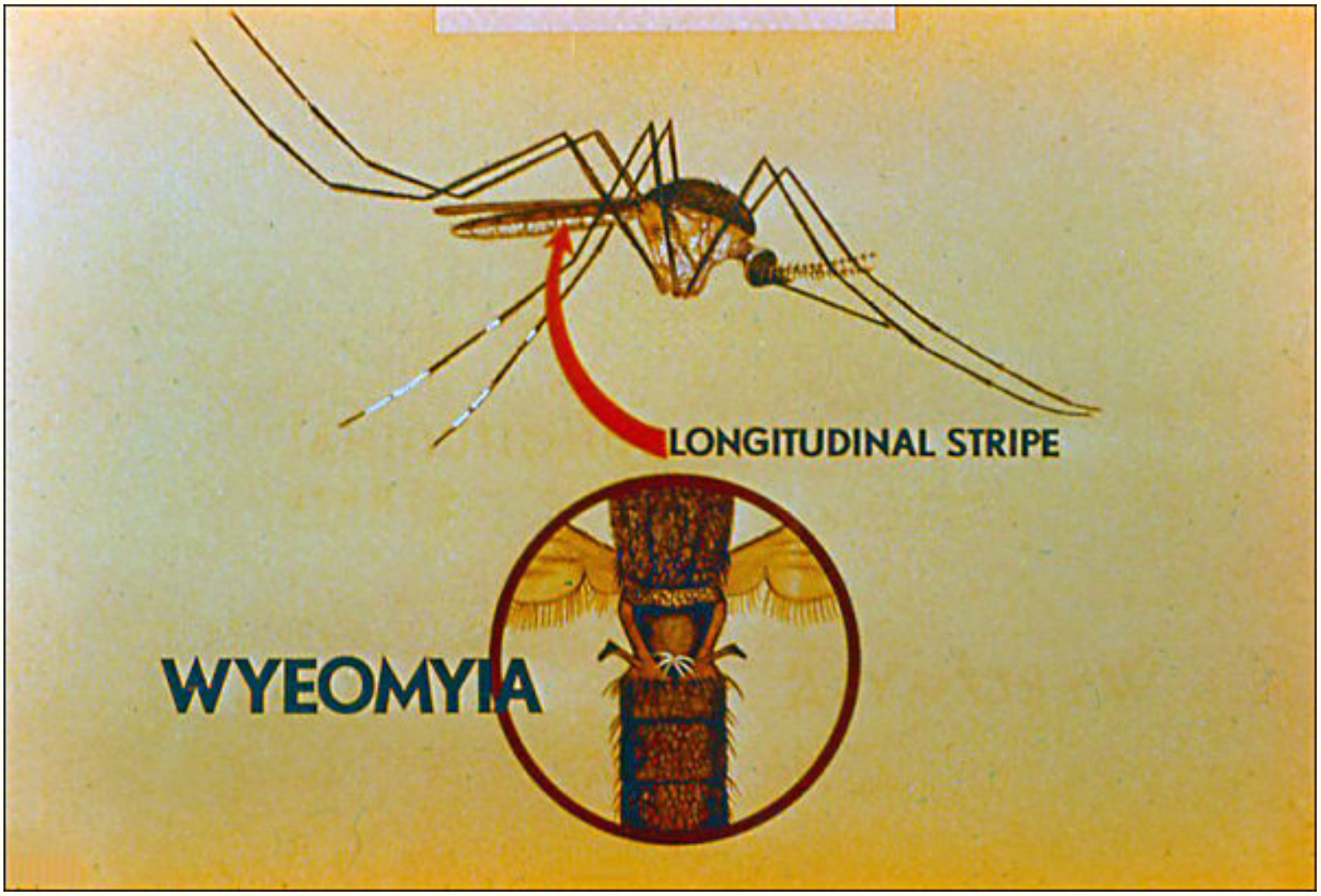

Another character useful in determining *Wyeomyia* is the longitudinal stripe on the side of the abdomen. This is formed where the dark dorsal scales meet the white ventral scales.

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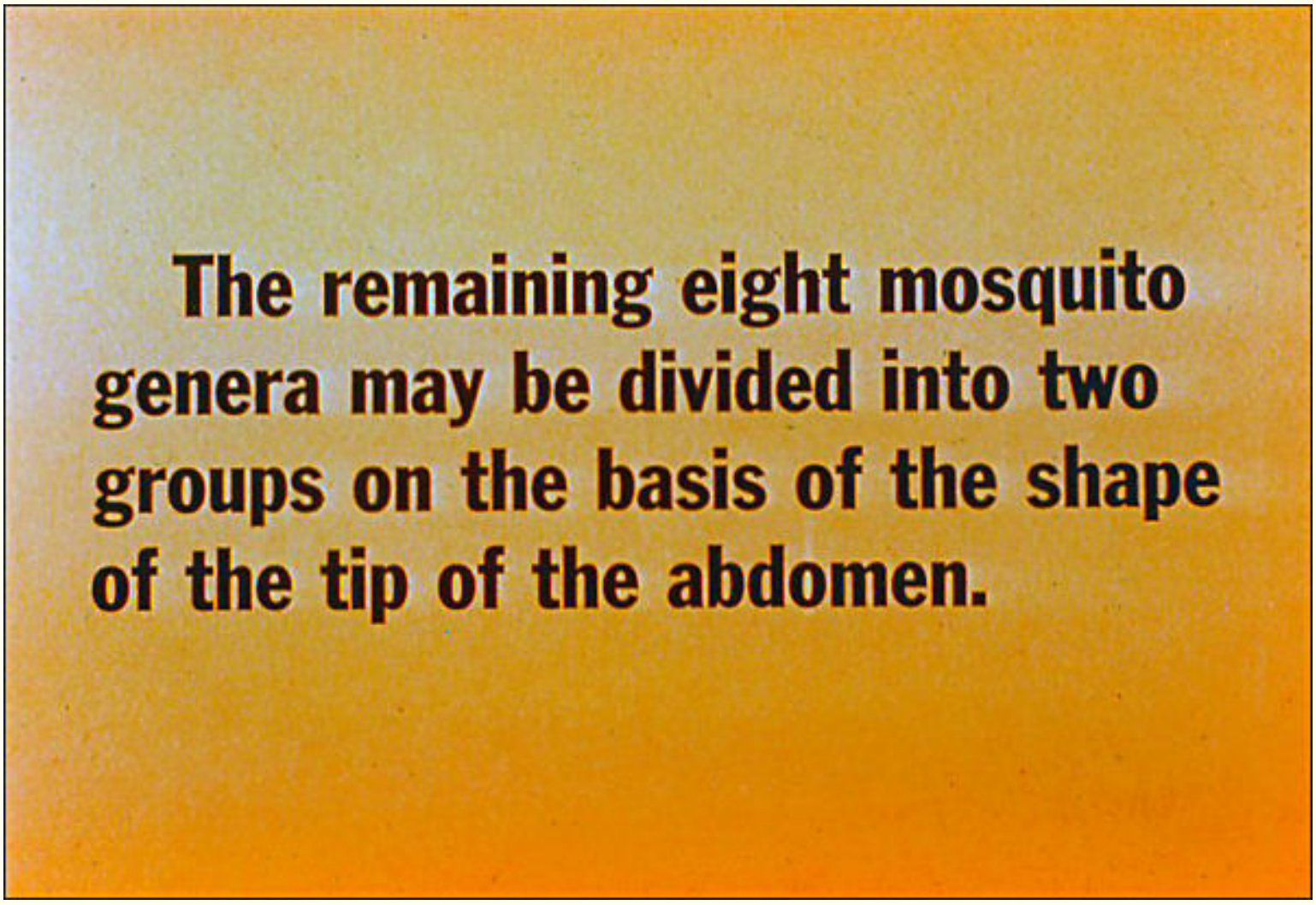

The remaining eight mosquito genera may be divided into two groups on the basis of the shape of the tip of the abdomen.

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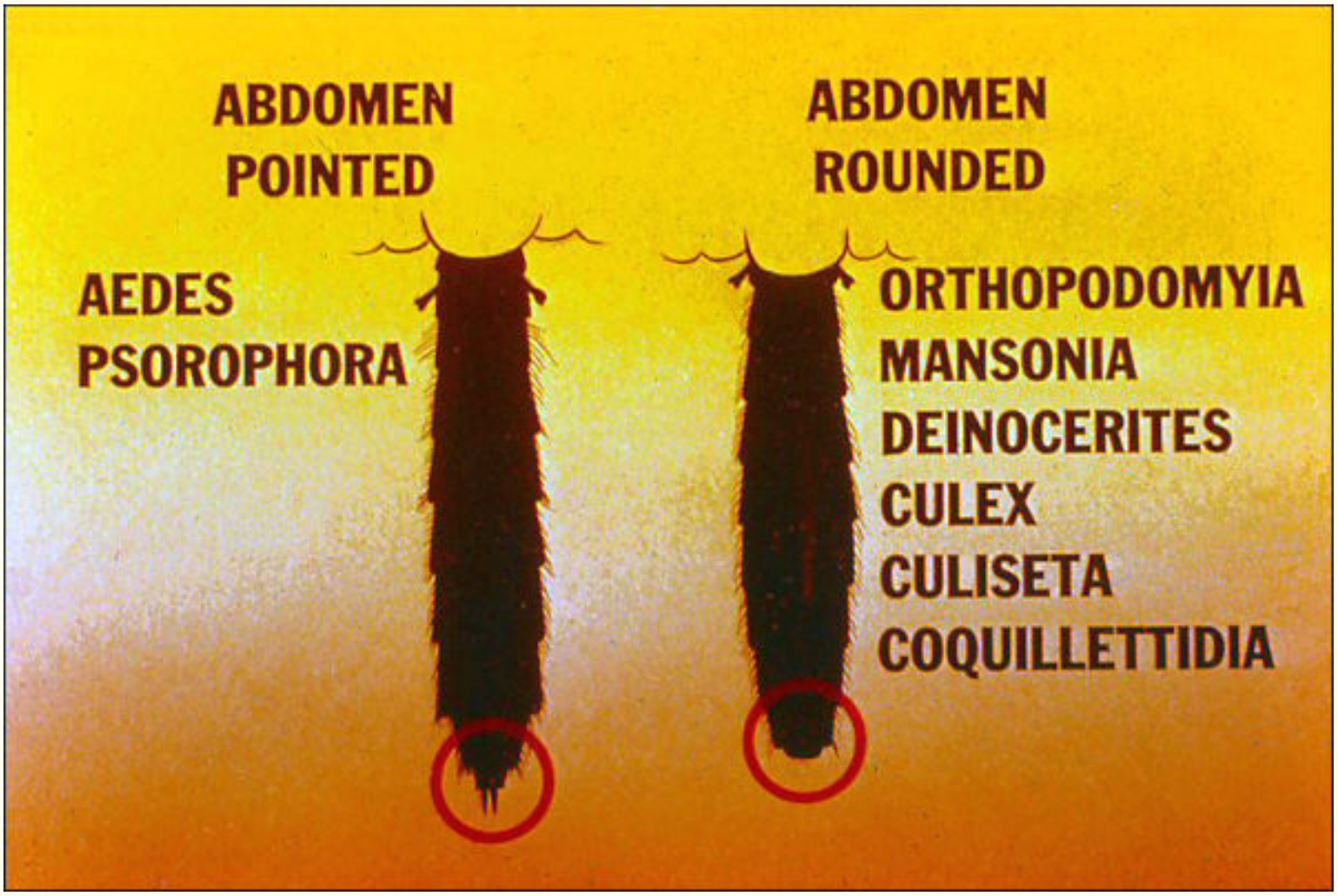

In two genera, *Aedes* and *Psorophora*, the tip of the abdomen is pointed. The remaining genera, which have blunt or rounded abdomens, are *Orthopodomyia, Mansonia, Deinocerites, Culex, Culiseta*, and *Coquillettidia*.

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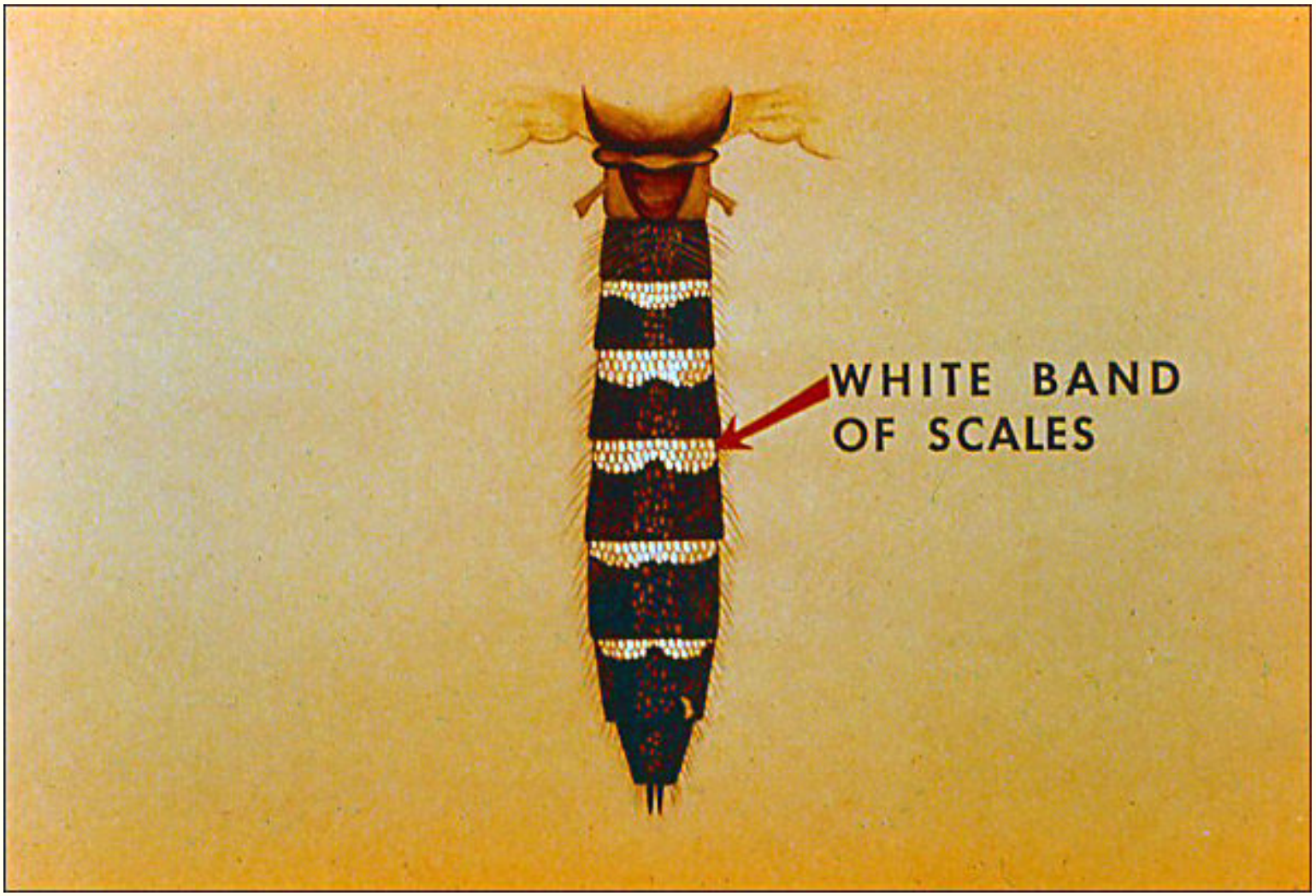

Aedes and *Psorophora*, the genera with with pointed abdomens, may be distinguished from each other by the location of the bands or lateral patches of pale scales on the abdomen segments, and by the presence or absence of prespiracular bristles, not pointed out on the illustrations of these genera in this slide set.

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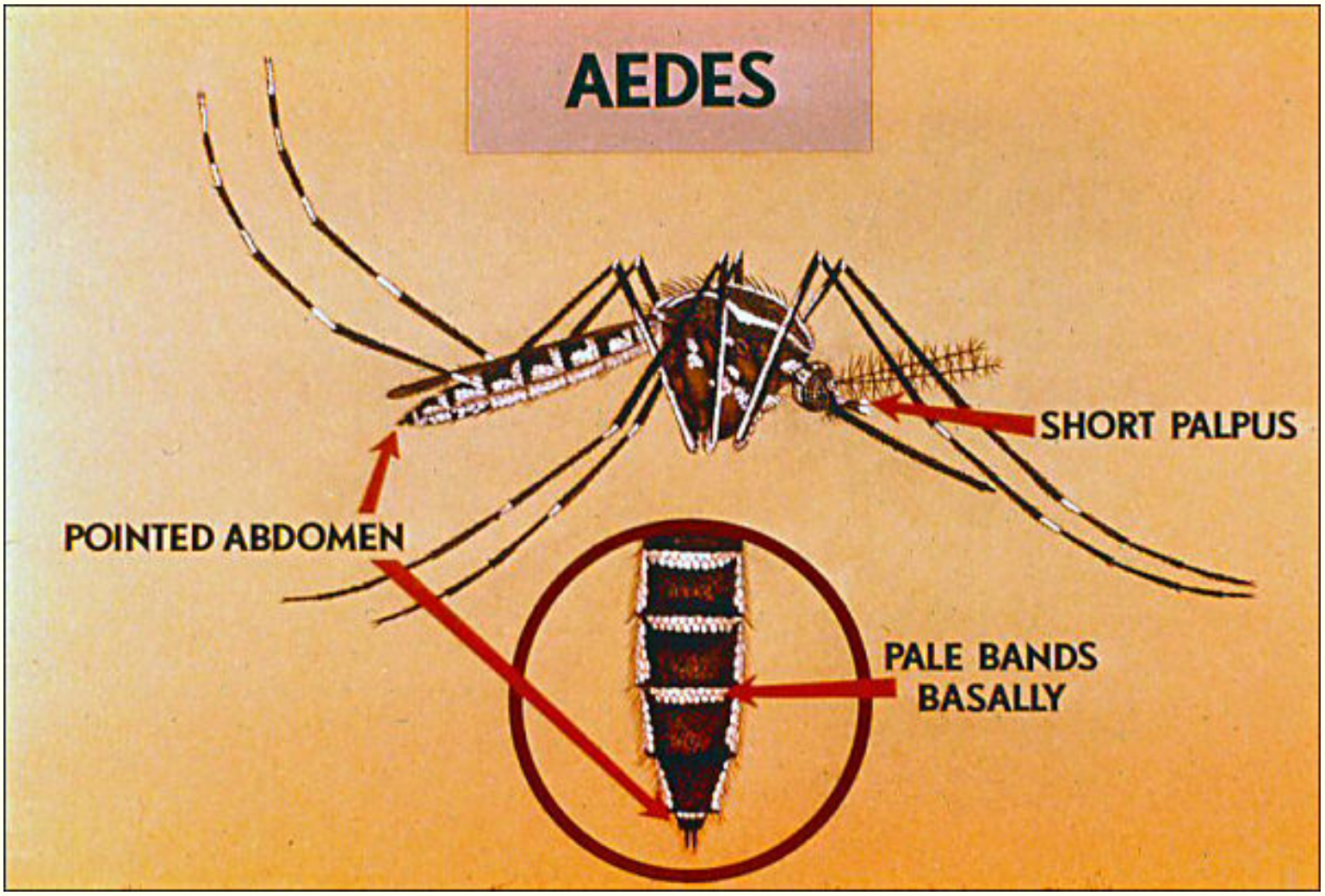

In the genus *Aedes*, a band or patch of pale scales occurs at the base or anterior end of the abdominal segment; also no prespiracular bristles are present.

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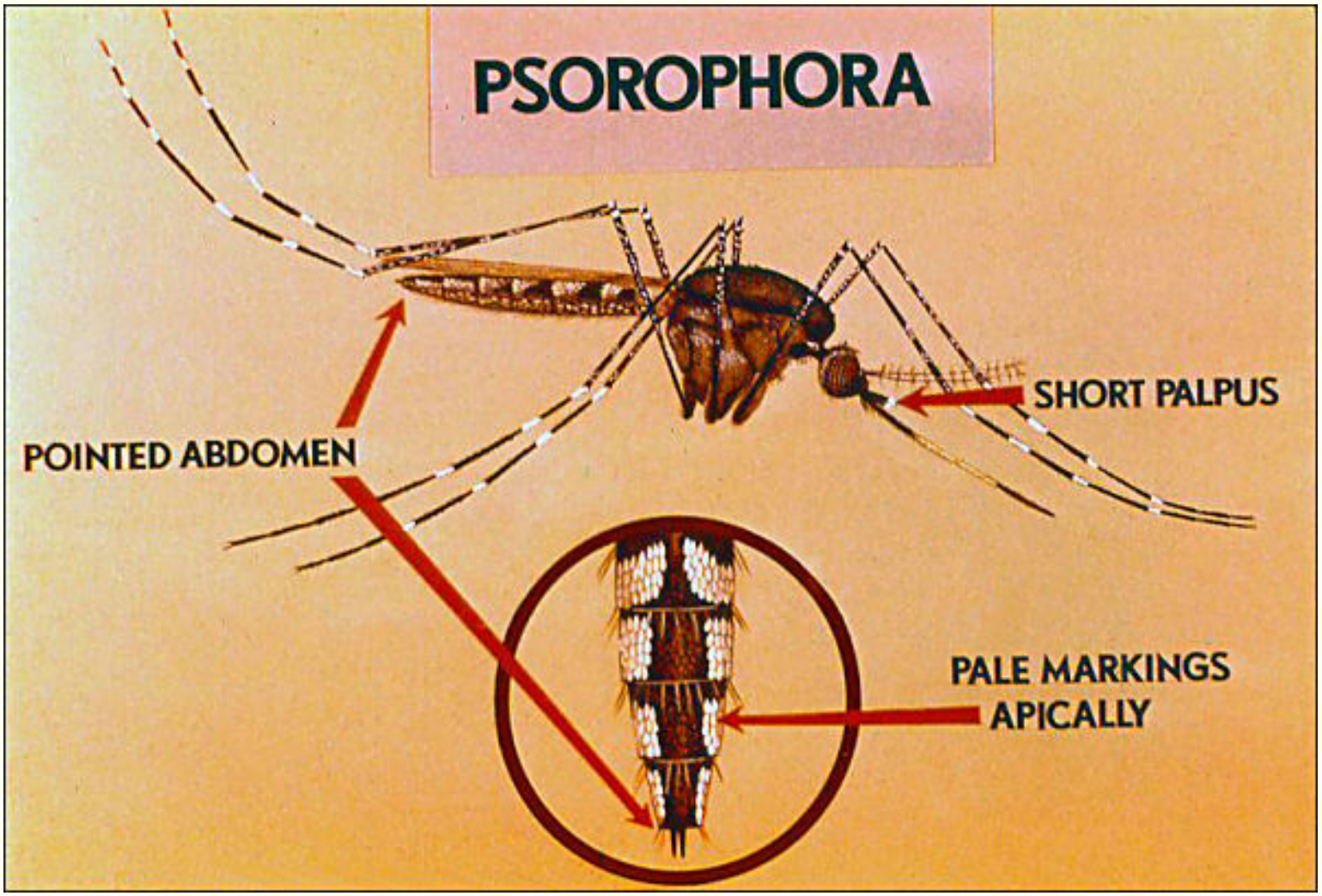

Abdominal segments of *Psorophora* have the bands or patches of pale scales located apically, or posteriorly; prespiracular bristles are present. In some members of this genus, the hind tibiae have long, erect scales.

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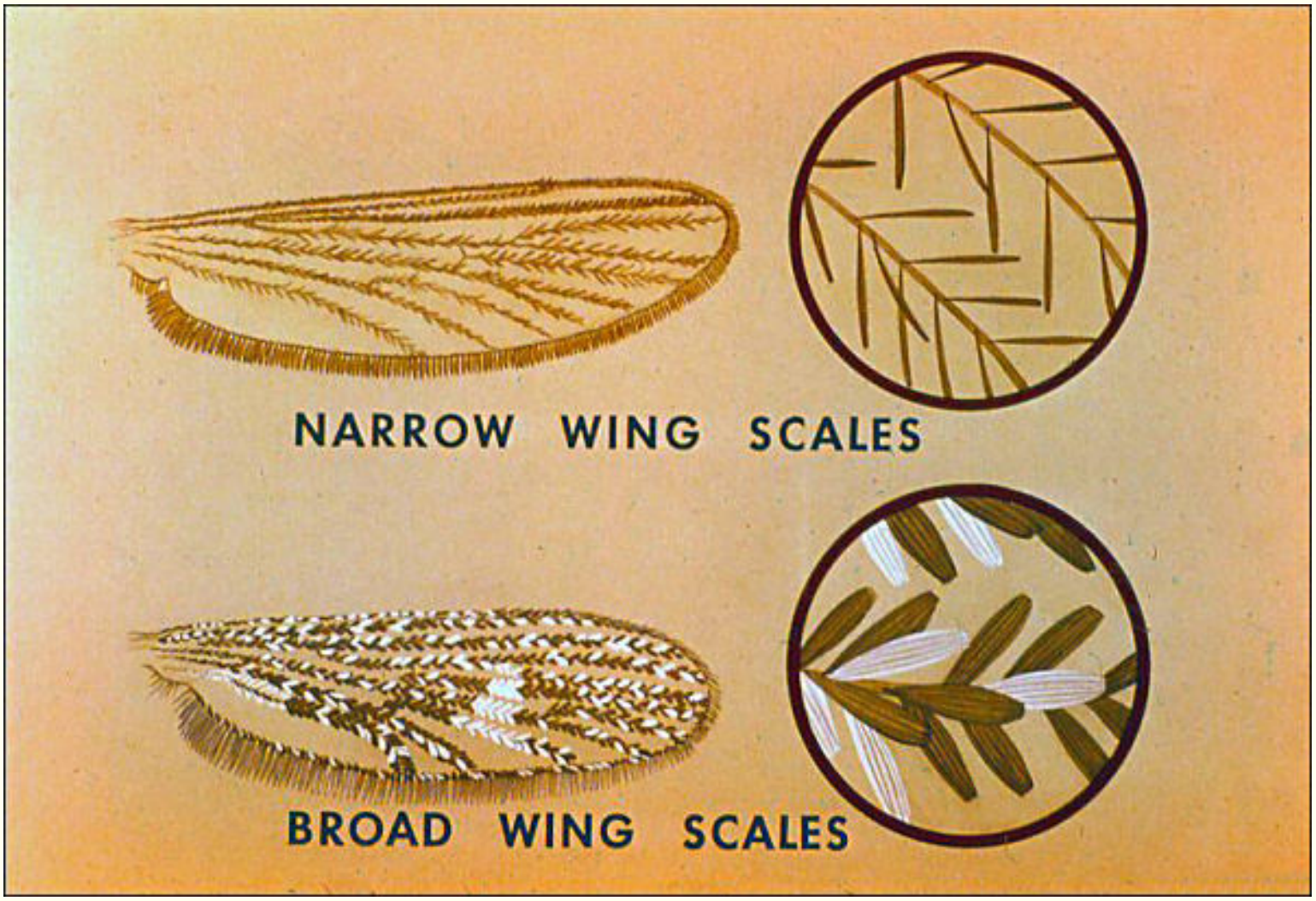

The other genera may be further divided into two groups. One group has comparatively broad, light and dark wing scales distributed over the entire wing. The other group usually has long narrow wing scales. But if the broad scales do occur on the outer part of the wing, they are all dark. In a few cases pale scales may be present on the

anterior wing veins.

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Note here that wing scales are quite broad. *Mansonia, Orthopodomyia*, and *Coquillettidia* have these broad varicolored wing scales.

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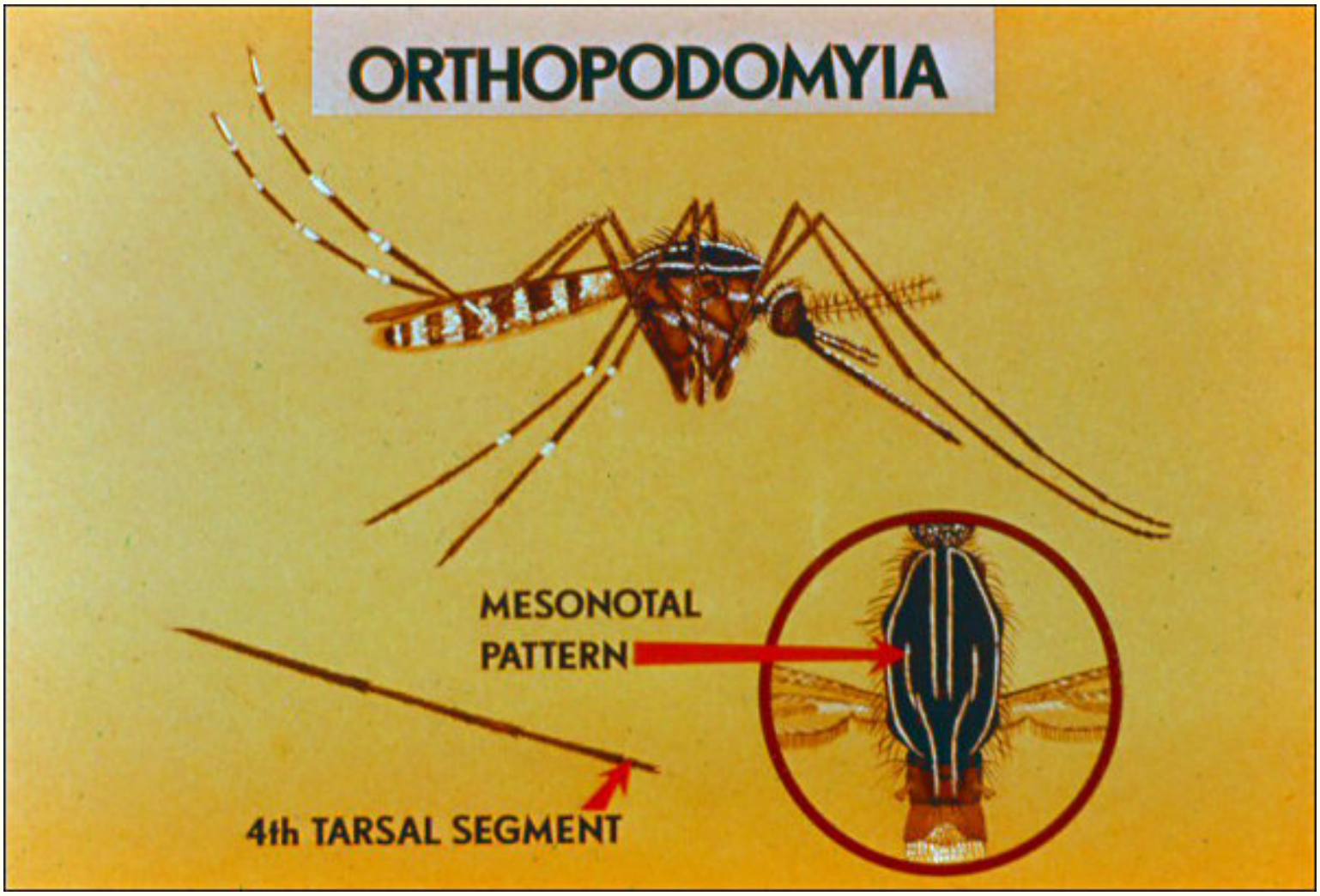

Orthopodomyia may be distinguished by the delicate lines on the mesonotum and the very short fourth tarsal segment on the front pair of legs.

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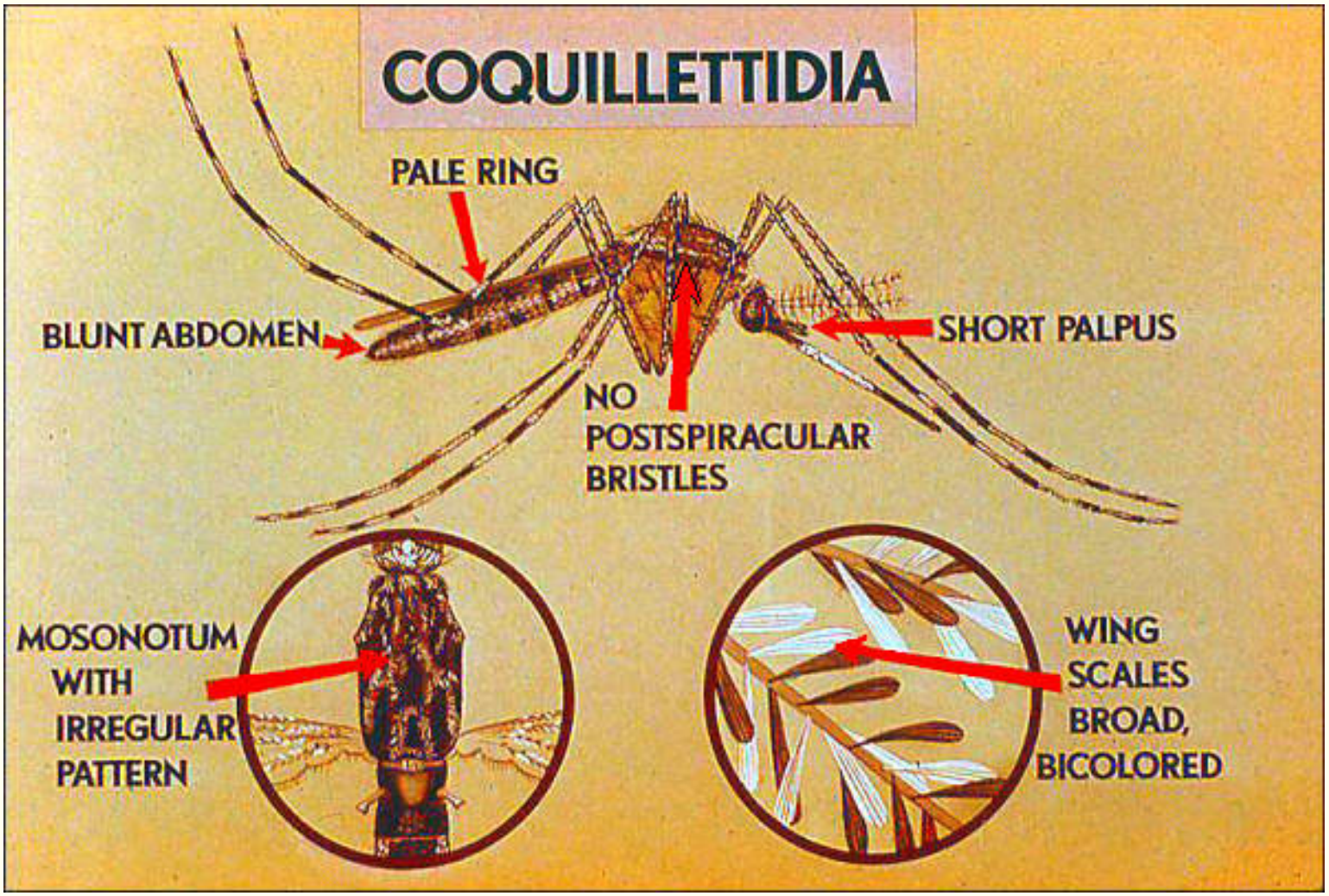

Coquillettidia has a white ring on the hind tibia and no postspiracular bristles.

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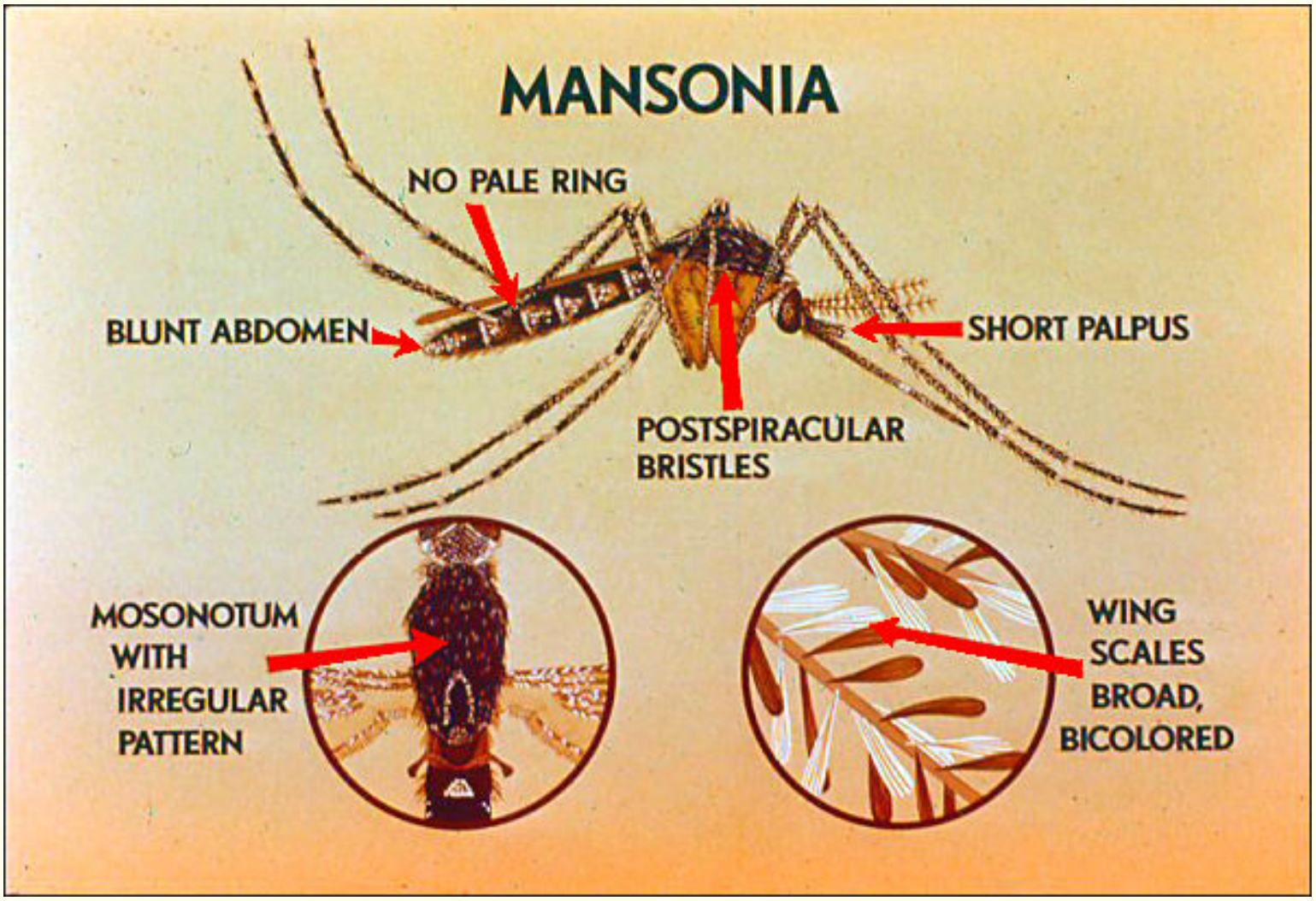

Mansonia, on the other hand, has no ring of pale scales on the hind tibia and post-spiracular bristles are present.

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The other three genera, *Deinocerites, Culex*, and *Culiseta*, have narrow wing scales.

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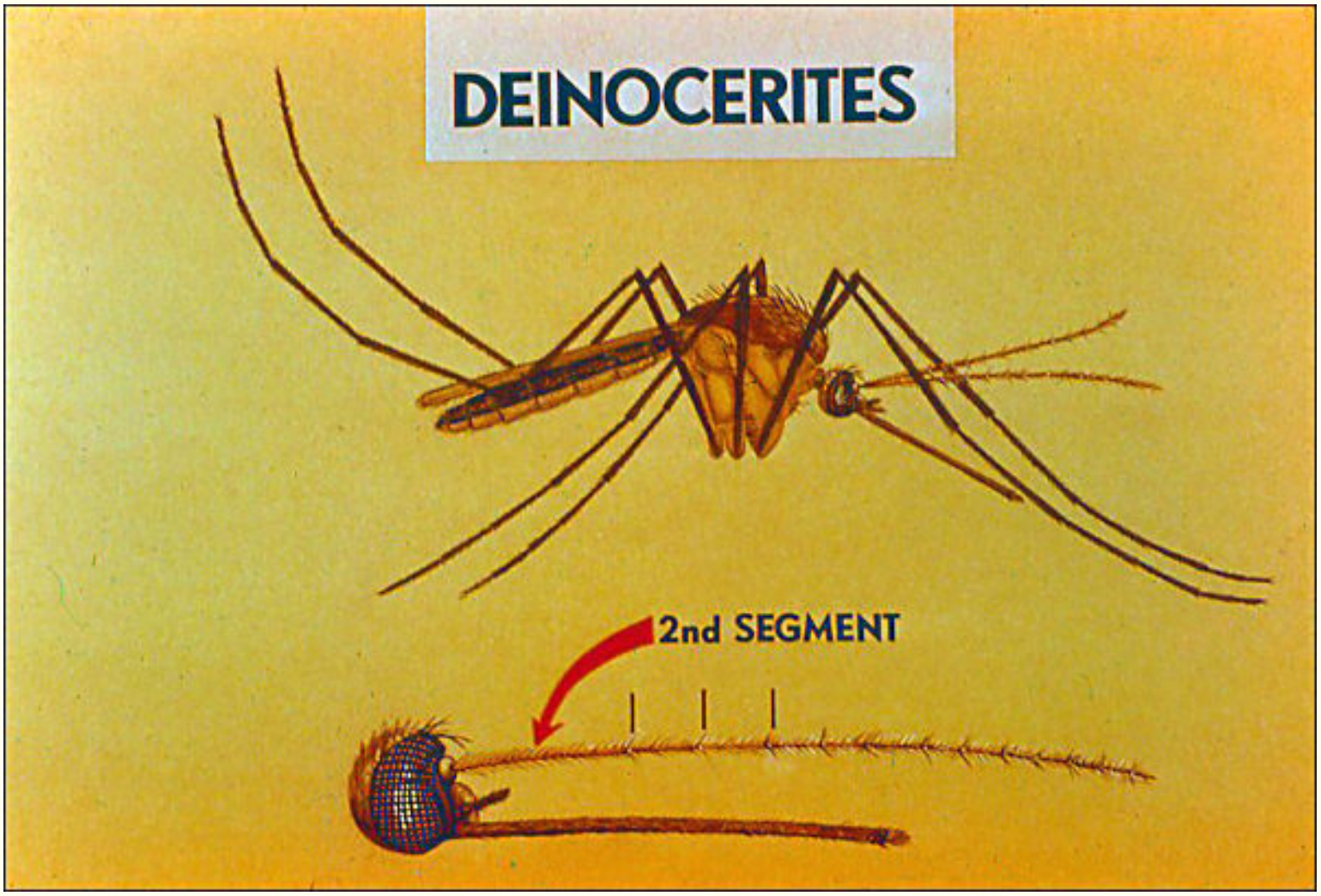

Deinocerites has antennal segments which are characteristic. Note that the second segment of the antenna is at least as long as the next two segments and the antennae are much longer than the proboscis.

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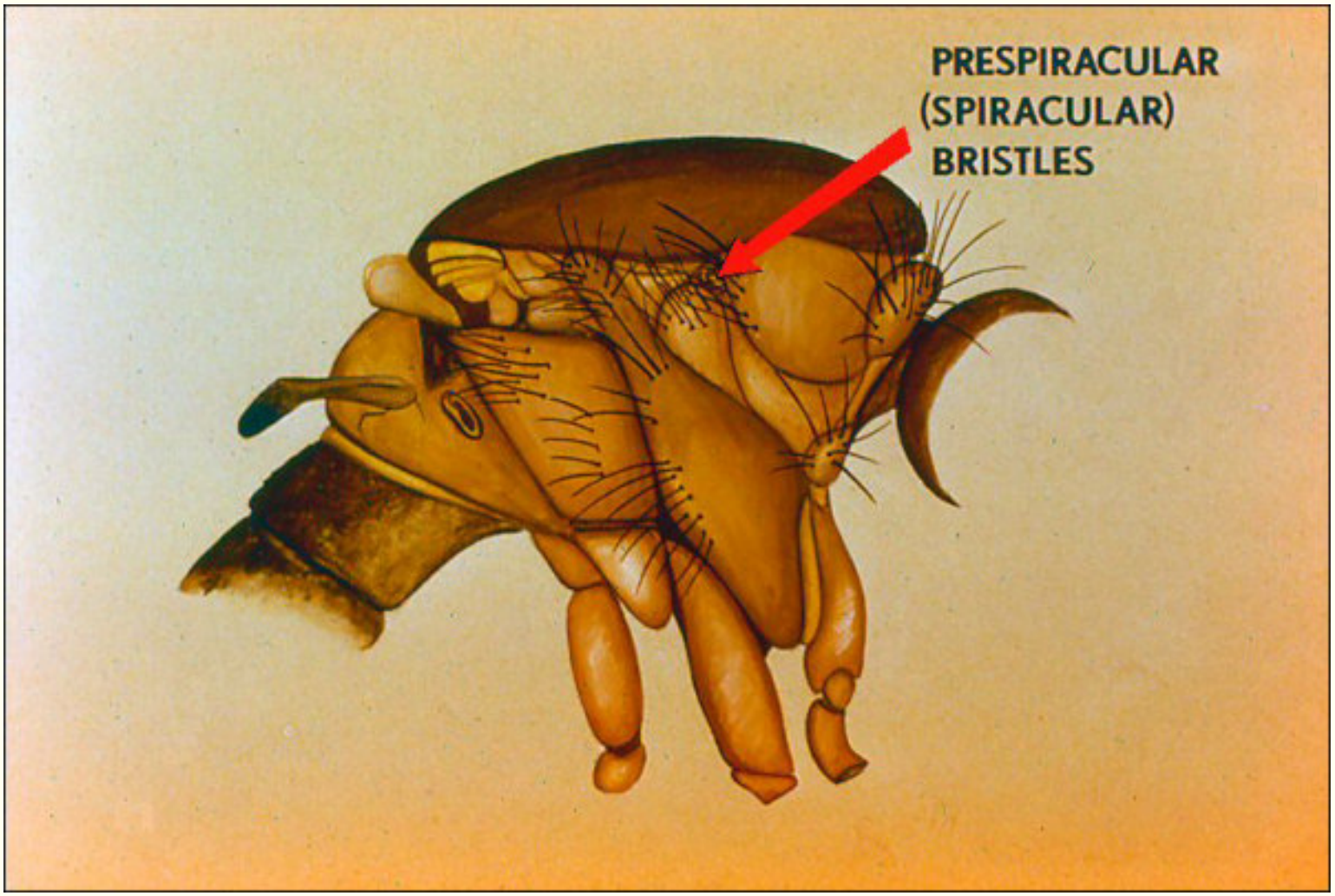

Culiseta may be distinguished from *Culex* mainly by the presence or absence of prespiracular bristles.

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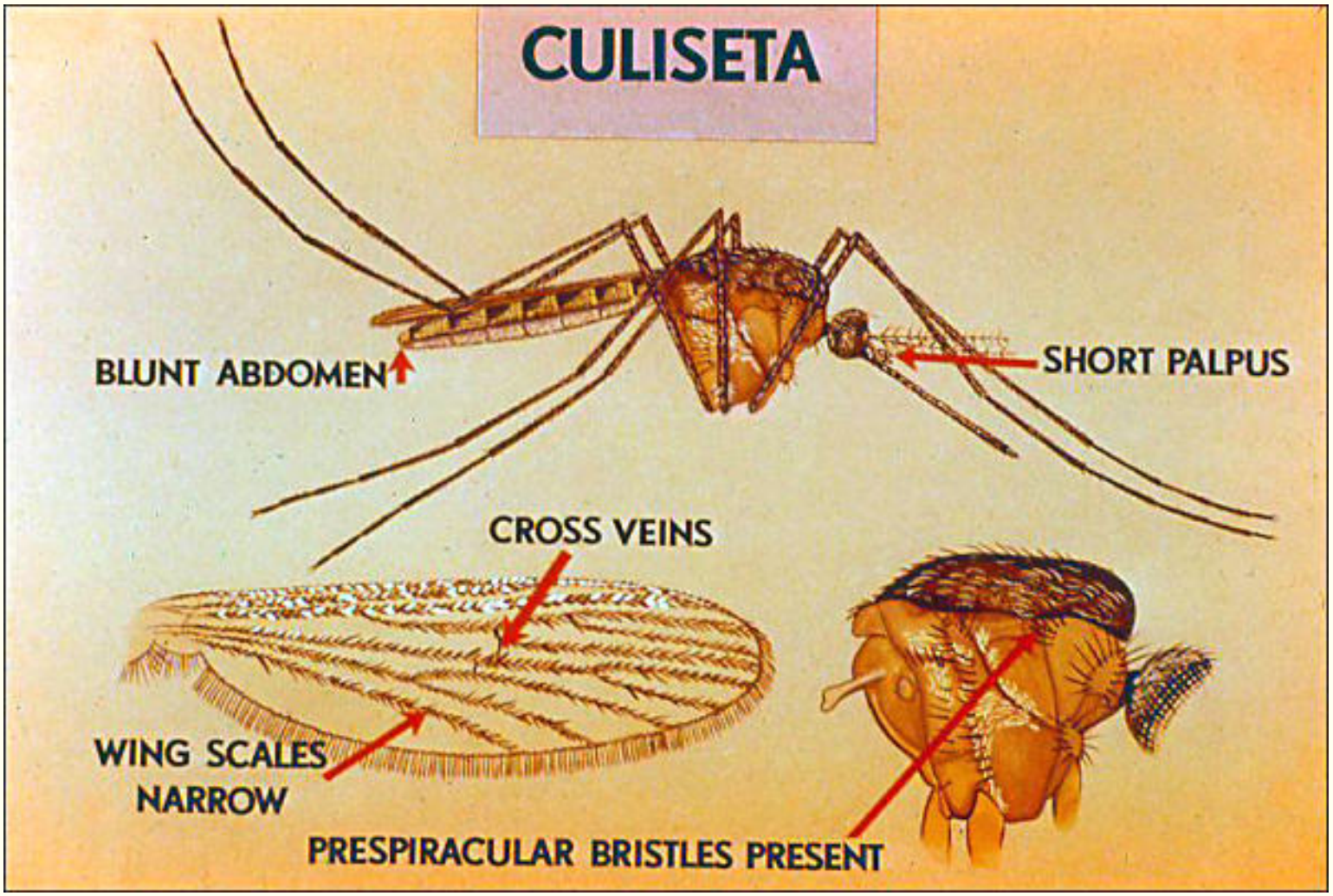

Culiseta has prespiracular bristles. In all but two rare species, the cross veins arising from the 4th wing vein are separated by a distance less than the length of either cross vein, and the subcosta wing vein has a row of bristles basally on the ventral side, a character not shown in this slide set.

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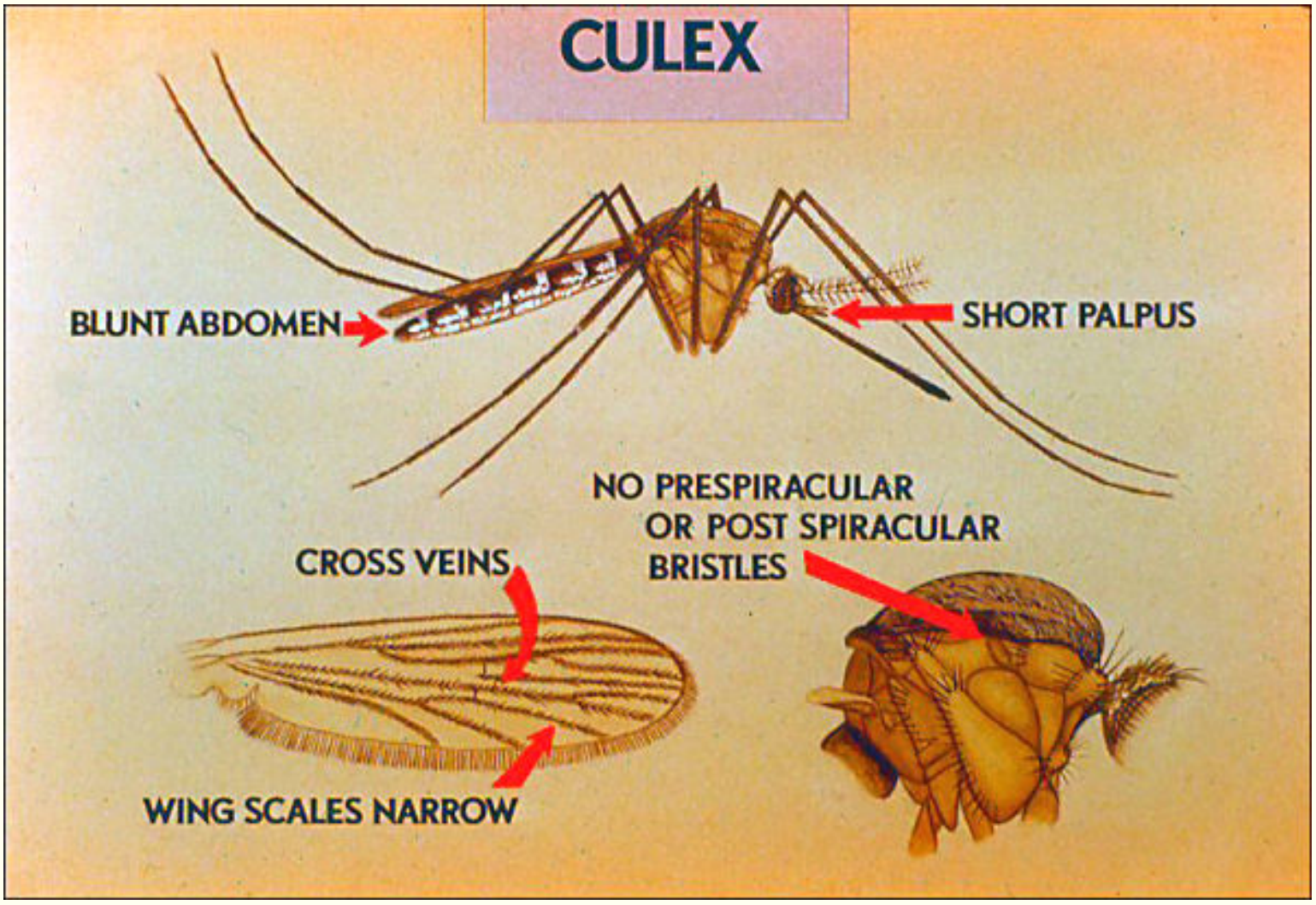

Culex does not have prespiracular bristles. Note also that the cross veins arising from wing vein four are separated by a distance greater than the length of either cross vein; in addition, the subcosta wing vein does not have a row of bristles.

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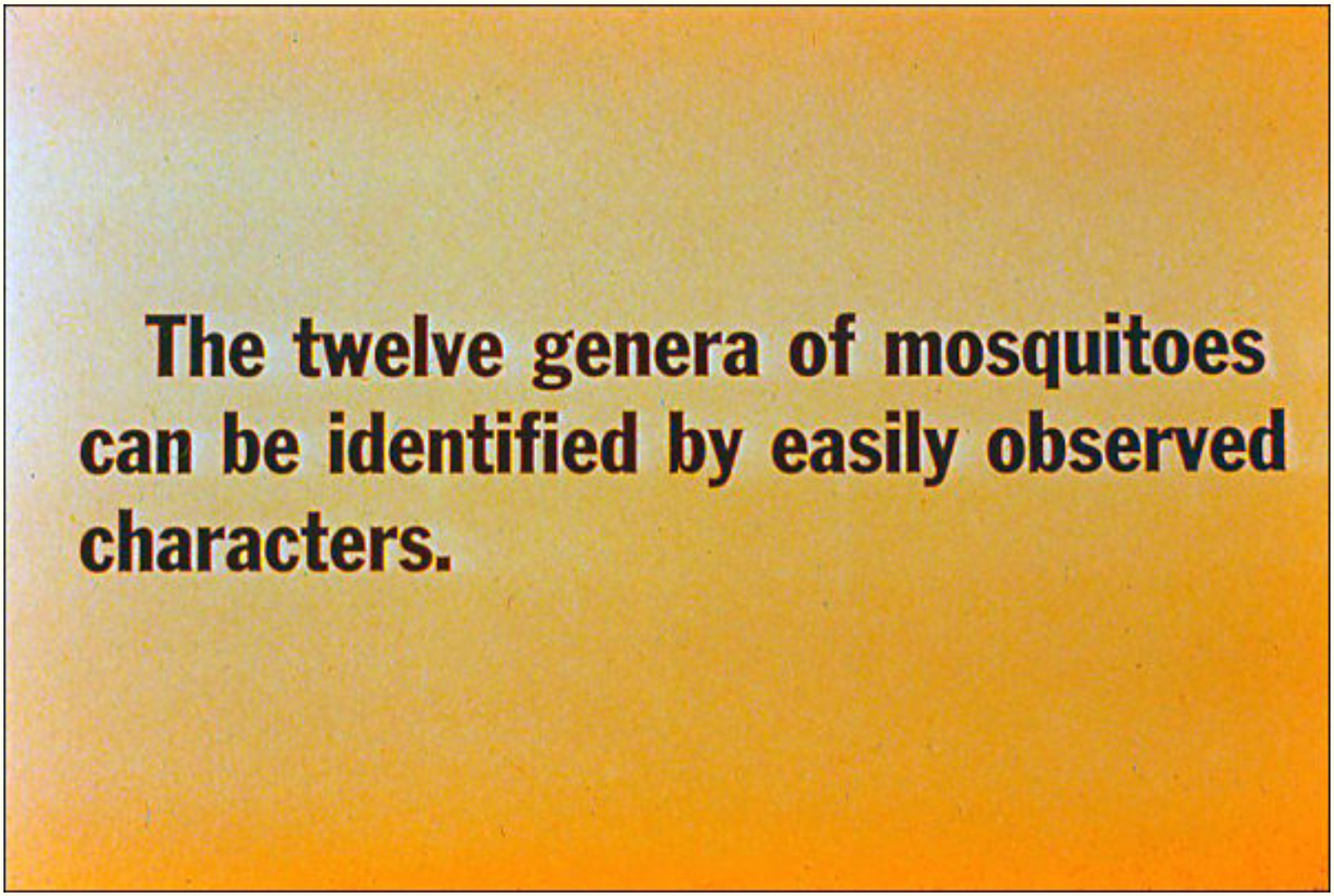

We have seen that the 12 genera of mosquitoes can be identified by easily observed characters.

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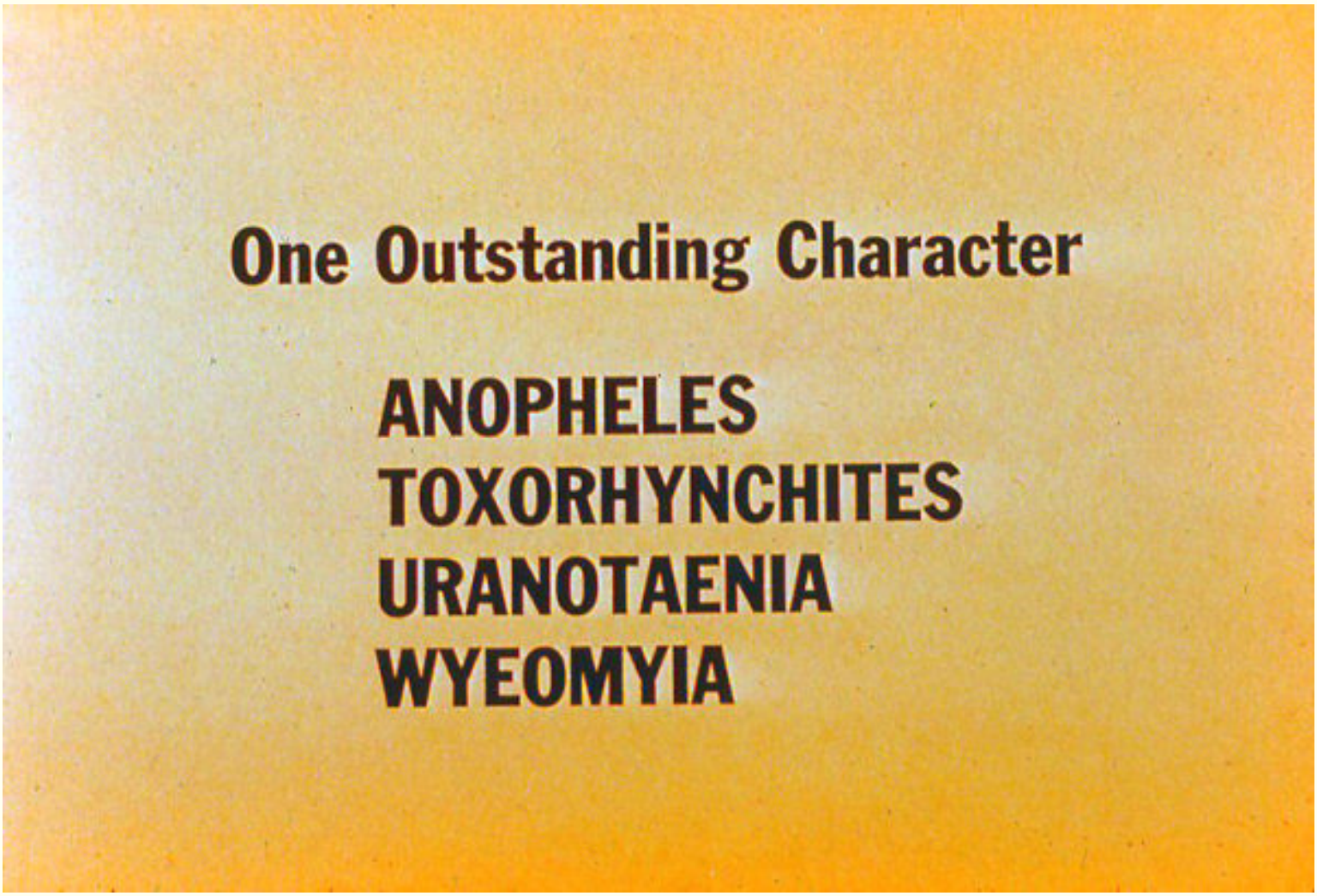

Four genera, *Anopheles, Toxorhynchites, Uranotaenia*, and *Wyeomyia* may each be recognized by a single outstanding character not possessed by other genera of mosquitoes.

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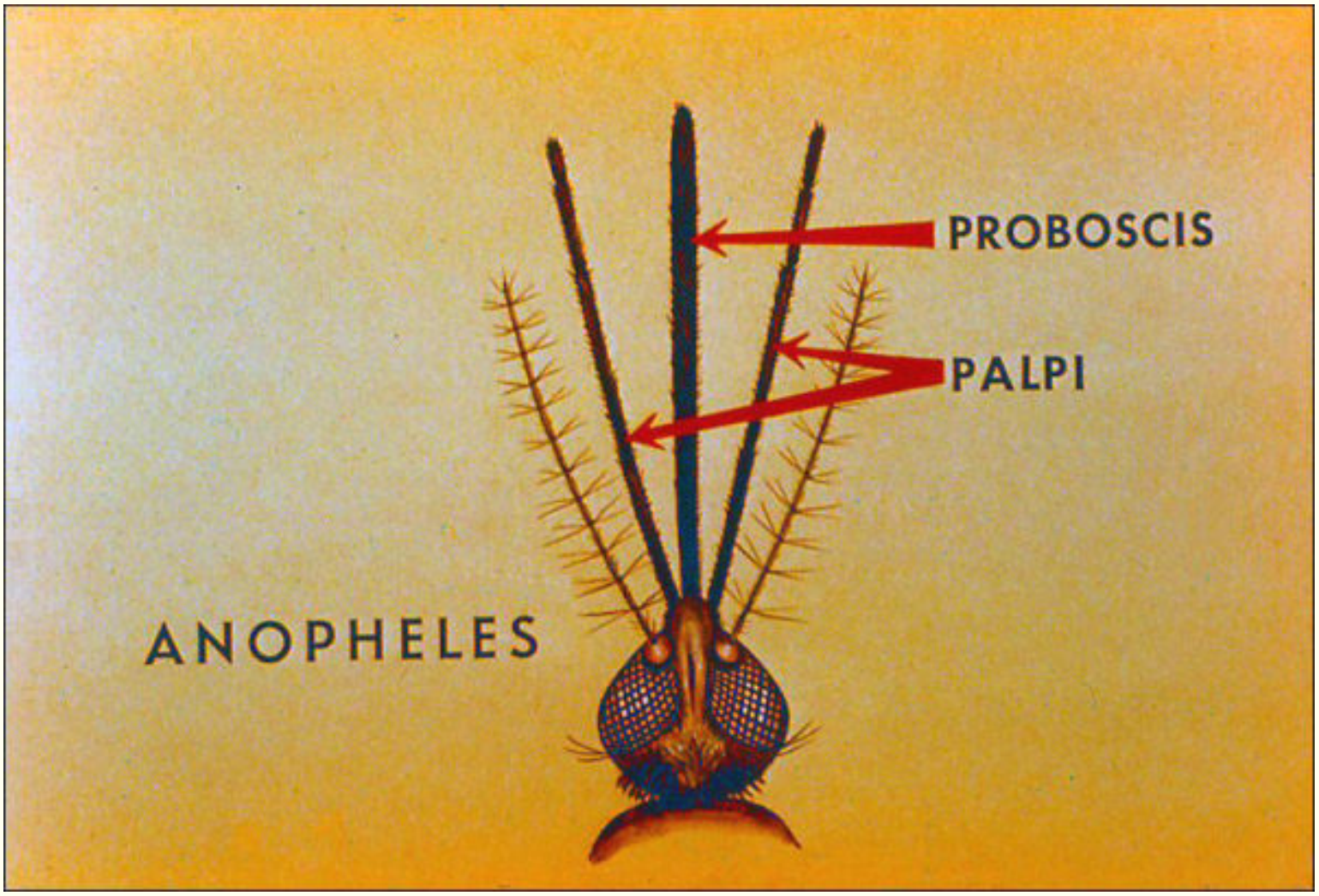

Anopheles has palpi as long as the proboscis.

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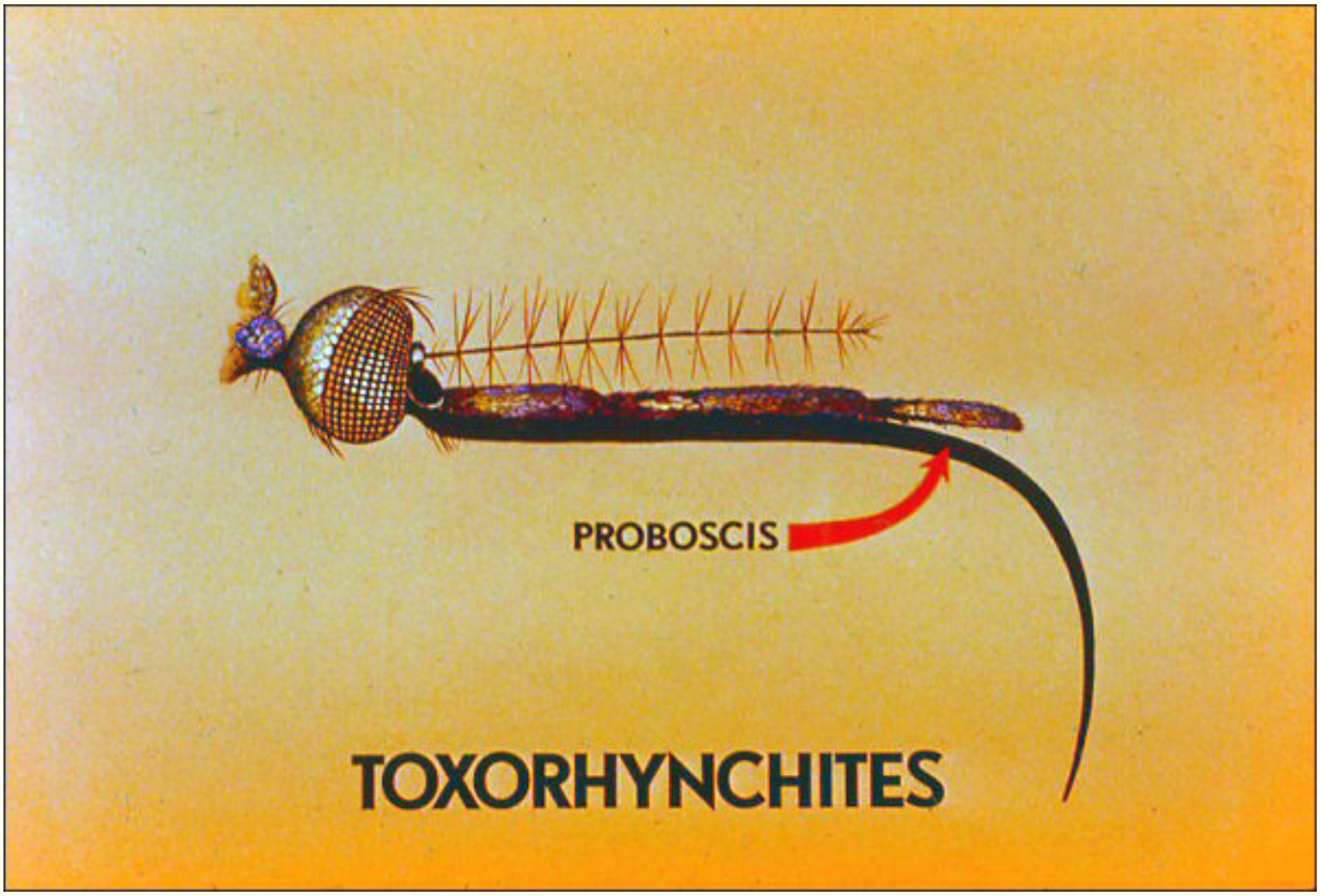

Toxorhynchites has a long curved proboscis.

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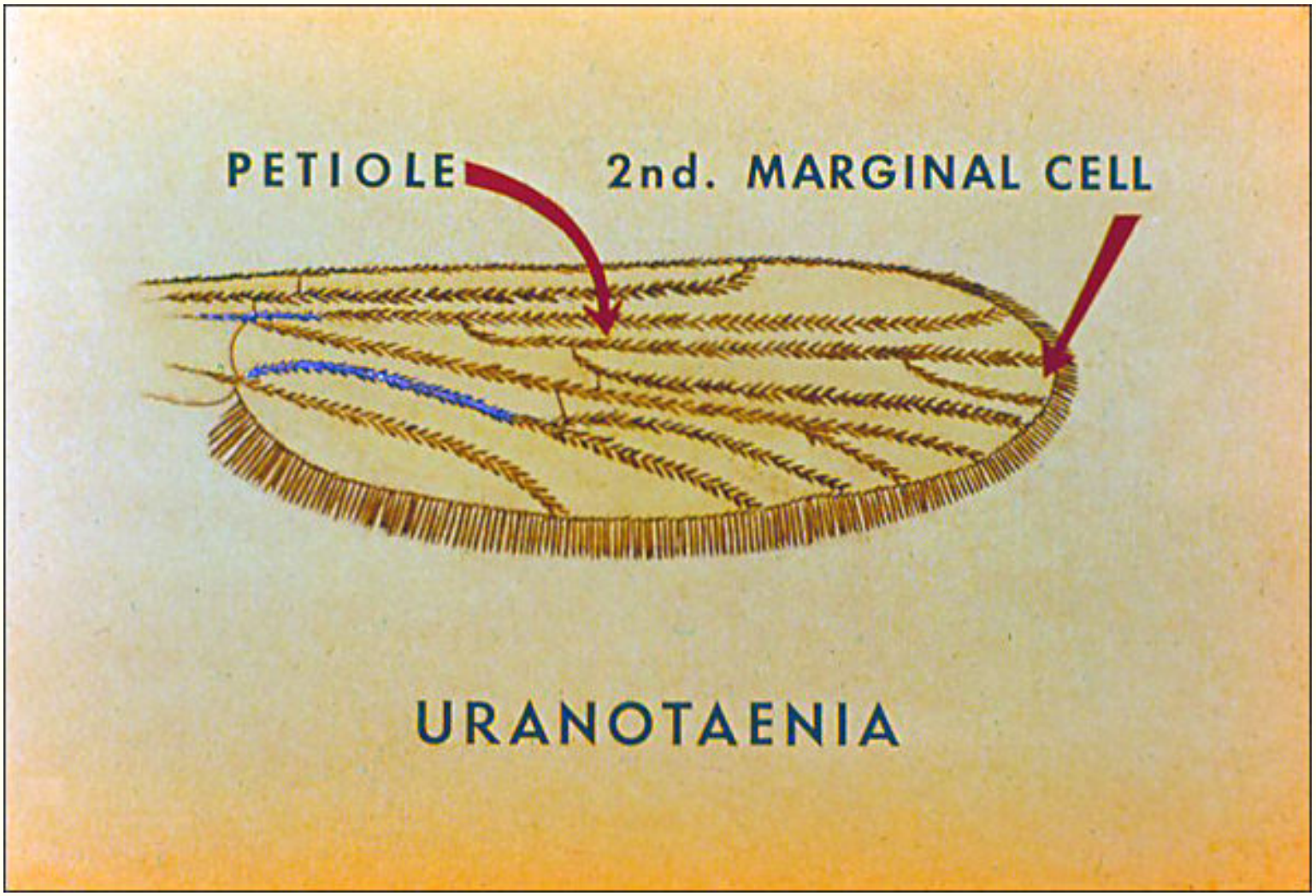

In *Uranotaenia*, the second marginal cell of the wing is less than half long as its stem, or petiole.

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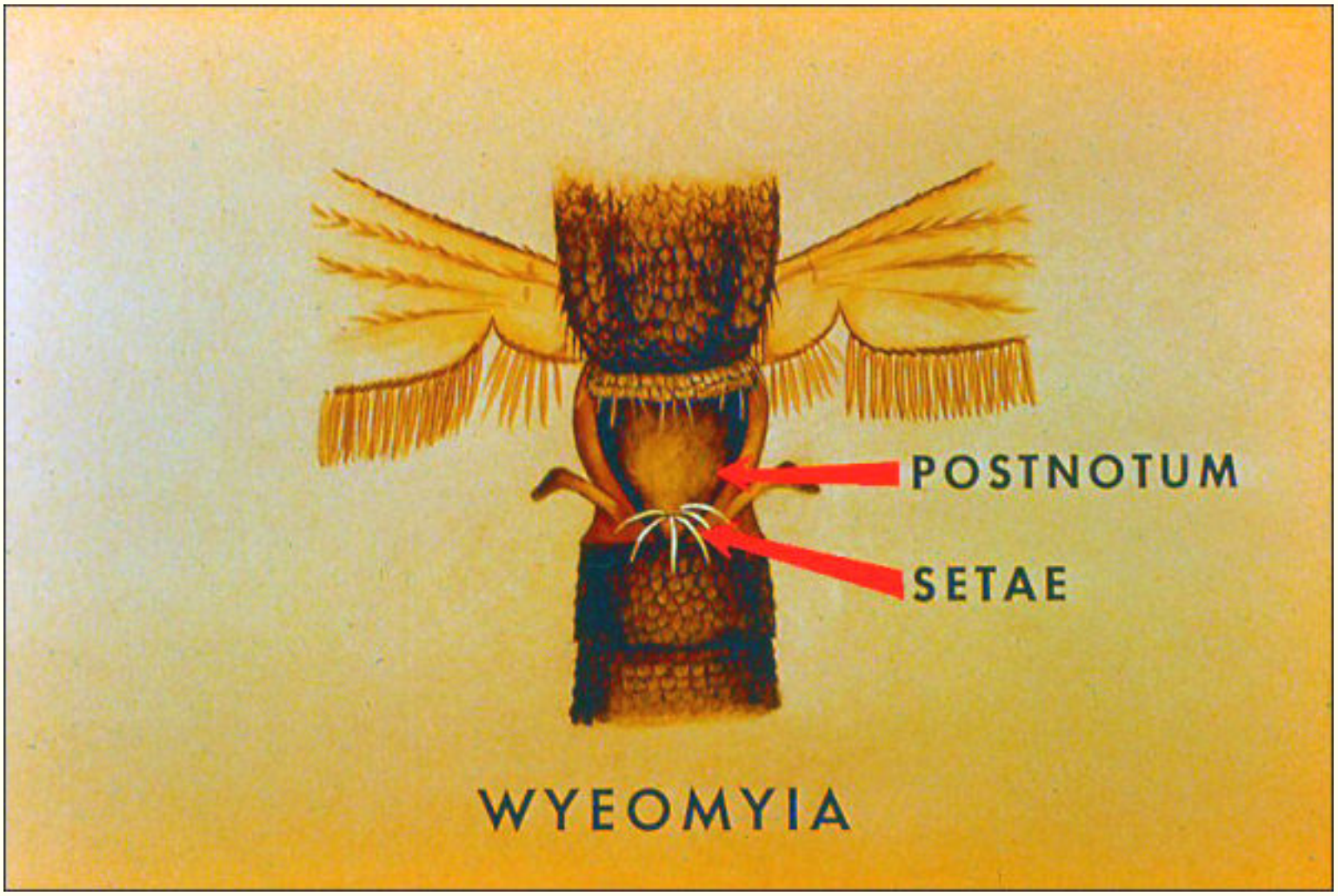

Wyeomyia has a hair tuft or setae on the postnotum.

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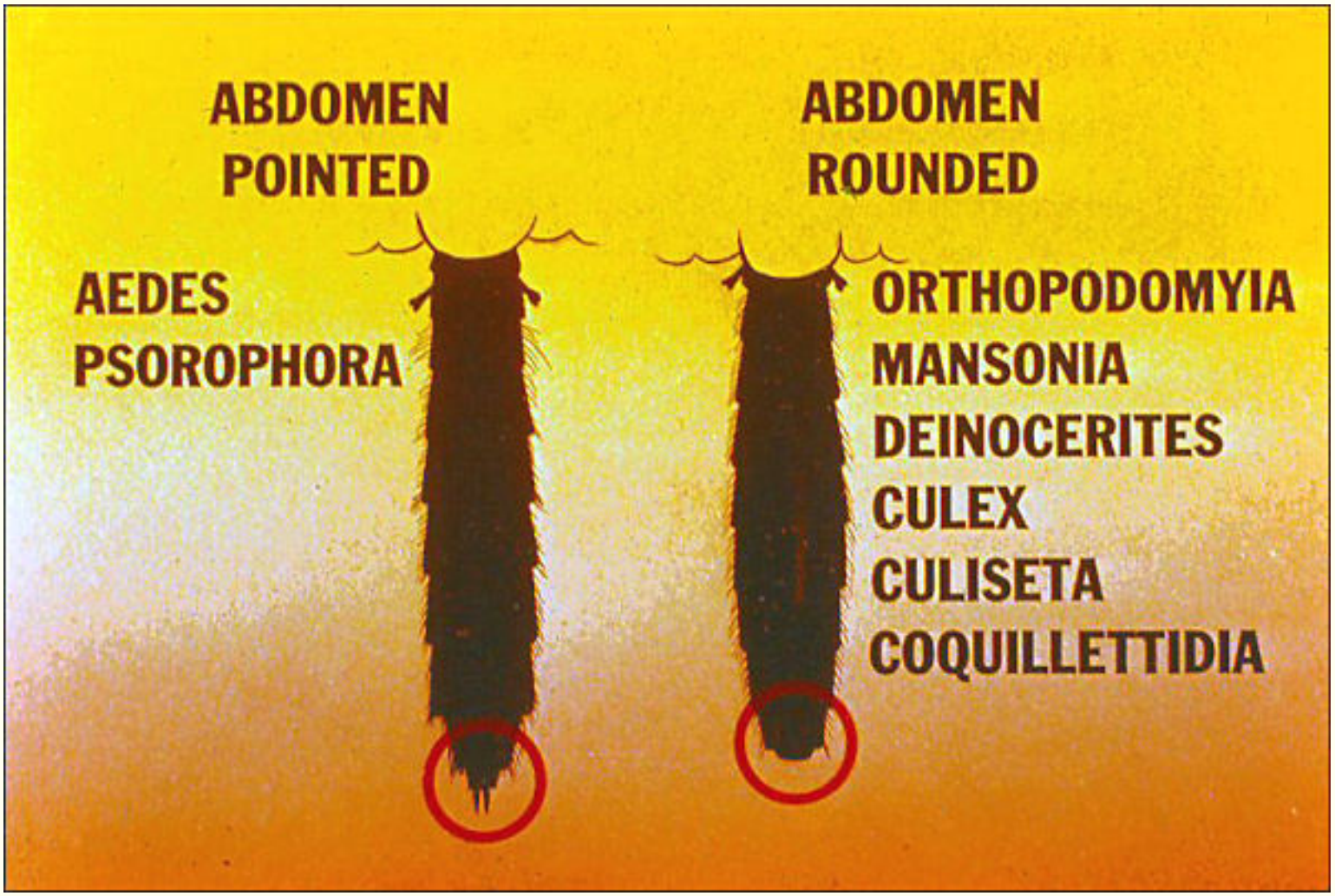

The other genera may be placed in one of two groups according to the shape of the tip of the abdomen. *Aedes* and *Psorophora* have pointed abdomens. *Orthopodomyia, Mansonia, Deinocerites, Culex, Culiseta*, and *Coquillettidia* have blunt abdomens.

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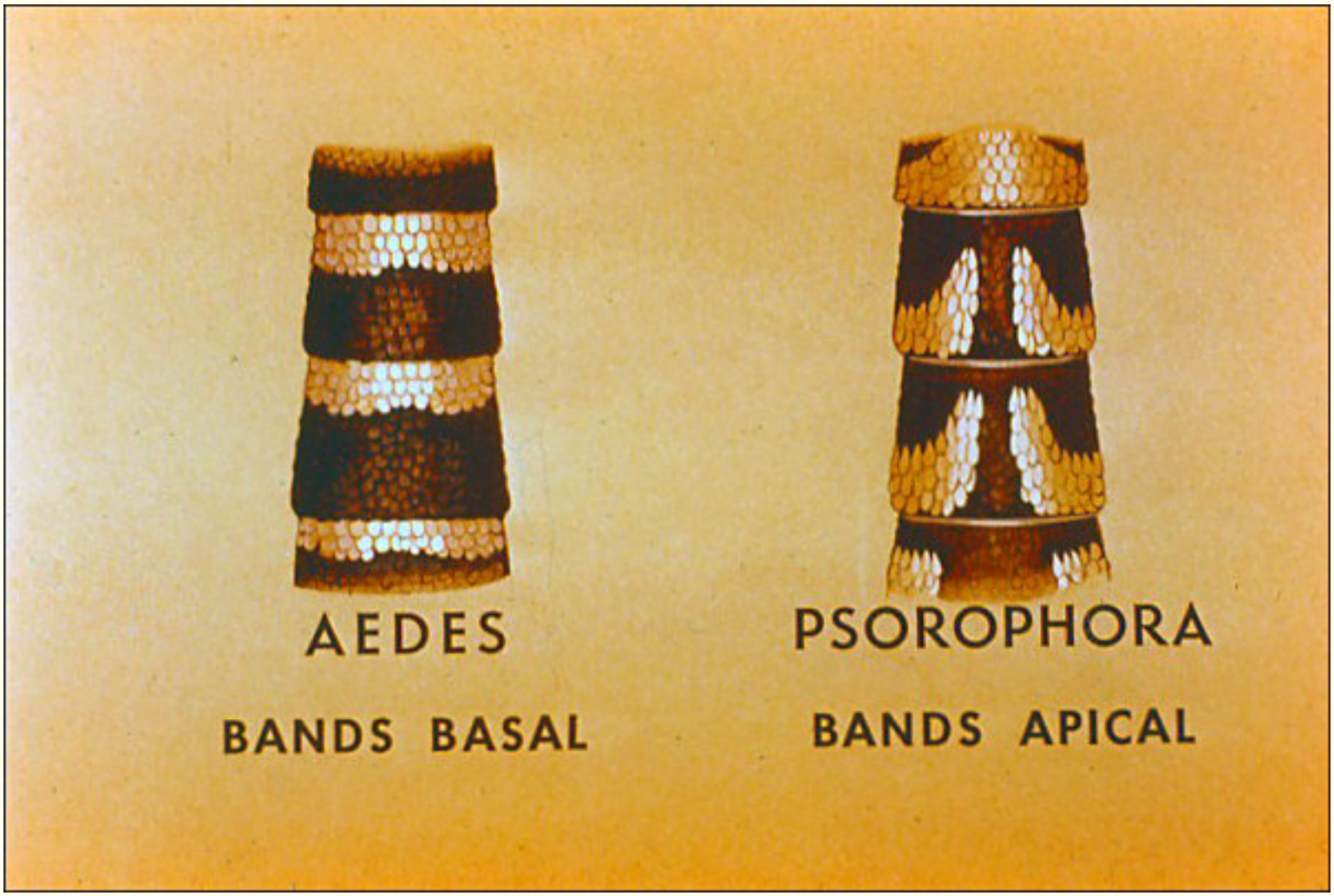

Aedes may be distinguished from *Psorophora* by location of white bands or lateral patches on the abdominal segments. In *Aedes* they are basal; in *Psorophora* they are apical. Don't forget that *Aedes* has no prespiracular bristles, while *Psorophora* does have them present.

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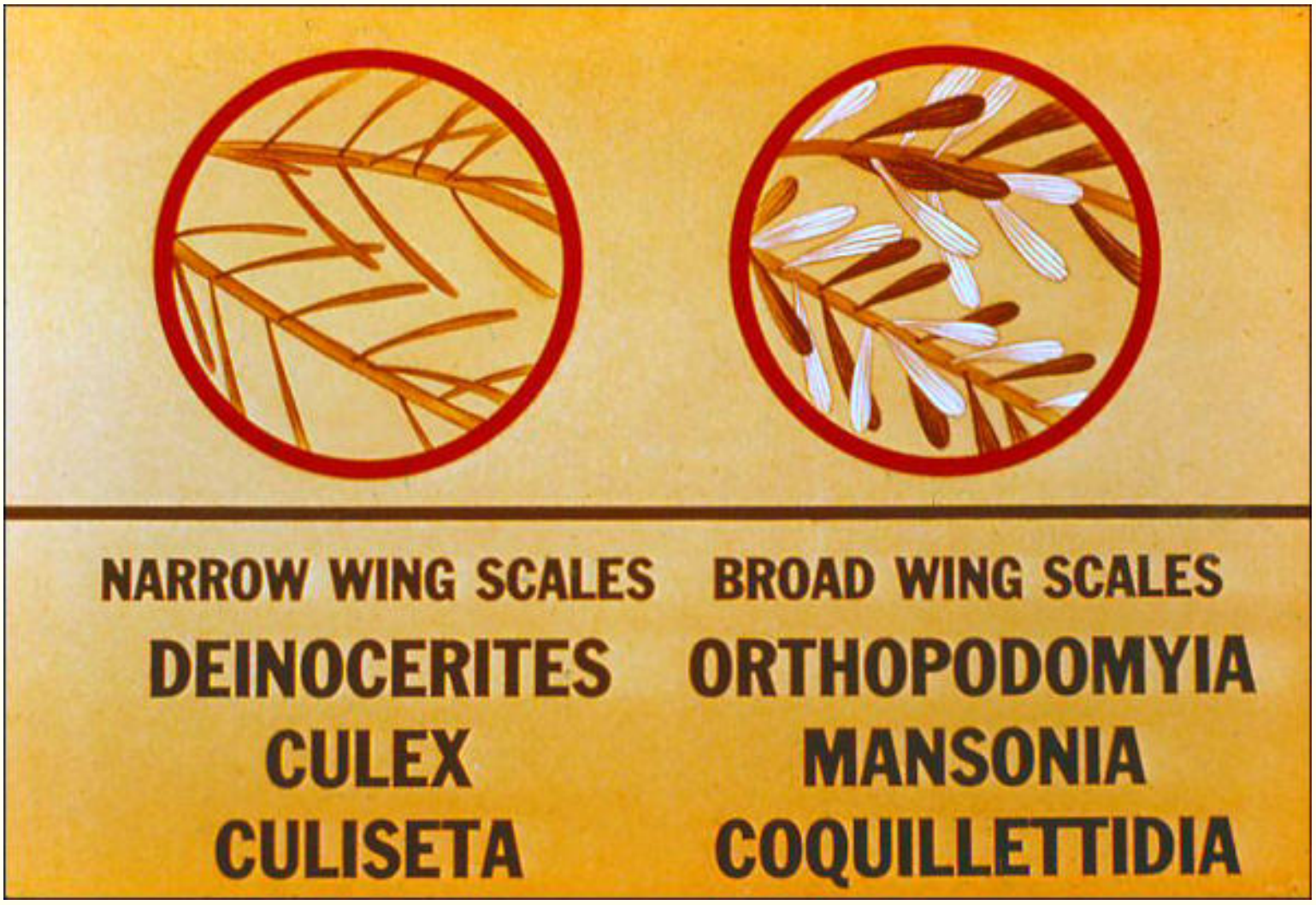

The genera with blunt abdomens may be further separated into two groups by using the size of wing scales. *Orthopodomyia, Mansonia*, and *Coquillettidia* have broad, light and dark wing scales. *Deinocerites*, and *Culiseta* usually have narrow wing scales.

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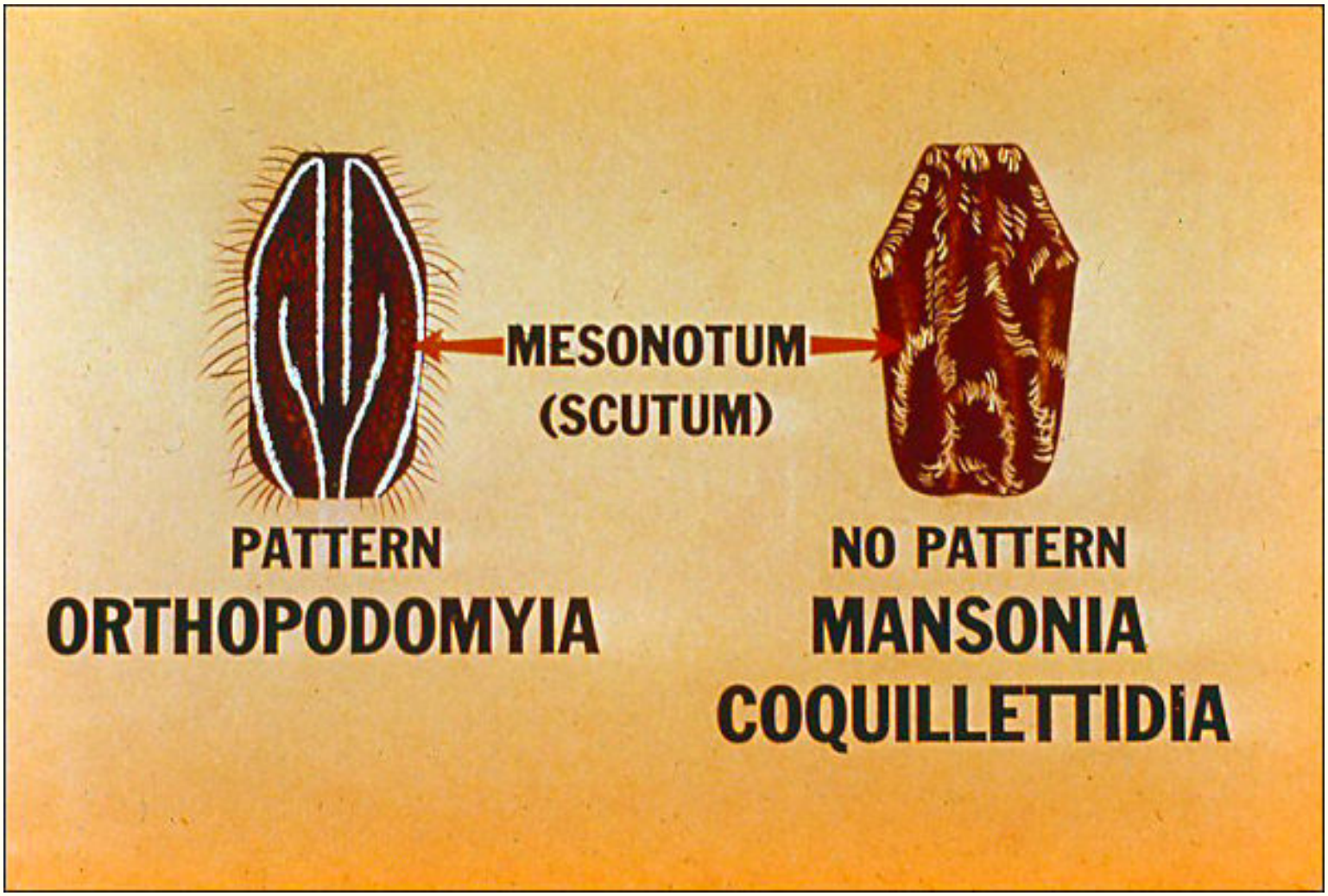

Orthopodomyia may be distinguished from *Mansonia* and *Coquillettidia* by the pattern on the mesonotum or scutum. Scales on the mesonotum of *Orthopodomyia* form a definite pattern of delicate white lines, while the dark and light scales on the mesonotums of *Mansonia* and *Coquillettidia* do not form a definite pattern.

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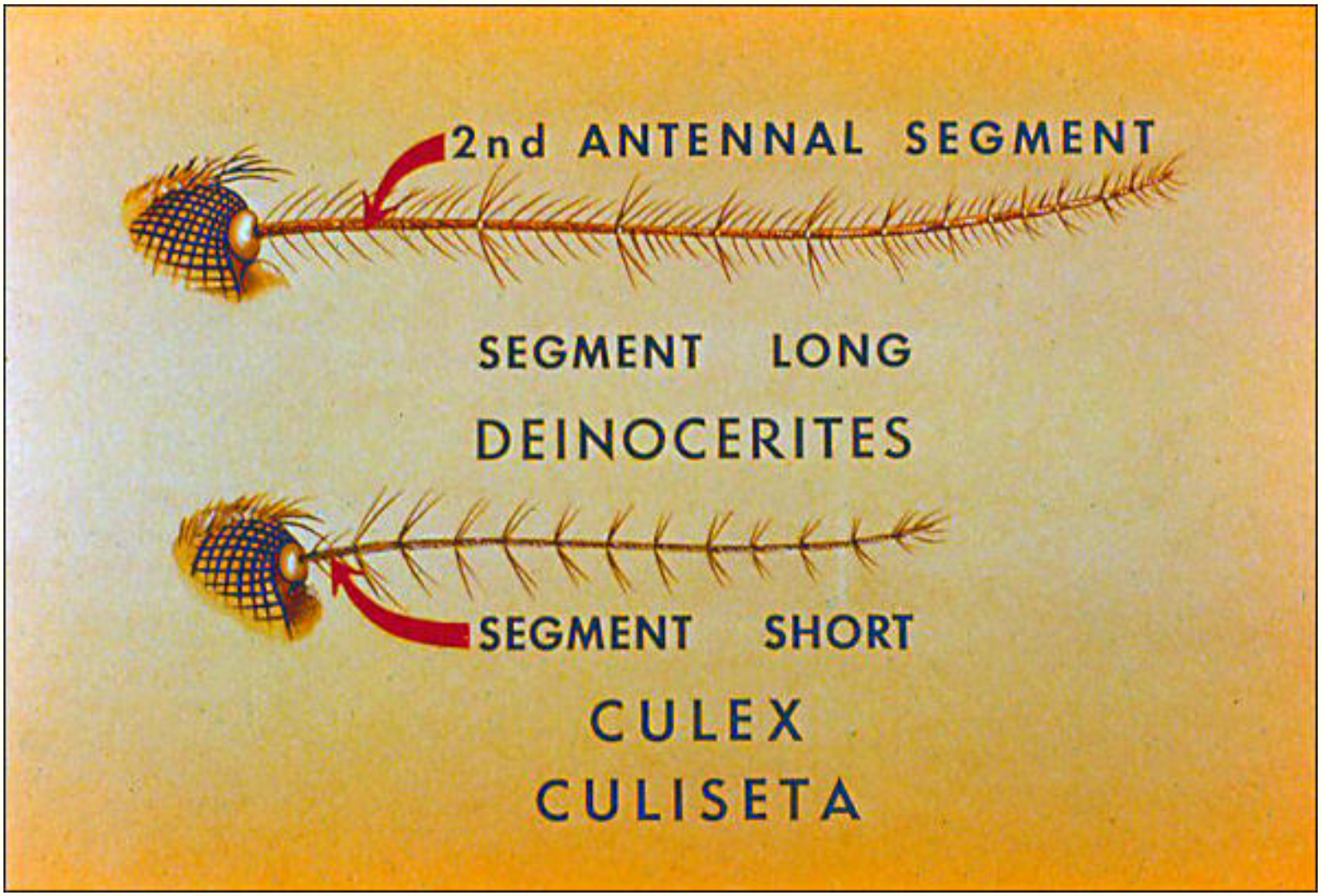

Deinocerites can be distinguished from *Culex* and *Culiseta* by the long second antennal segment and by the unusually long antennae. In the other genera the second segment is about a long as the third and the antennae are no longer than the proboscis.

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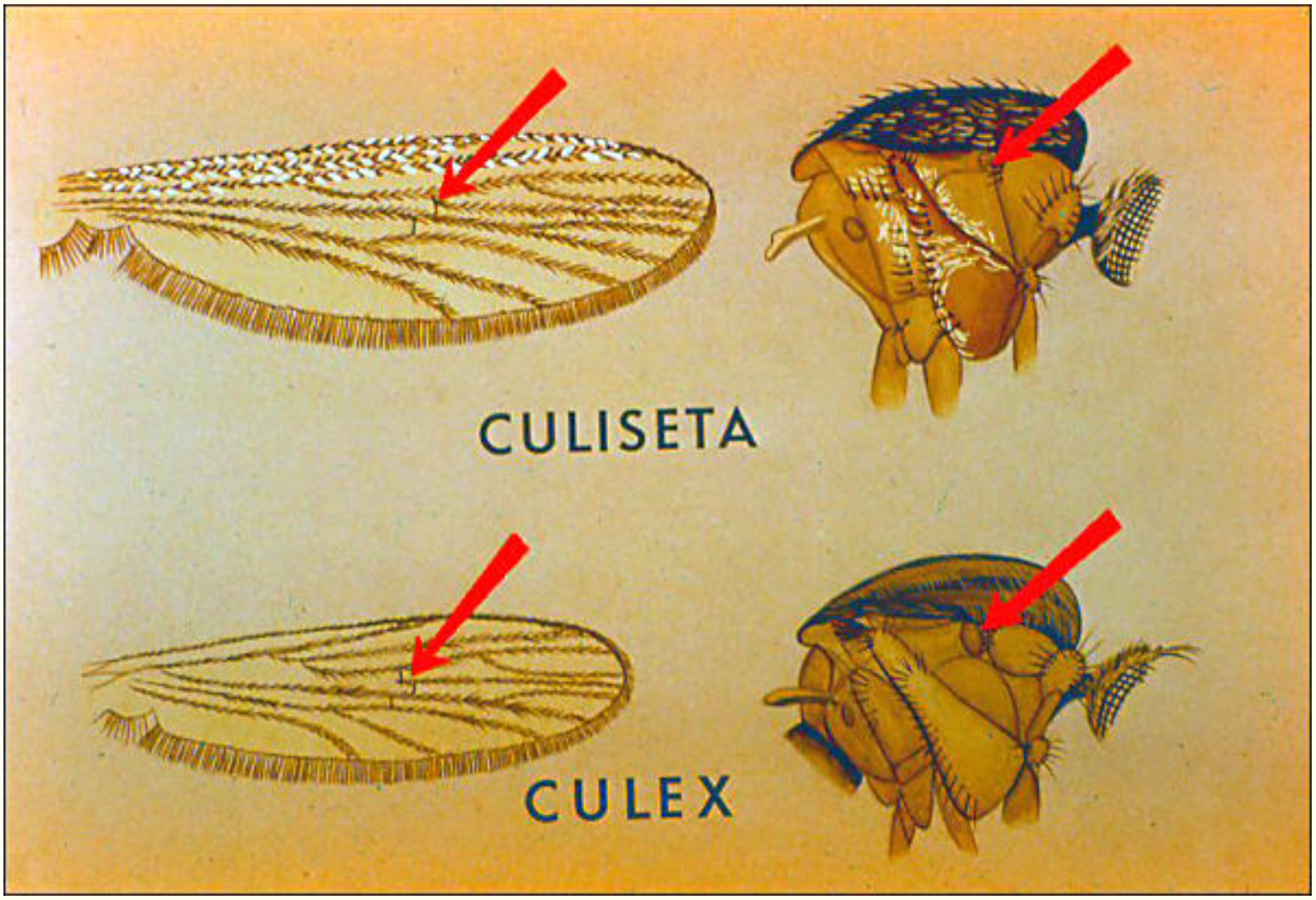

The last two genera, *Culiseta* and *Culex* may be differentiated by the presence or absence of prespiracular bristles. *Culiseta* has prespiracular bristles. *Culex* does not. In most species of *Culiseta* the cross veins arising from wing vein four are close together. In *Culex* they are widely separated. Likewise, *Culiseta* has a row of bristles on the subcosta wing vein and *Culex* does not.

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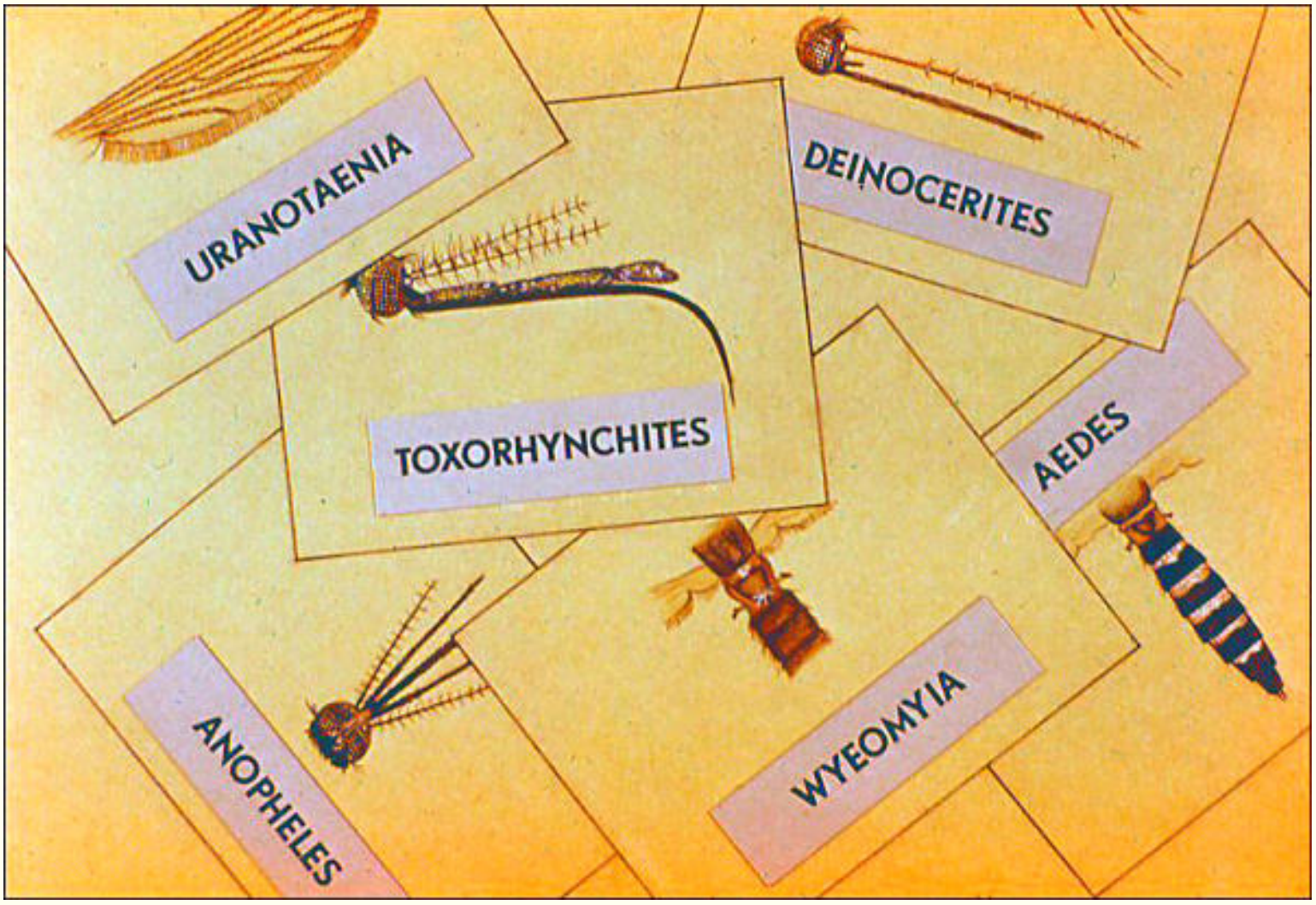

You will now have a chance to recall the distinguishing characters of the different genera. Remember that you must follow a definite procedure or the scheme of identification may not work accurately.

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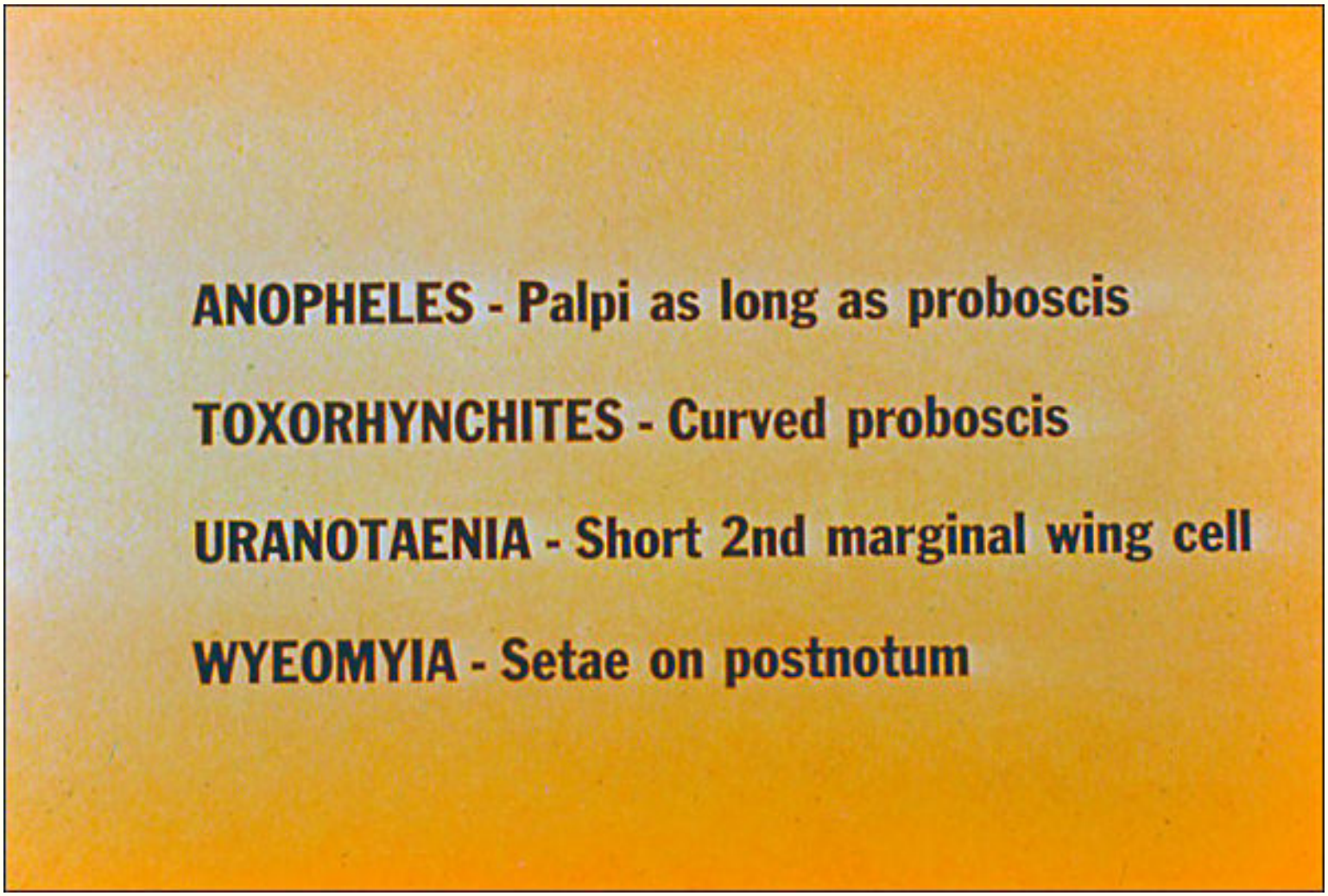

Consider first if the mosquito belongs to one of the genera with a unique character. *Anopheles, Toxorhynchites, Uranotaenia*, or *Wyeomyia*.

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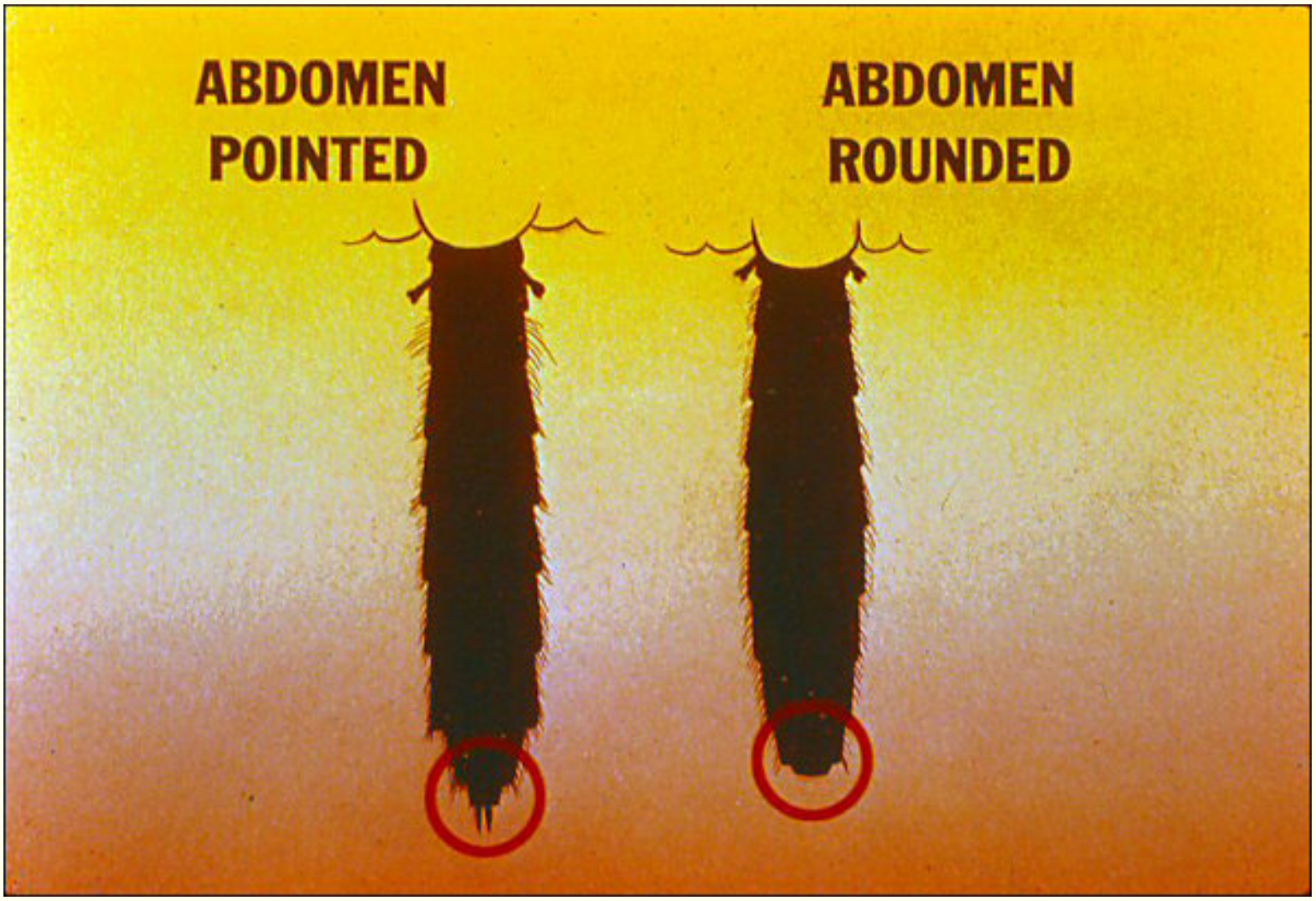

Next see if the tip of the abdomen is pointed or blunt.

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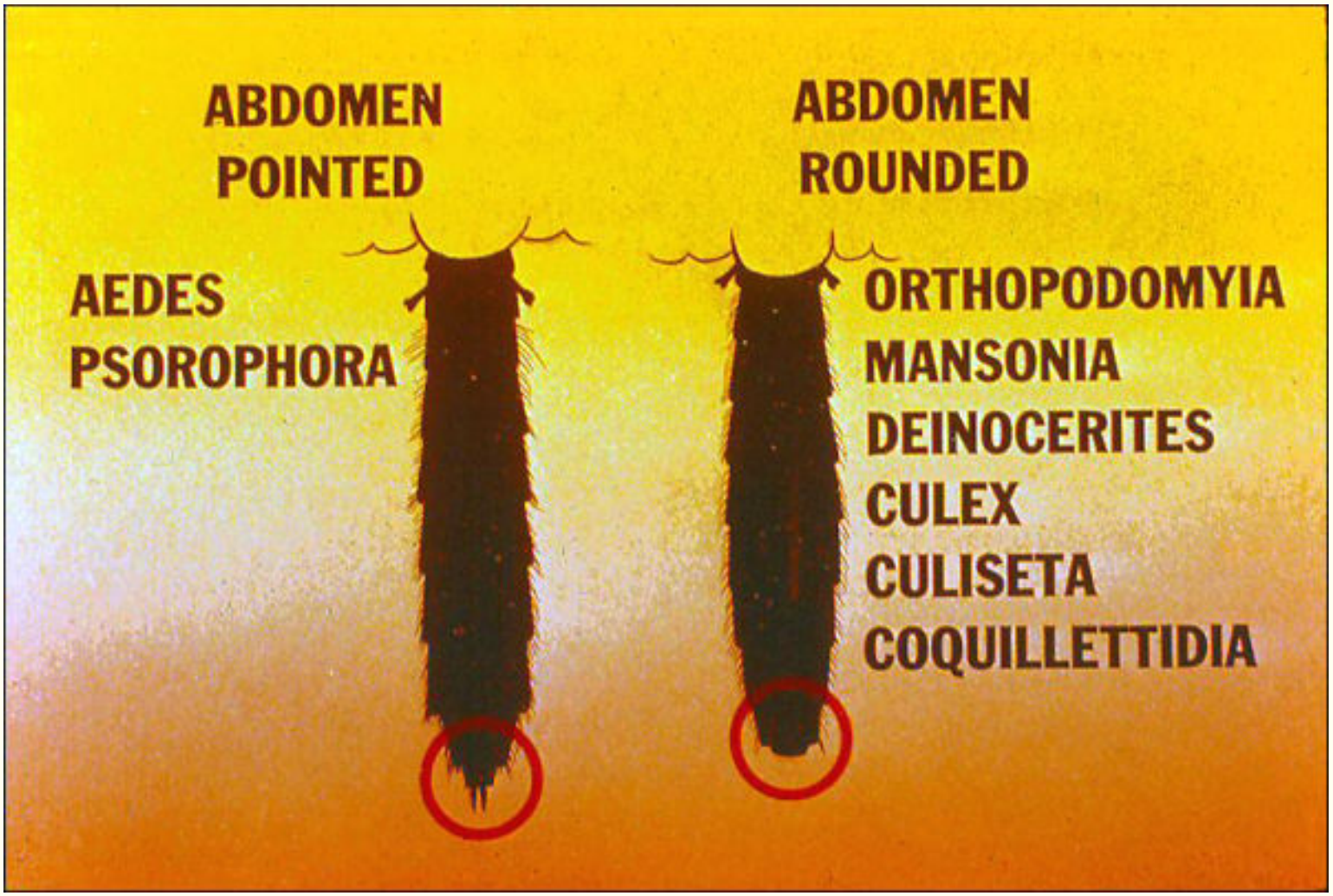

Two genera have abdomens pointed: *Aedes* and *Psorophora*. The remaining genera have blunt or rounded abdomens: *Orthopodomyia, Mansonia, Deinocerites, Culex, Culiseta*, and *Coquillettidia*.

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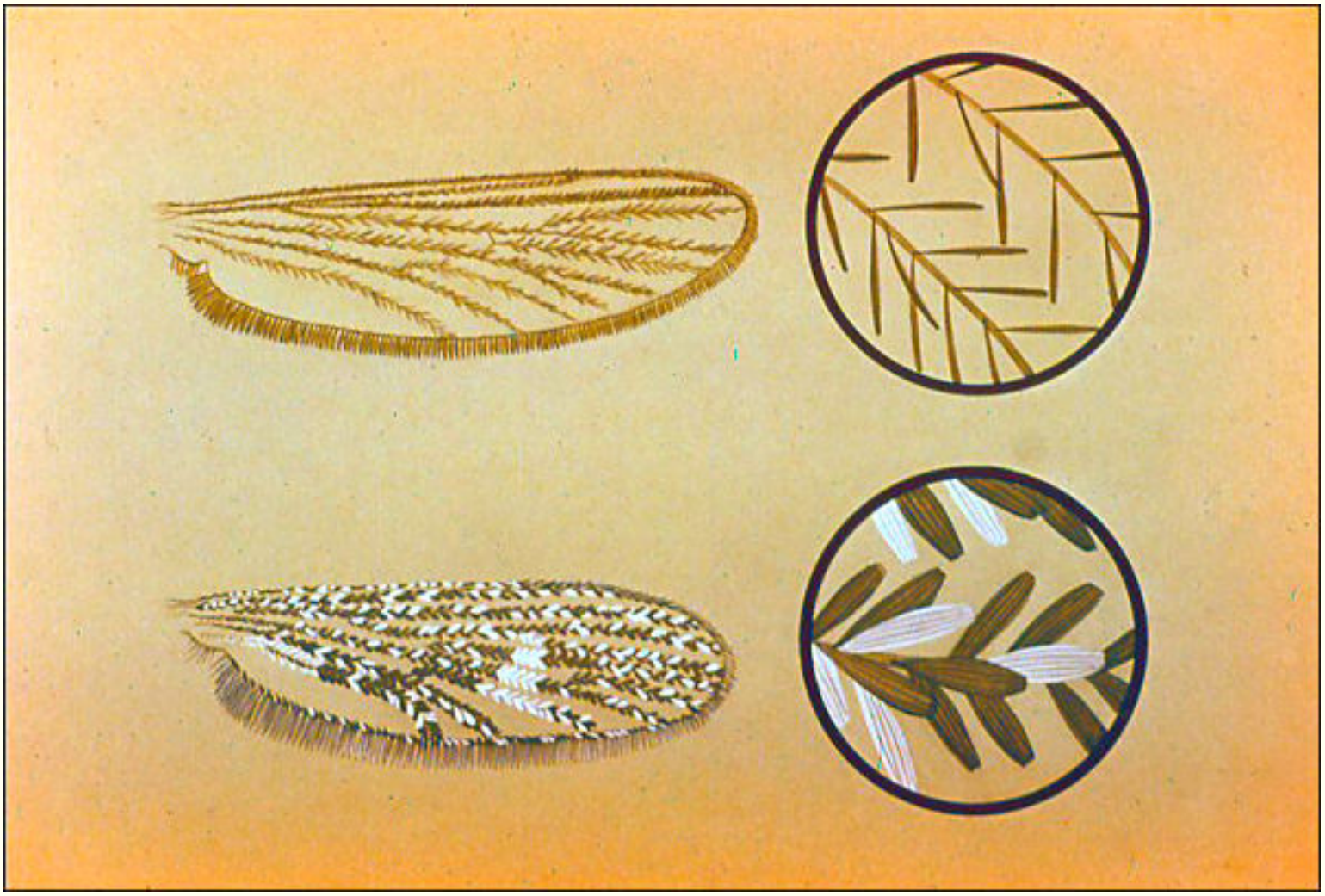

If the tip of the abdomen is blunt, then examine the wing scales.

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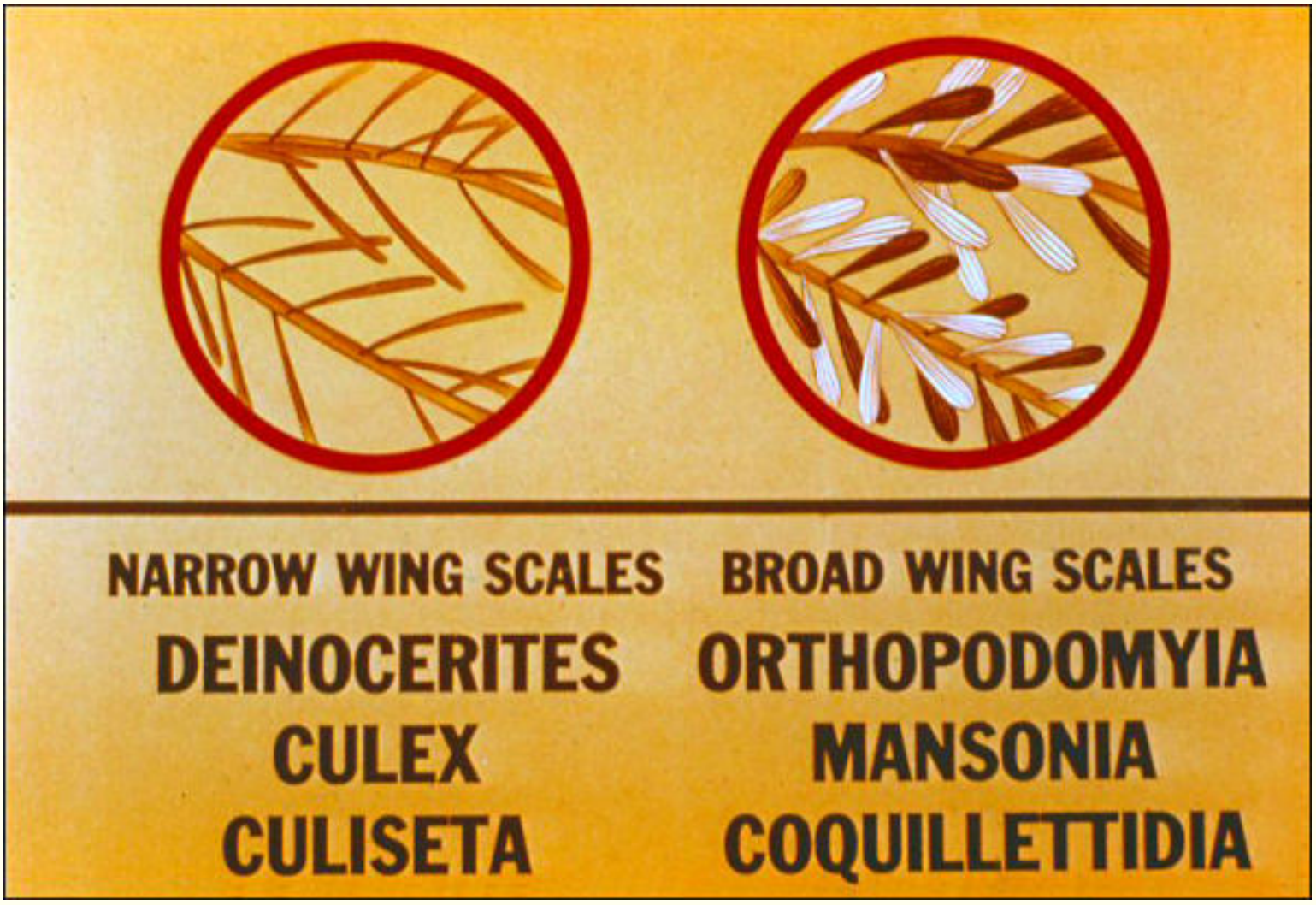

Remember, the genera with blunt abdomens can be separated into two groups by using the relative size of the wing scales. *Orthopodomyia, Mansonia*, and *Coquillettidia* have broad, pale and dark wing scales. *Deinocerites, Culex*, and *Culiseta* have all or most wing scales narrow.

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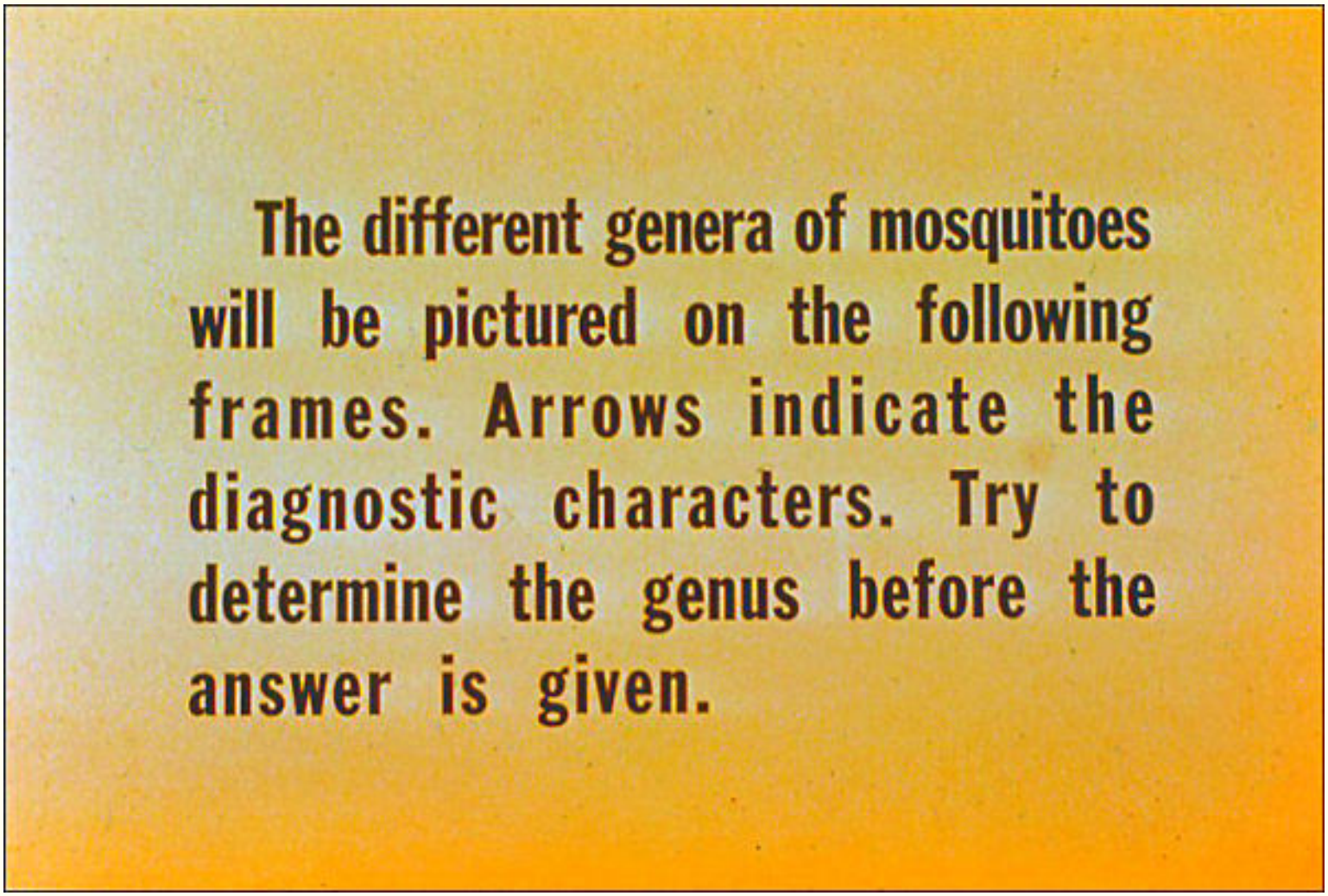

Now, the different genera of mosquitoes will be pictured on the following frames. Arrows indicate the diagnostic characters. Try to determine the genus before the answer is given.

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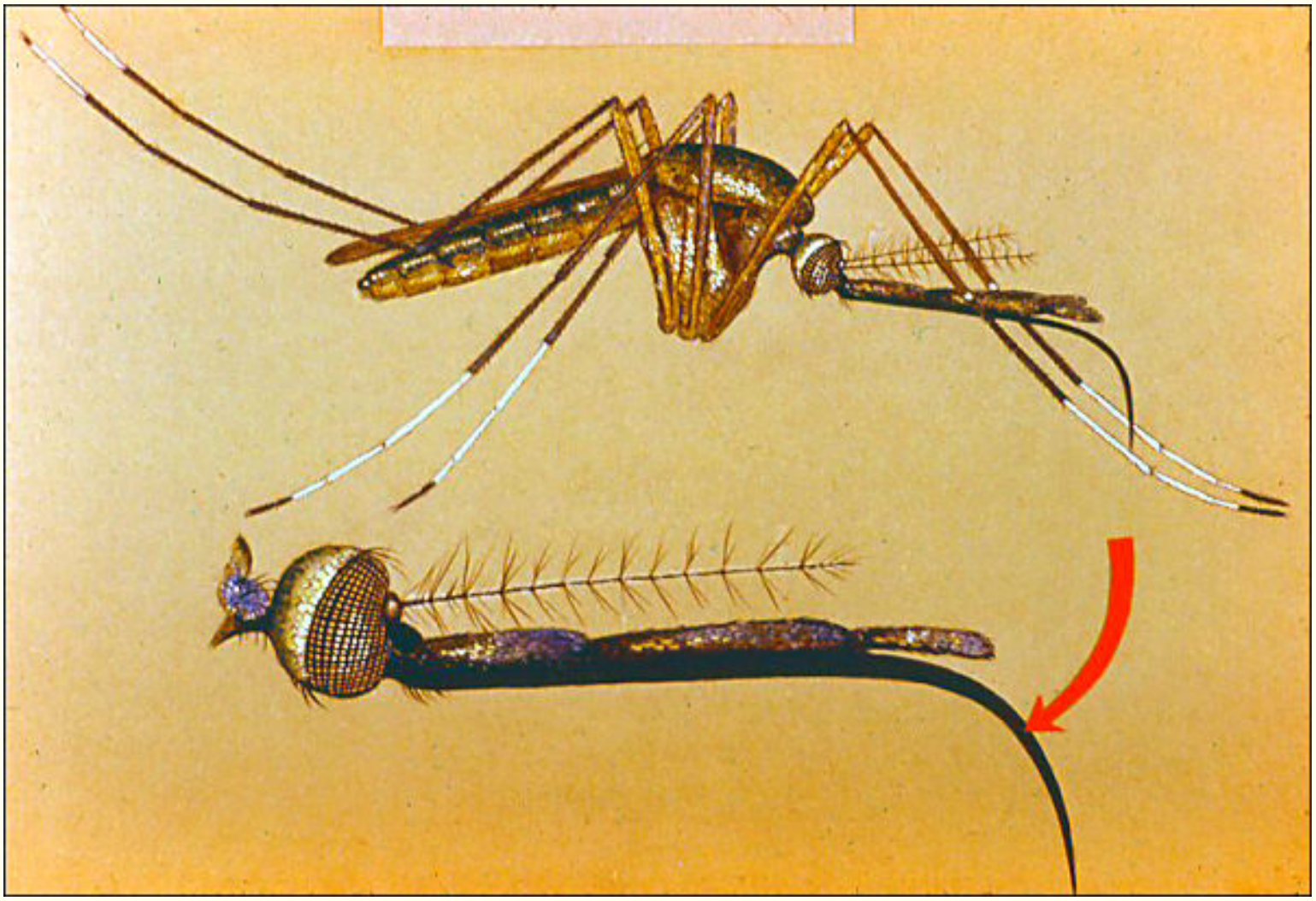

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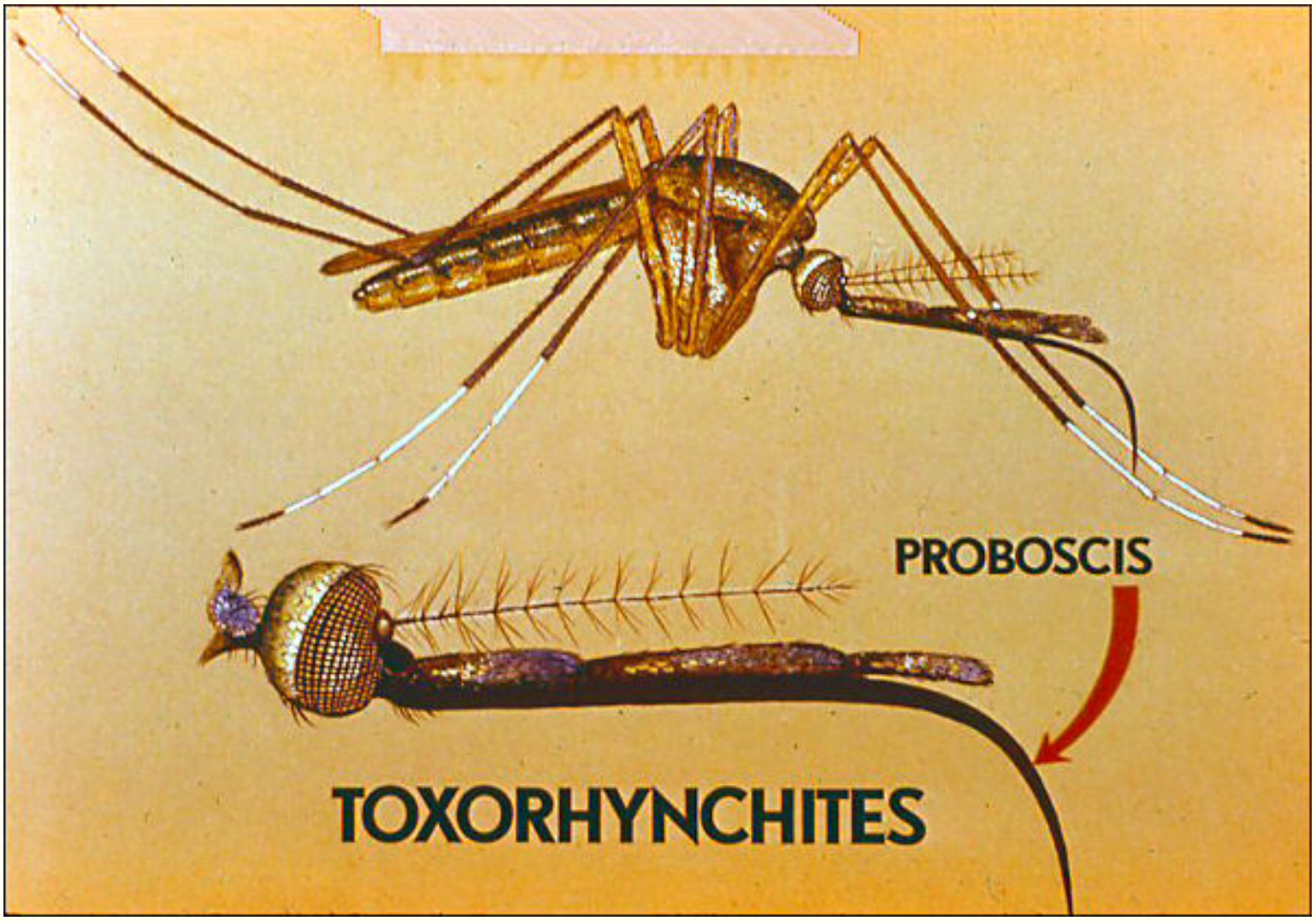

Toxorhynchites the only genus of mosquitoes with a curved proboscis.

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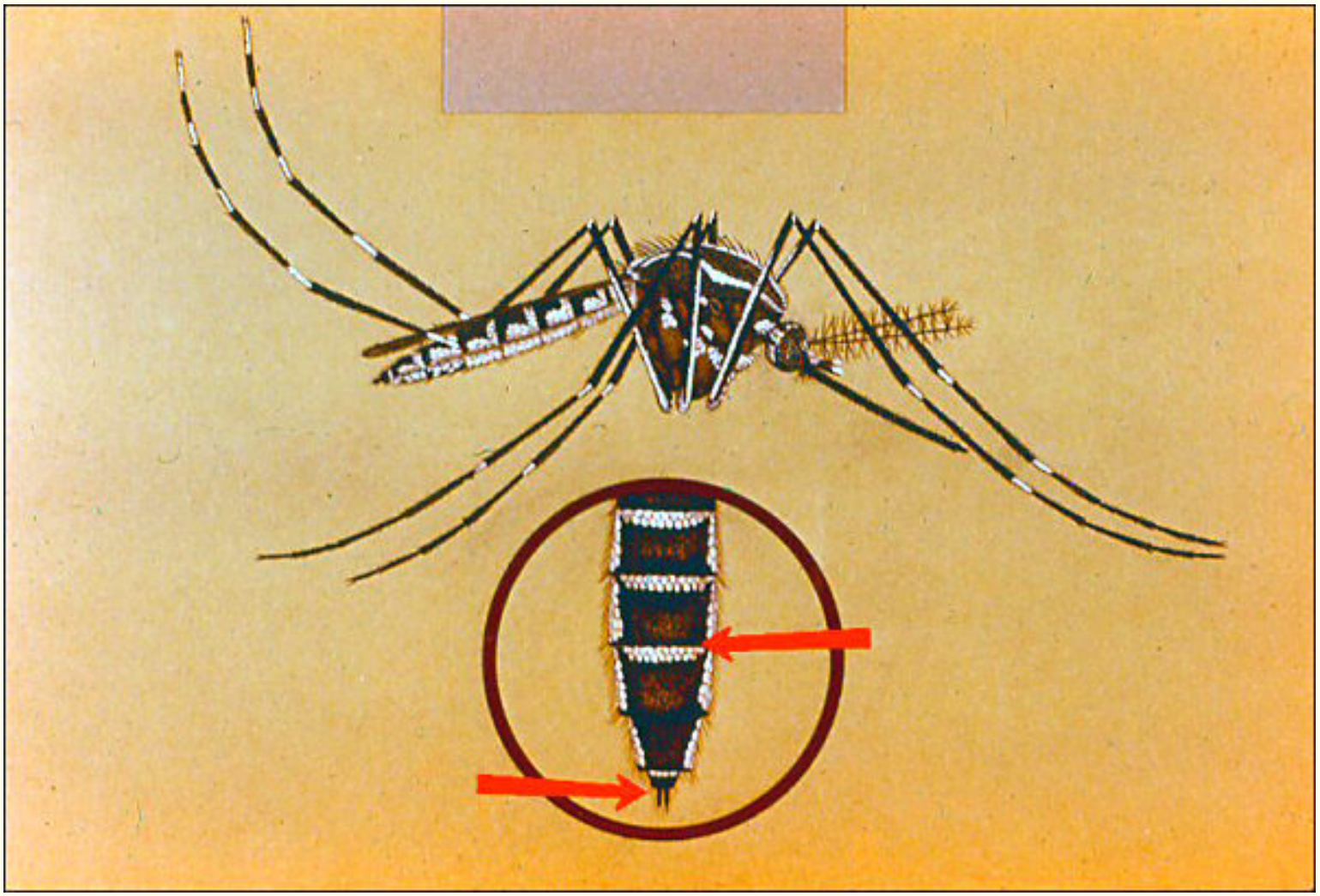

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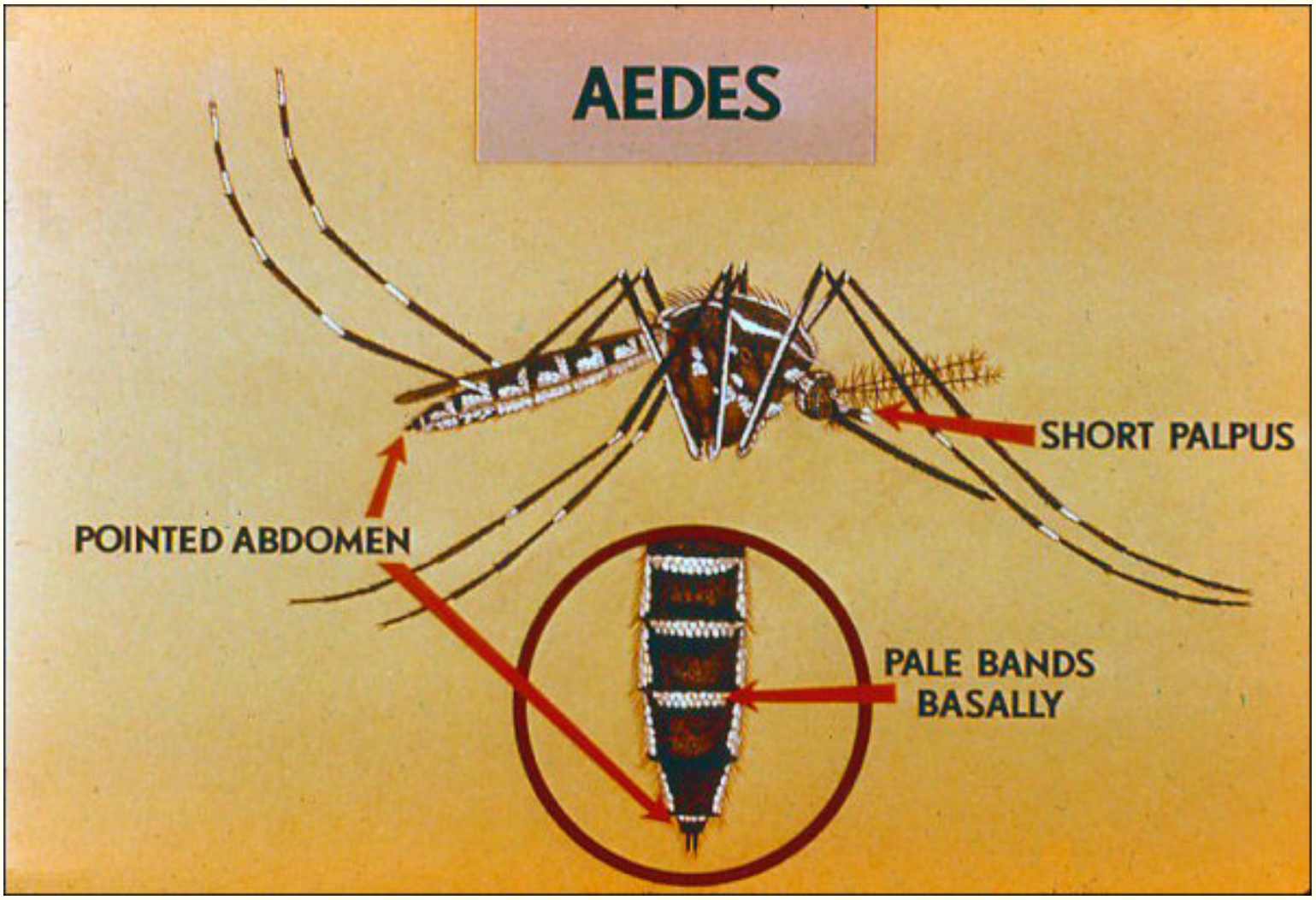

Aedes, the abdomen is pointed and the bands or lateral patches of pale-scales on abdominal segments arc basal in position. Remember in this genus prespiracular bristles are absent.

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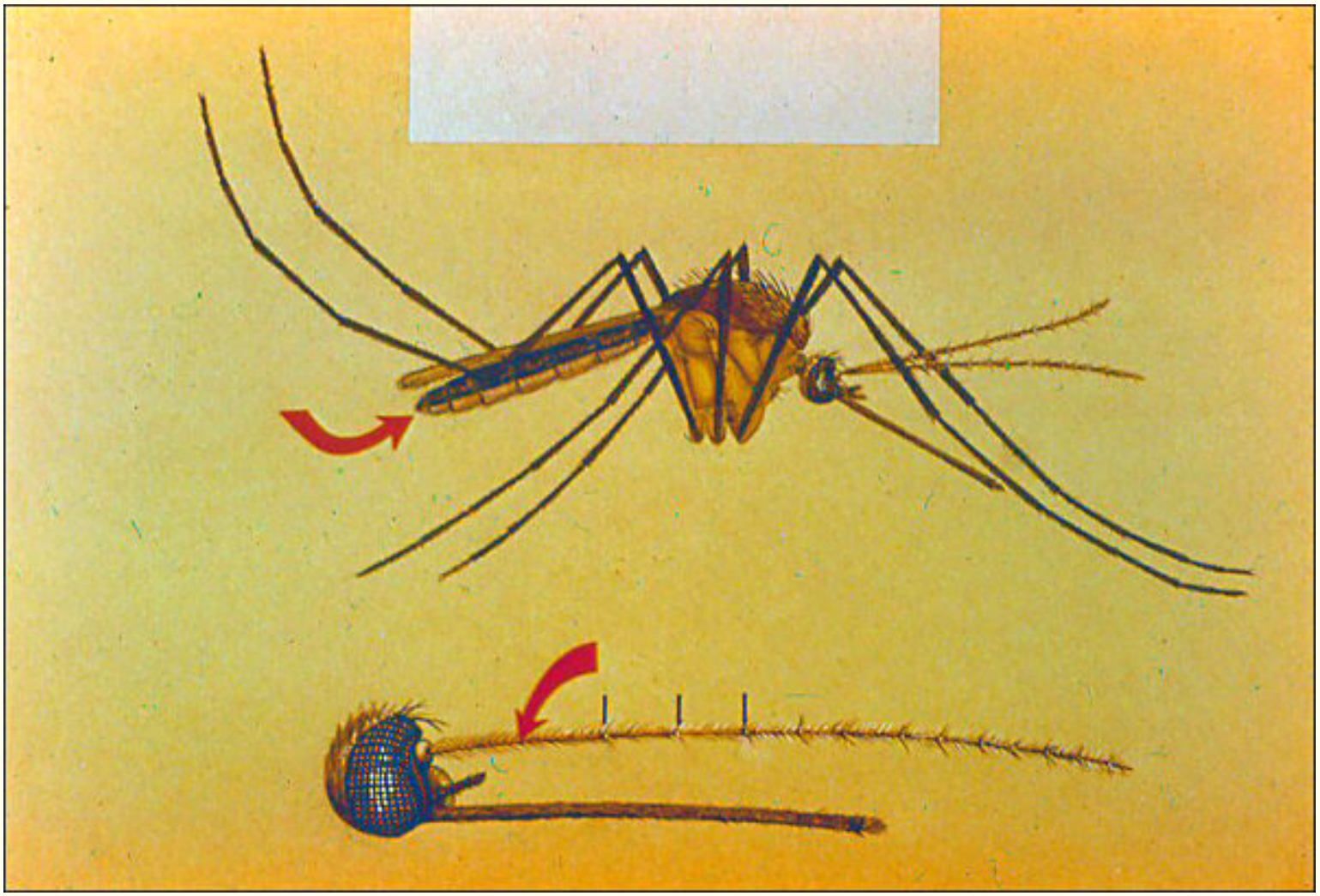

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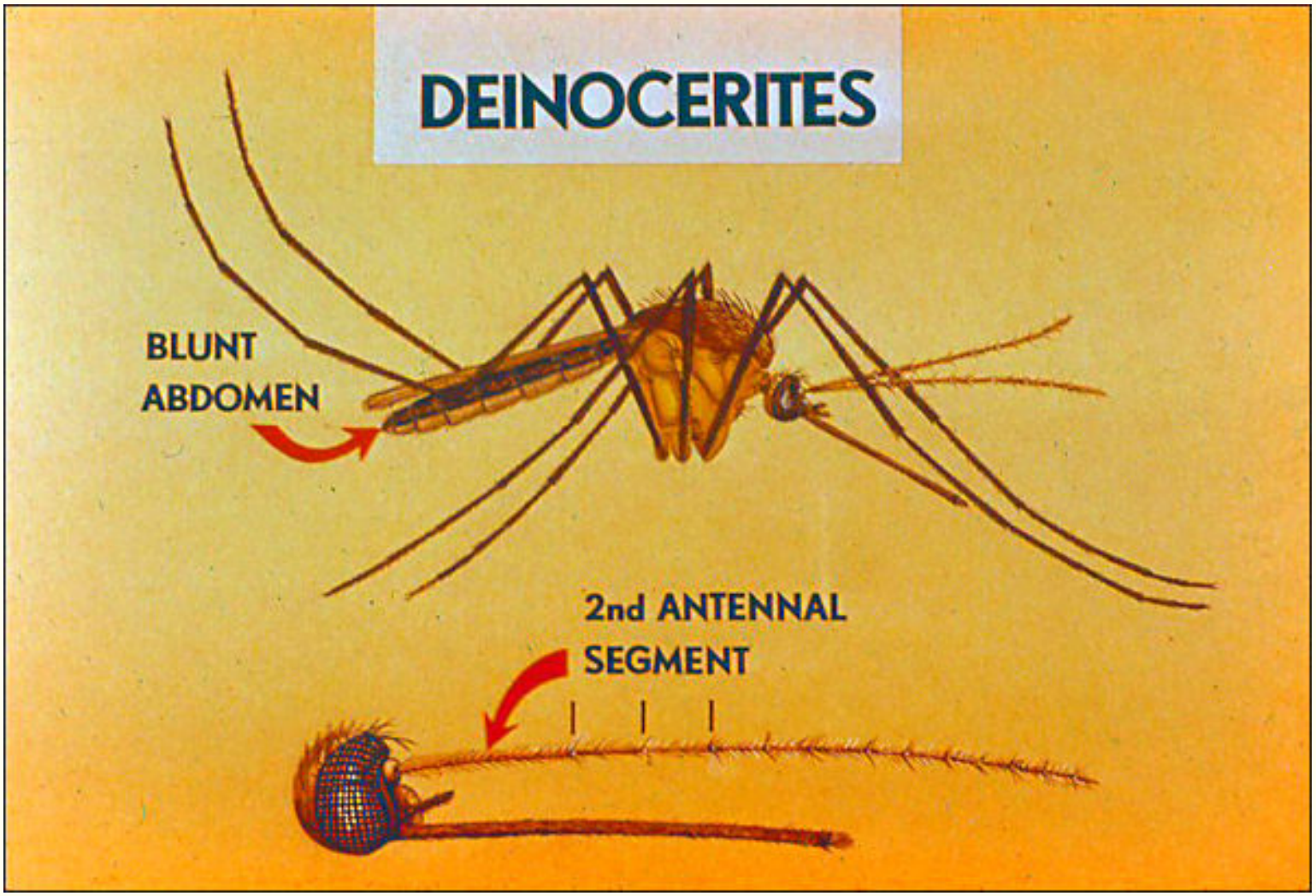

Deinocerites, with blunt abdomen, the long second antennal segment permits easy identification.

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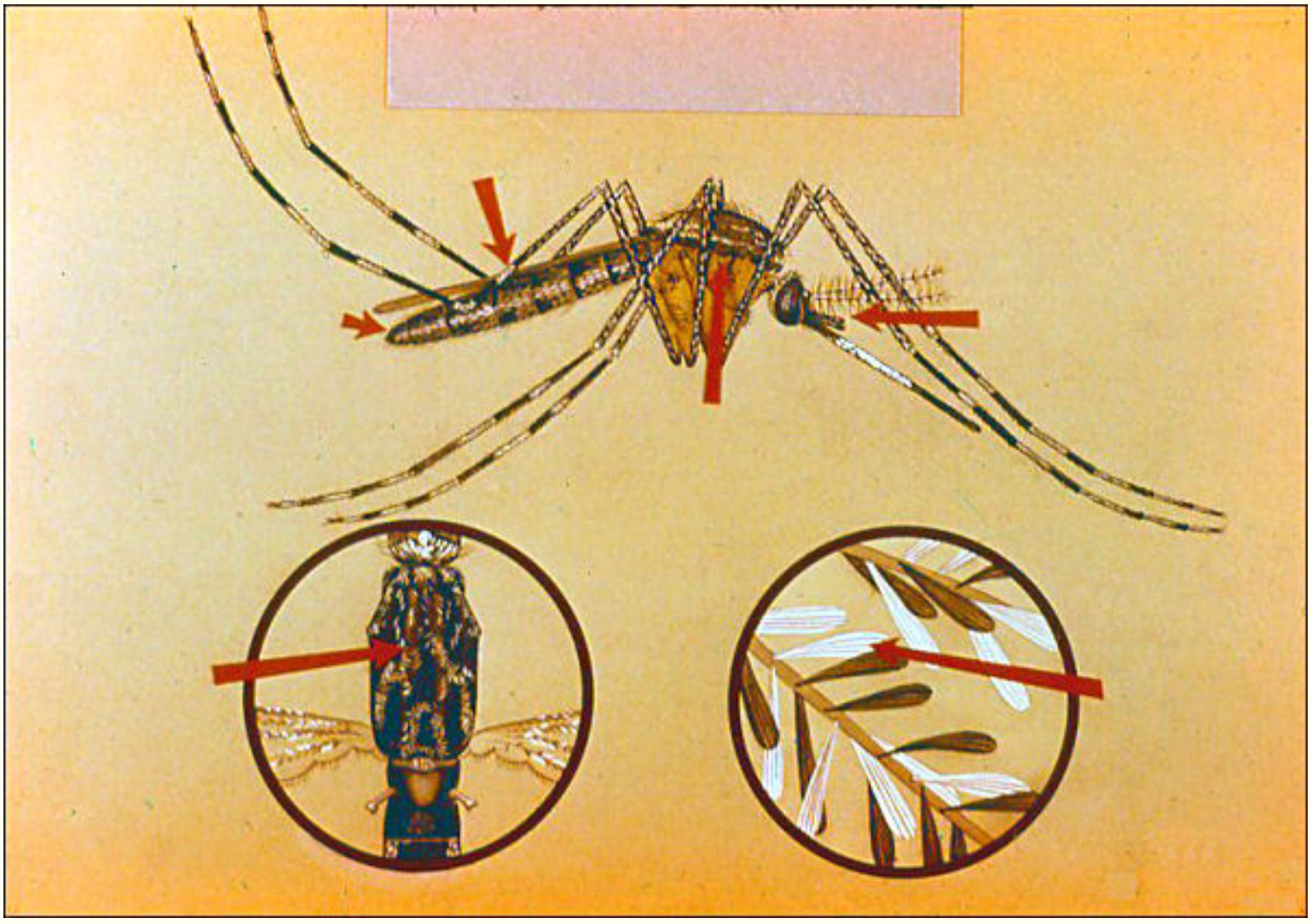

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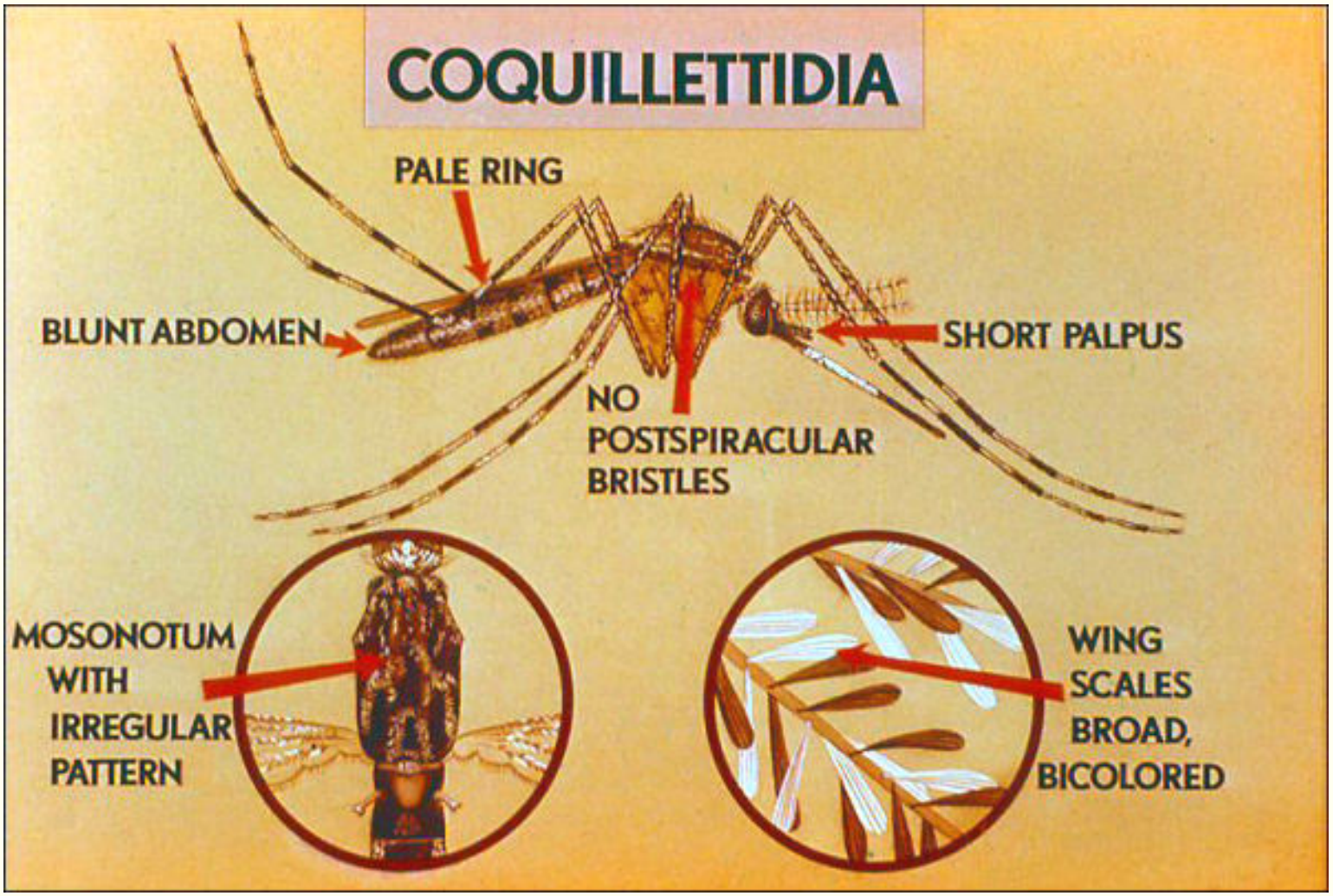

Coquillettidia belongs in the group with blunt abdomens and to the subgroup with broad wing scales. It is distinguished from its close relative by the white band on the hind tibia and absence of post-spiracular bristles.

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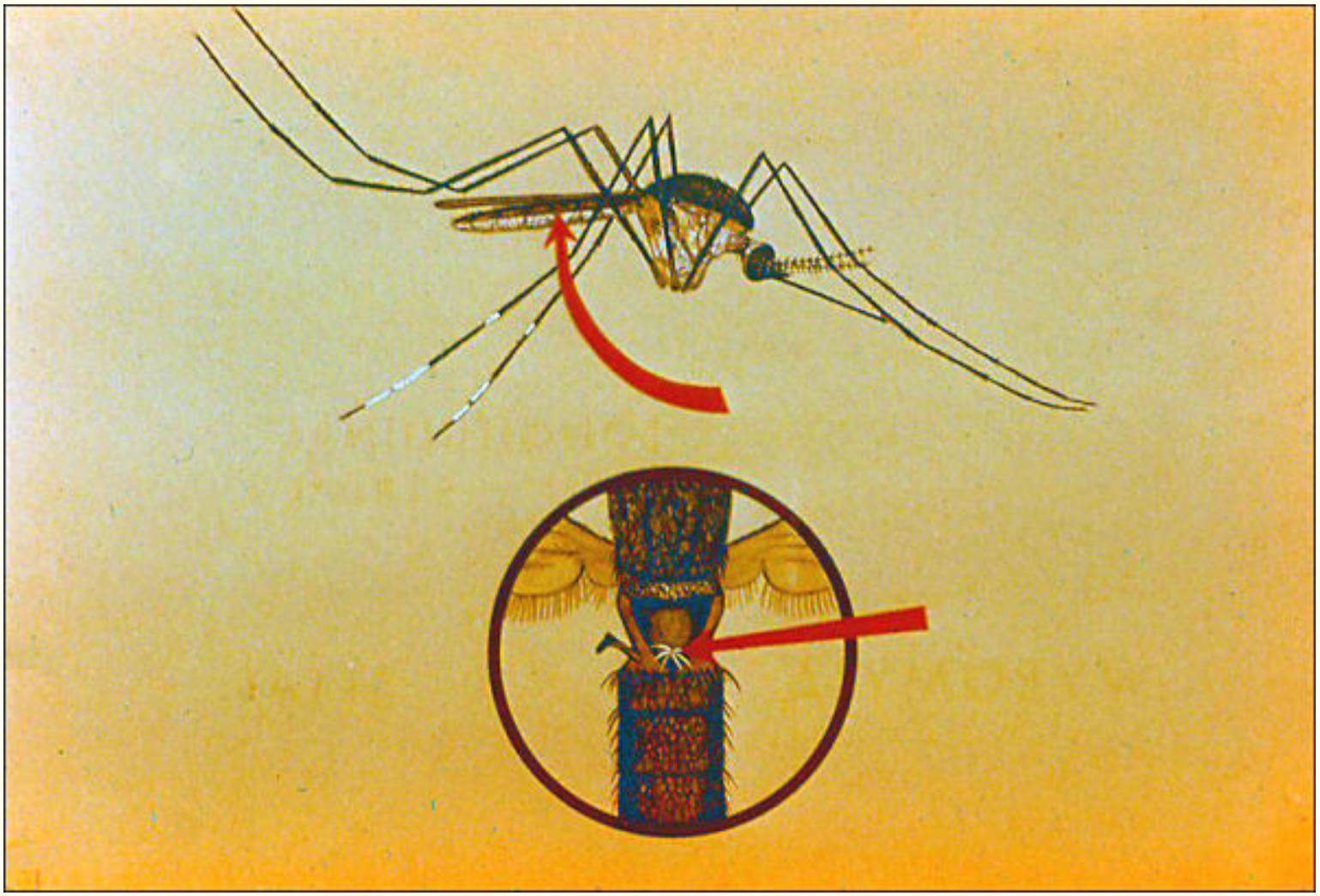

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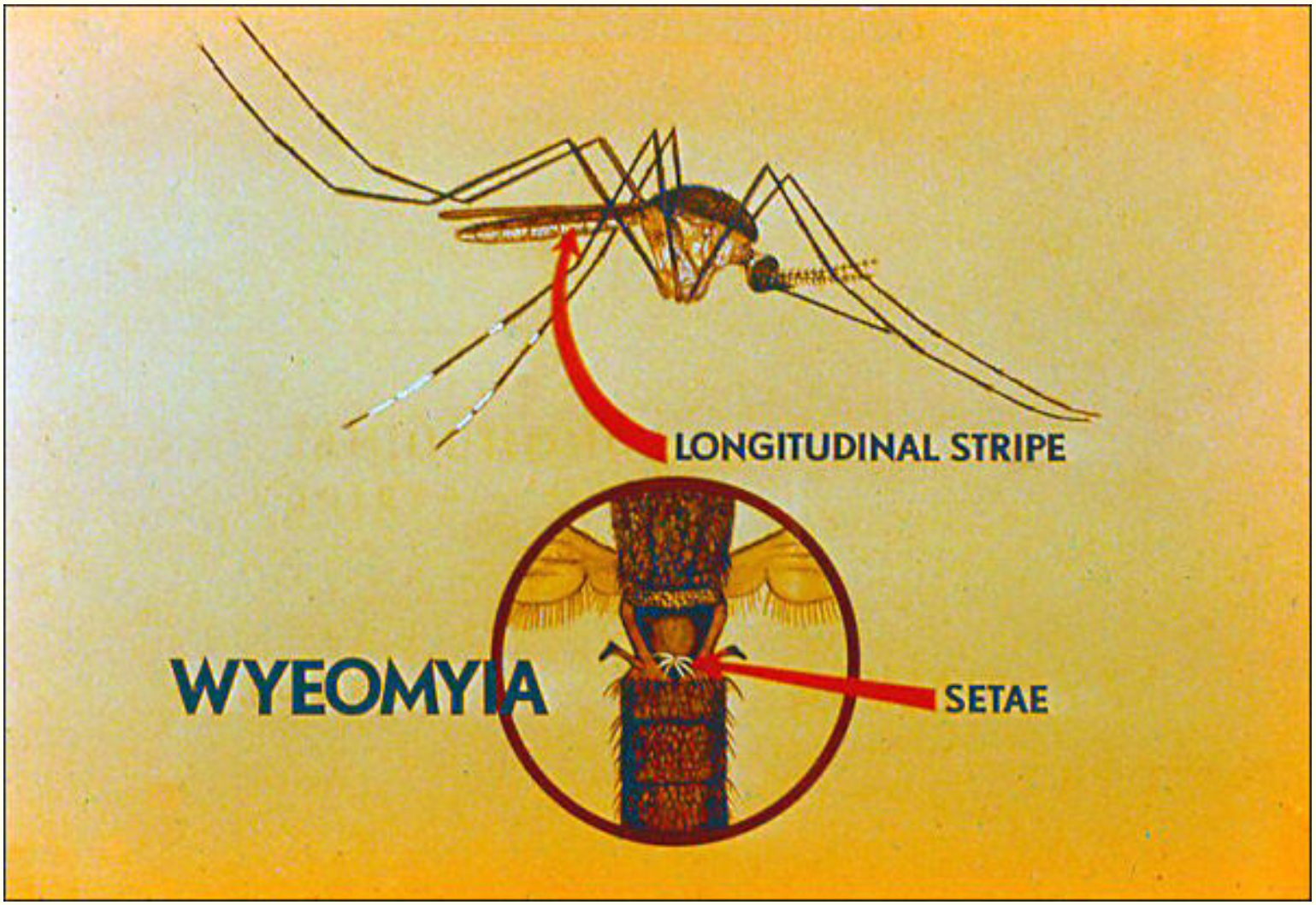

Wyeomyia, setae on the postnotum permits immediate identification. The longitudinal stripe on each side of the abdomen is also characteristic.

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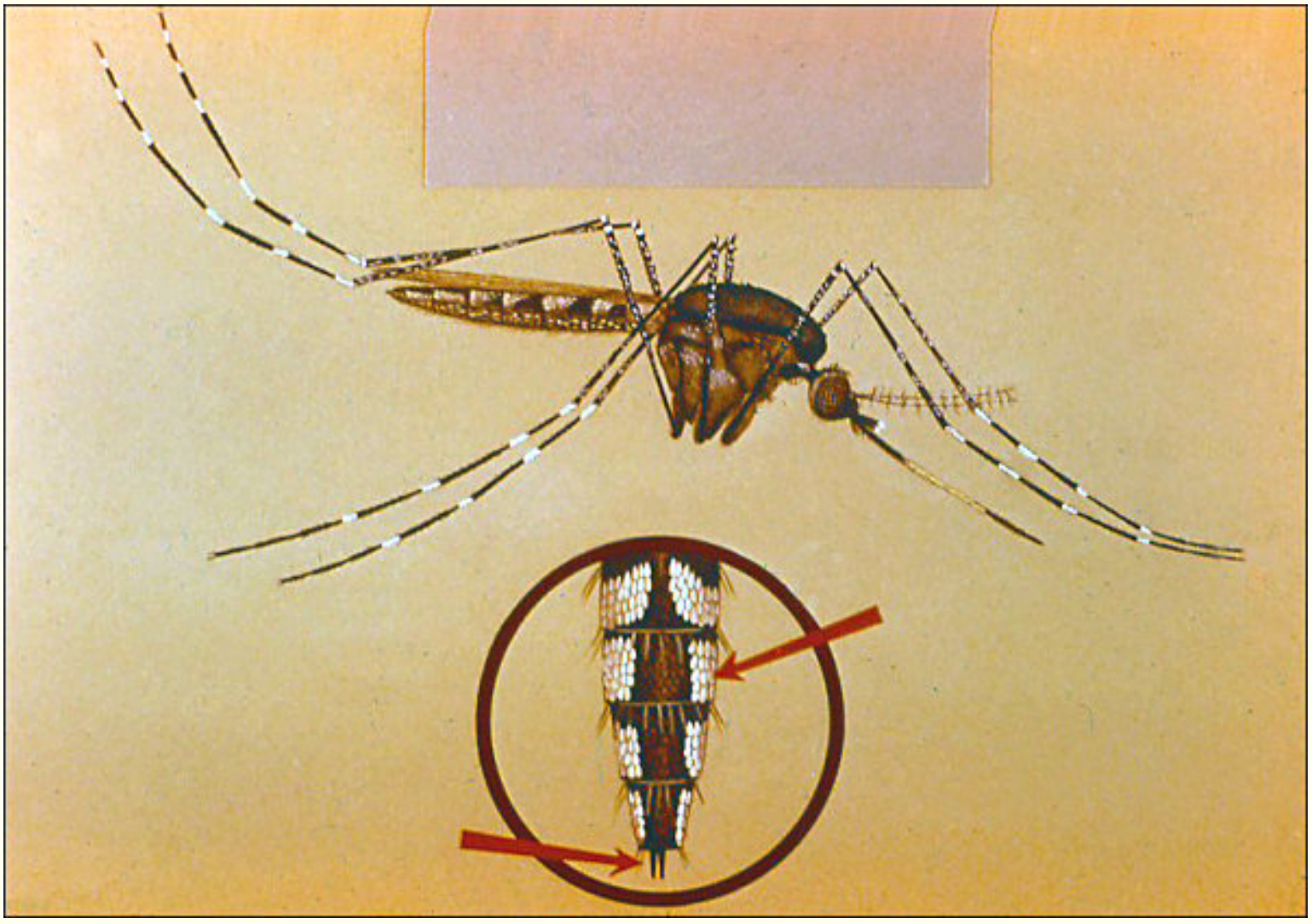

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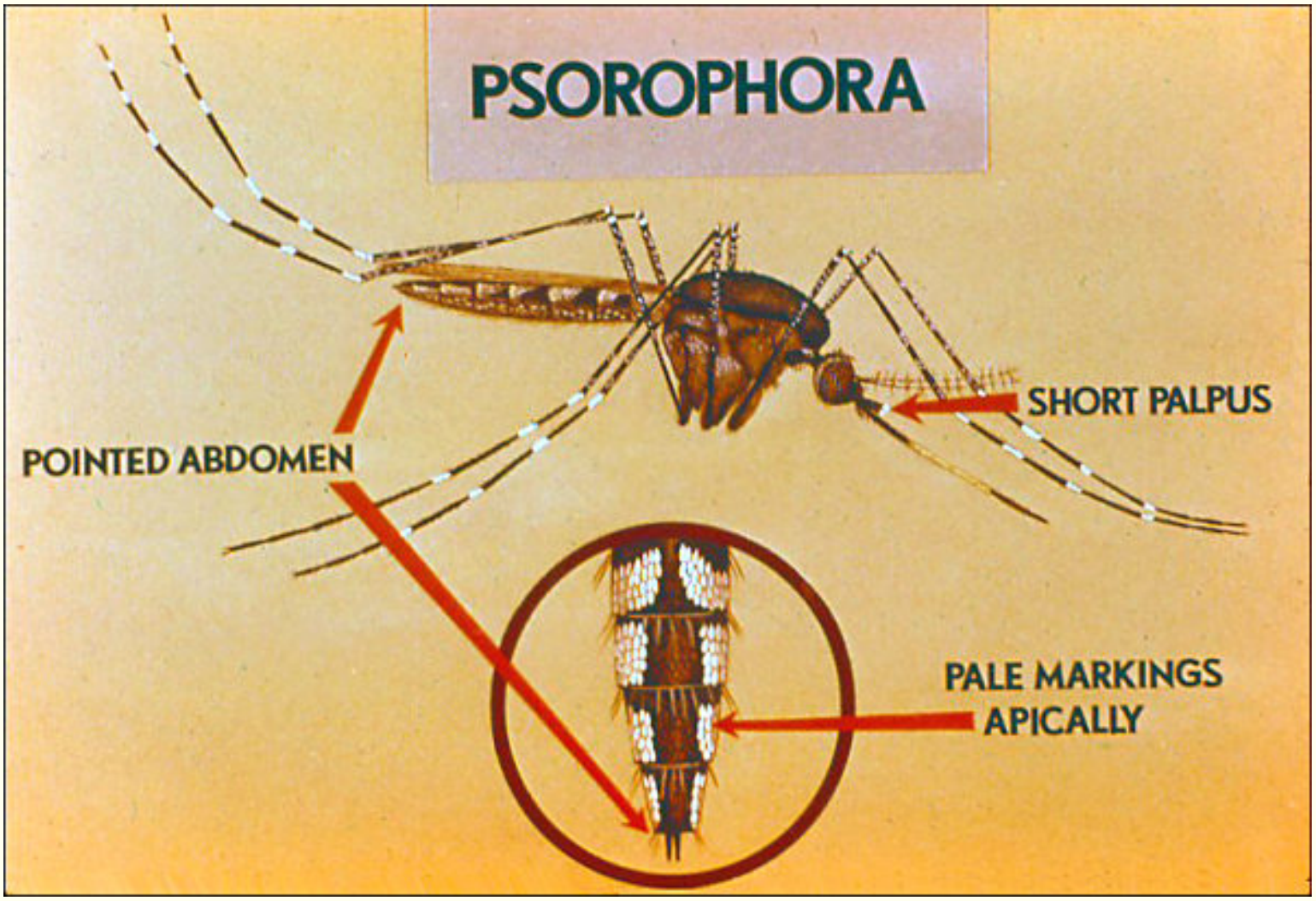

Psorophora, the other mosquito with a pointed abdomen, is usually distinguished from *Aedes* by the apical white bands or patches on the abdominal segments and the presence of prespiracular bristles.

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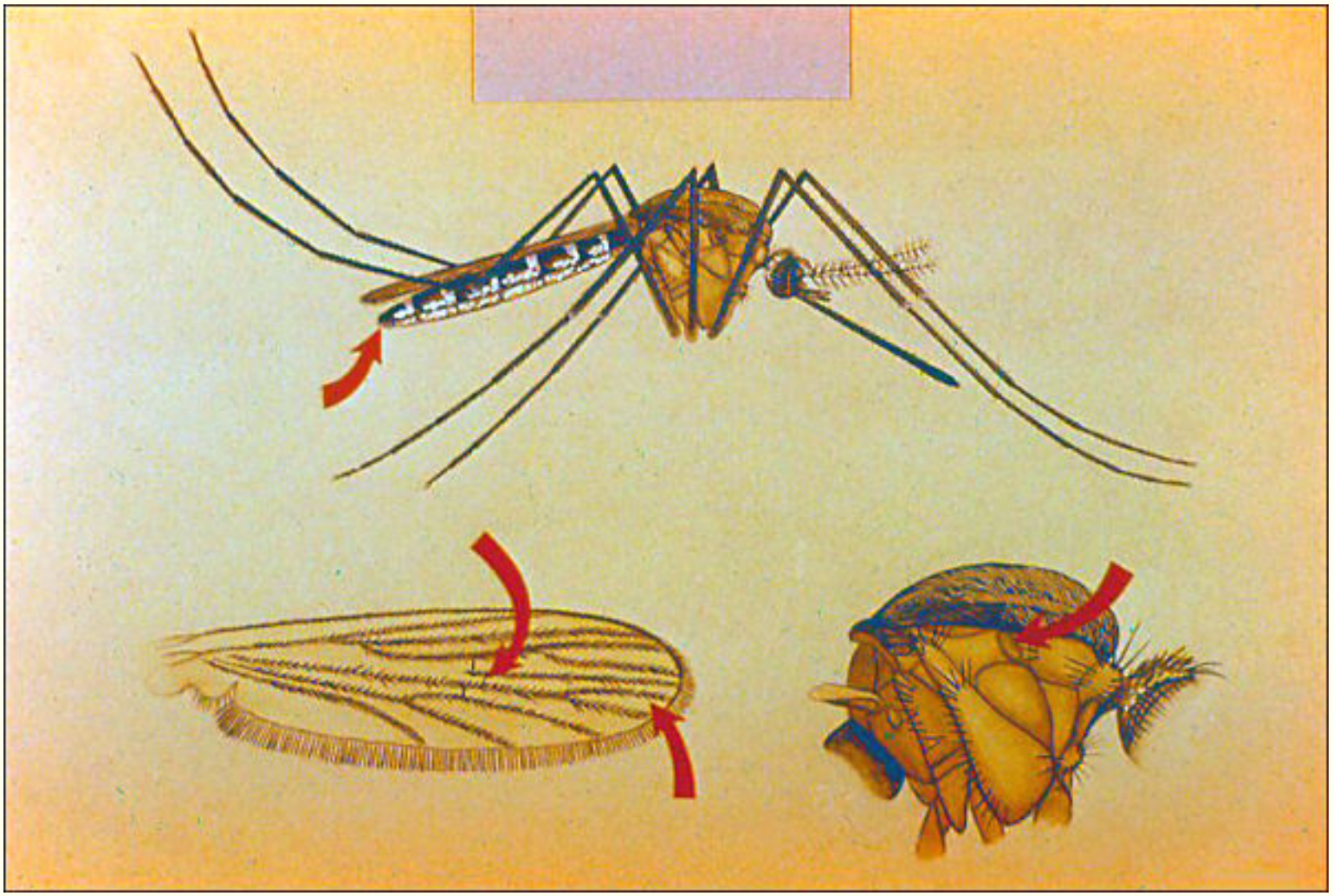

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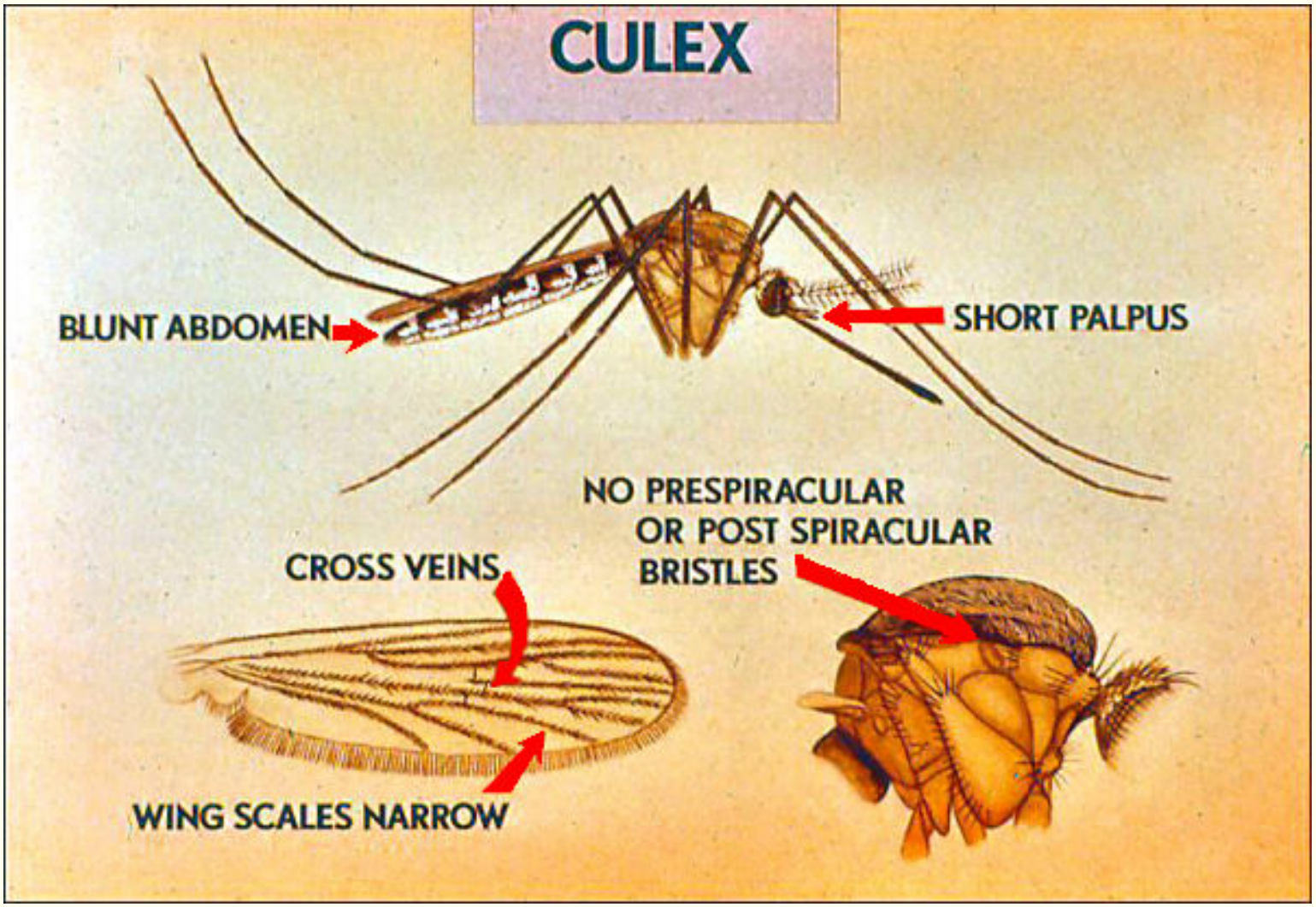

Culex, blunt abdomen, narrow wing scales. The absence of prespiracular bristles separates this genus from *Culiseta*. Note the widely separated cross veins.

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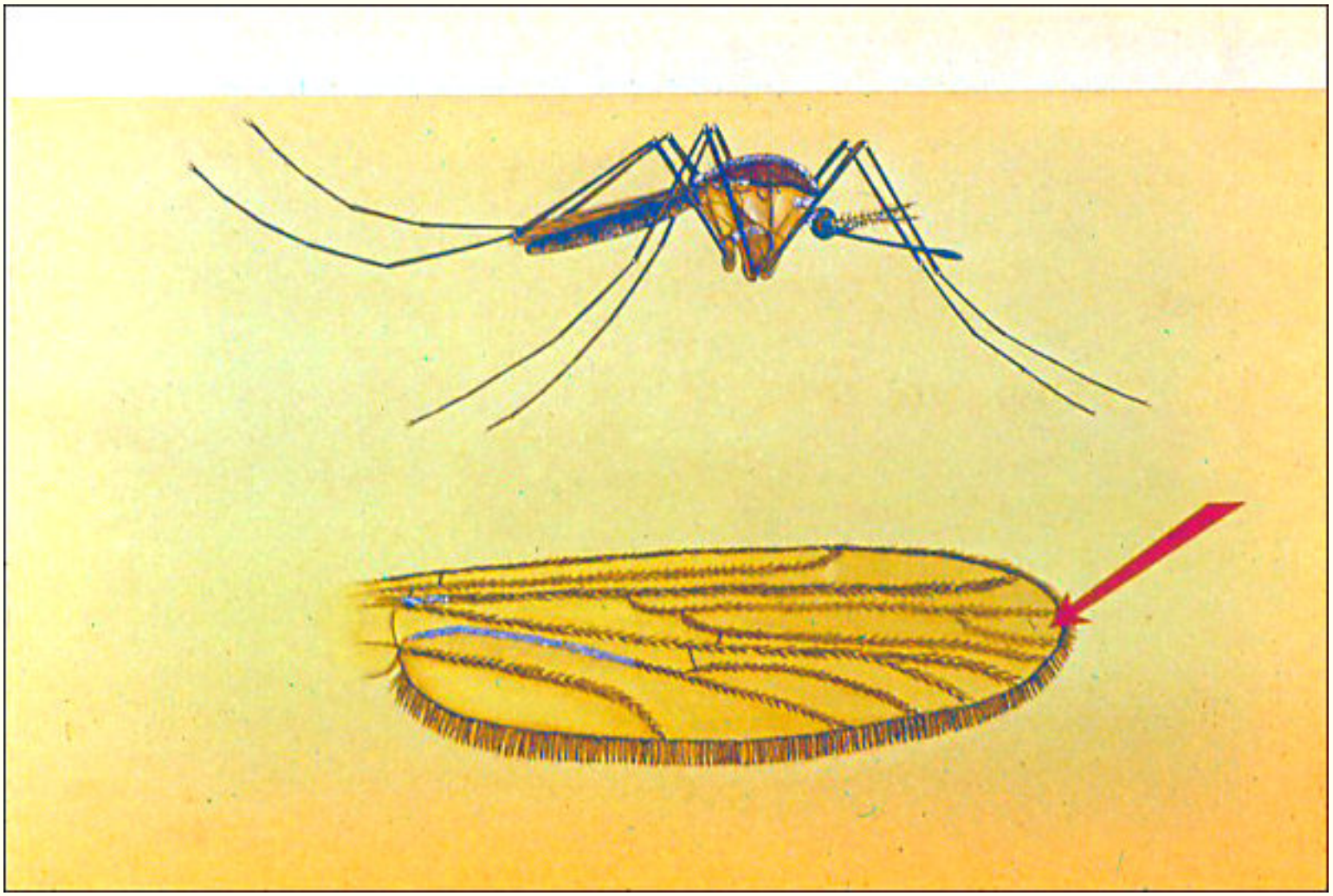

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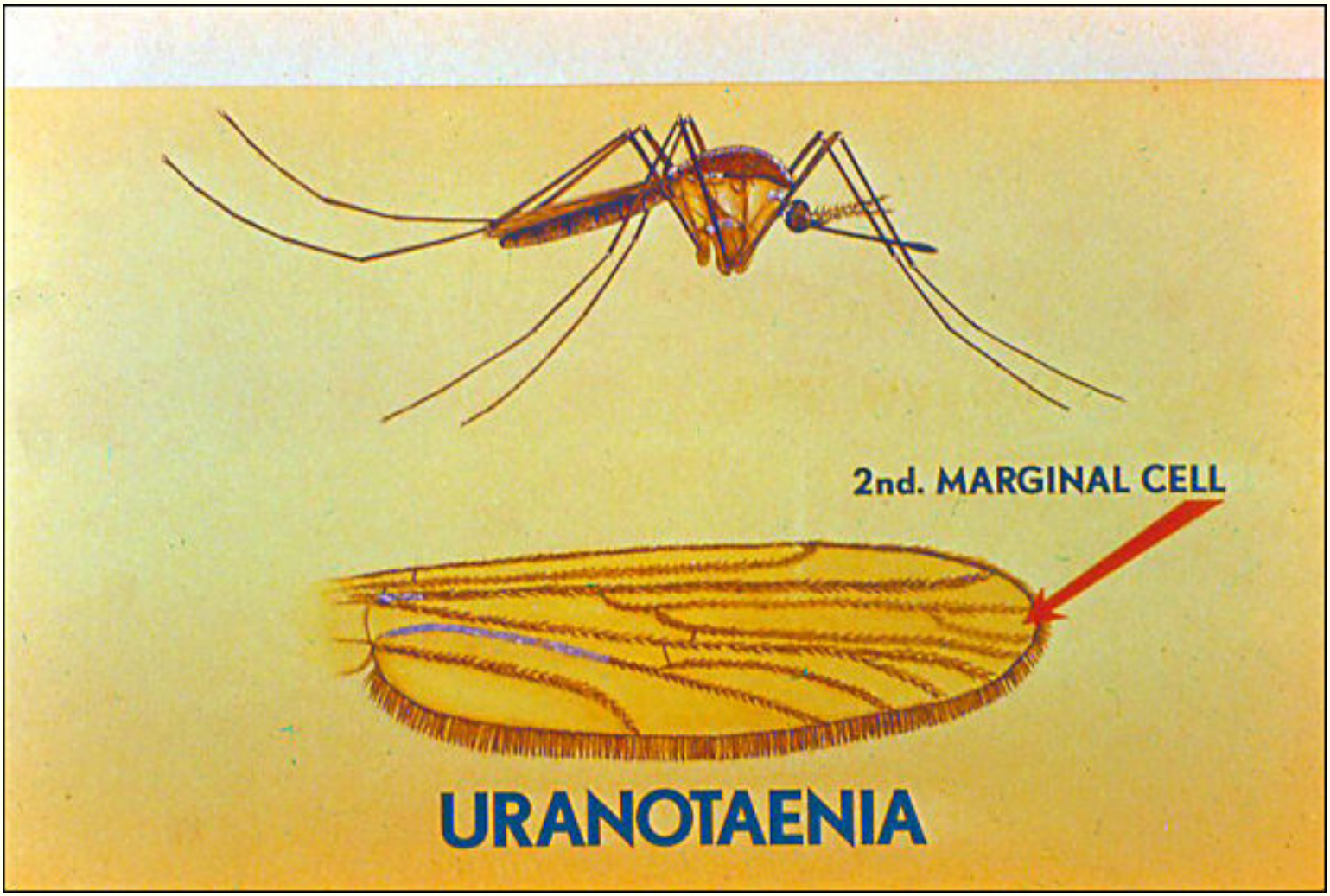

Uranotaenia - the short second marginal cell of the wing distinguishes this genus from all others.

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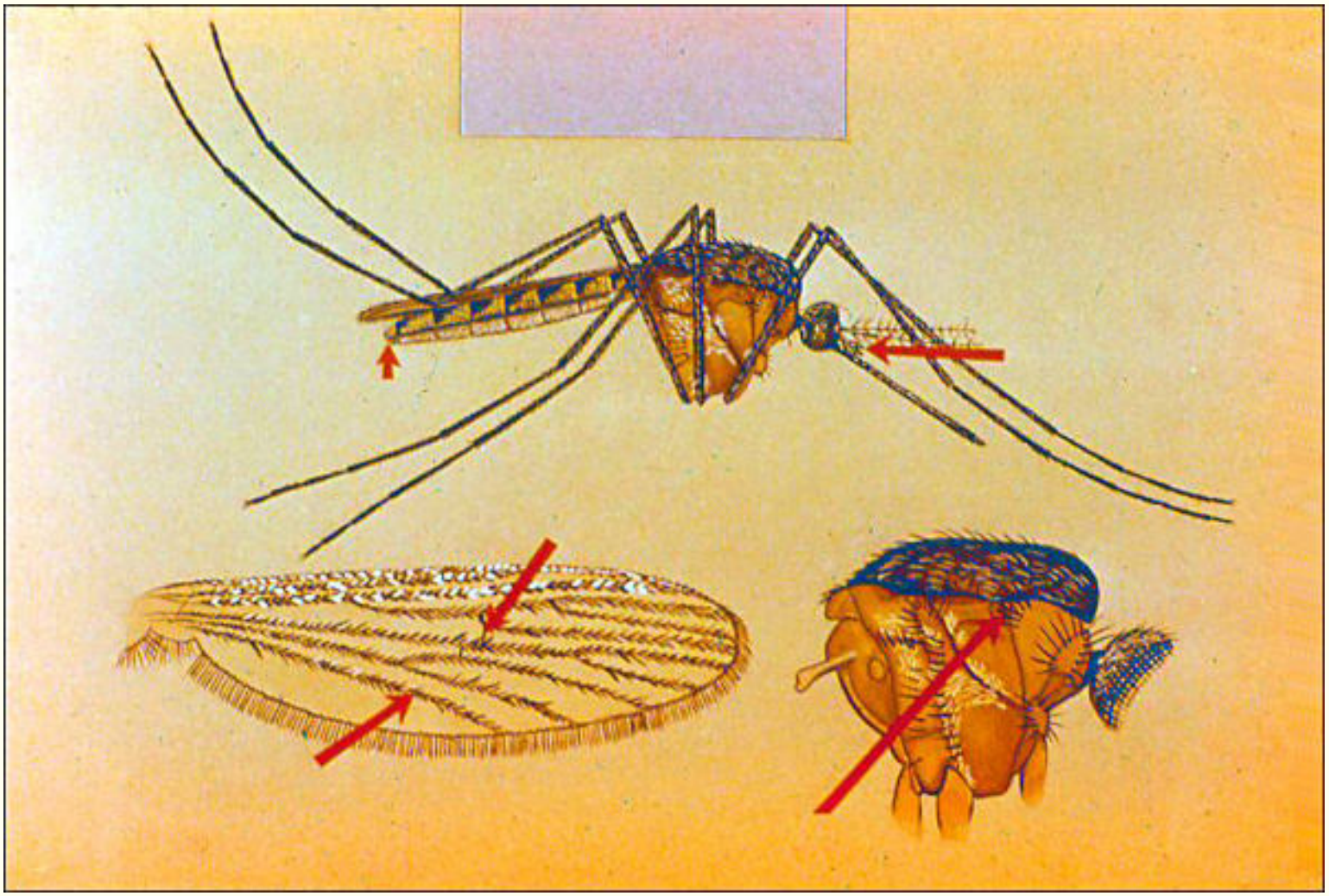

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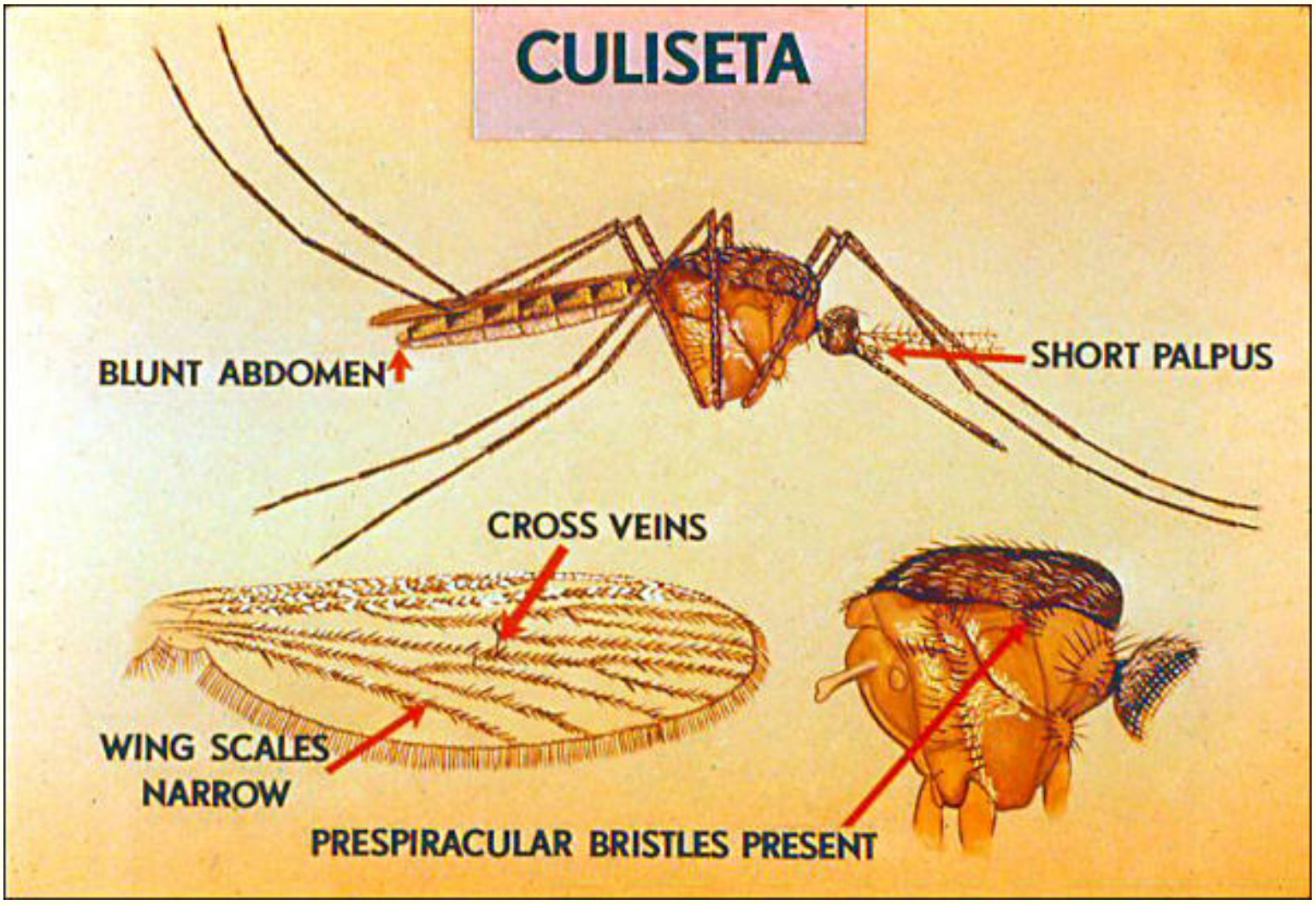

Culiseta, abdomen blunt - wing scales narrow. The presence of prespiracular and subcostal wing vein bristles distinguish *Culiseta* from *Culex*. In most species the cross veins are close together.

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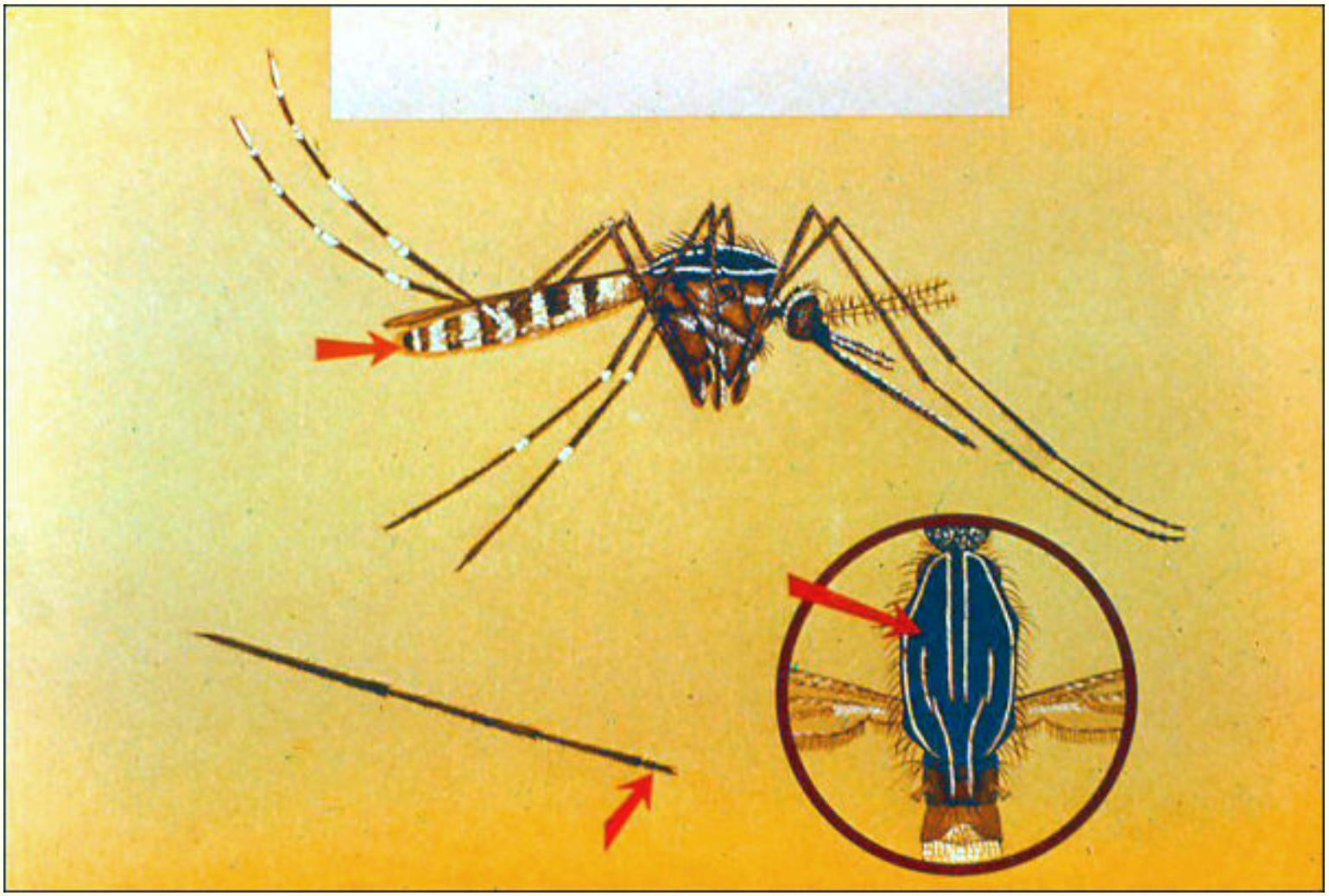

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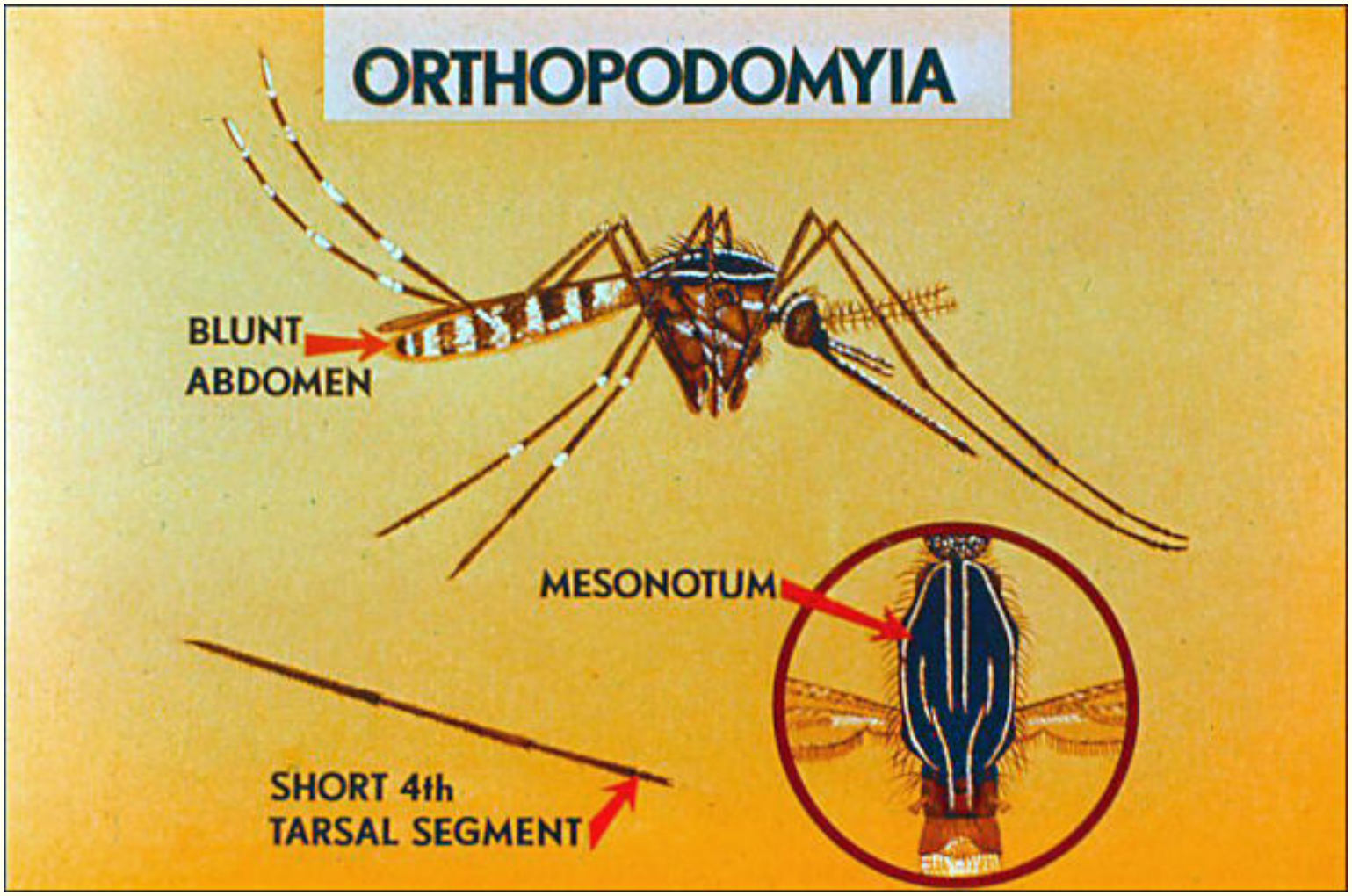

Orthopodomyia has a blunt abdomen and broad wing scales. The delicate lines on the mesonotum and the short fourth tarsal segment on the foreleg are characteristic.

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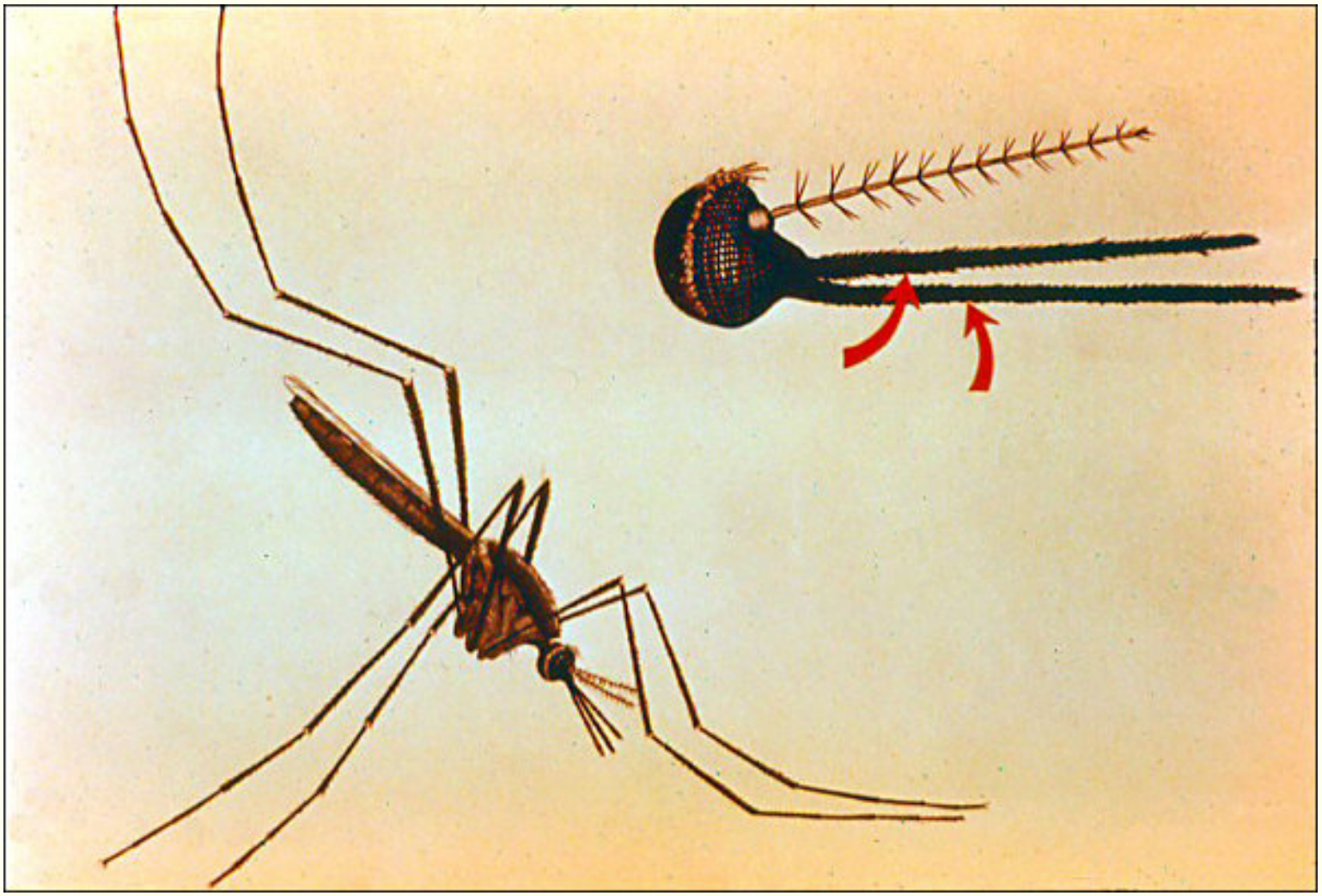

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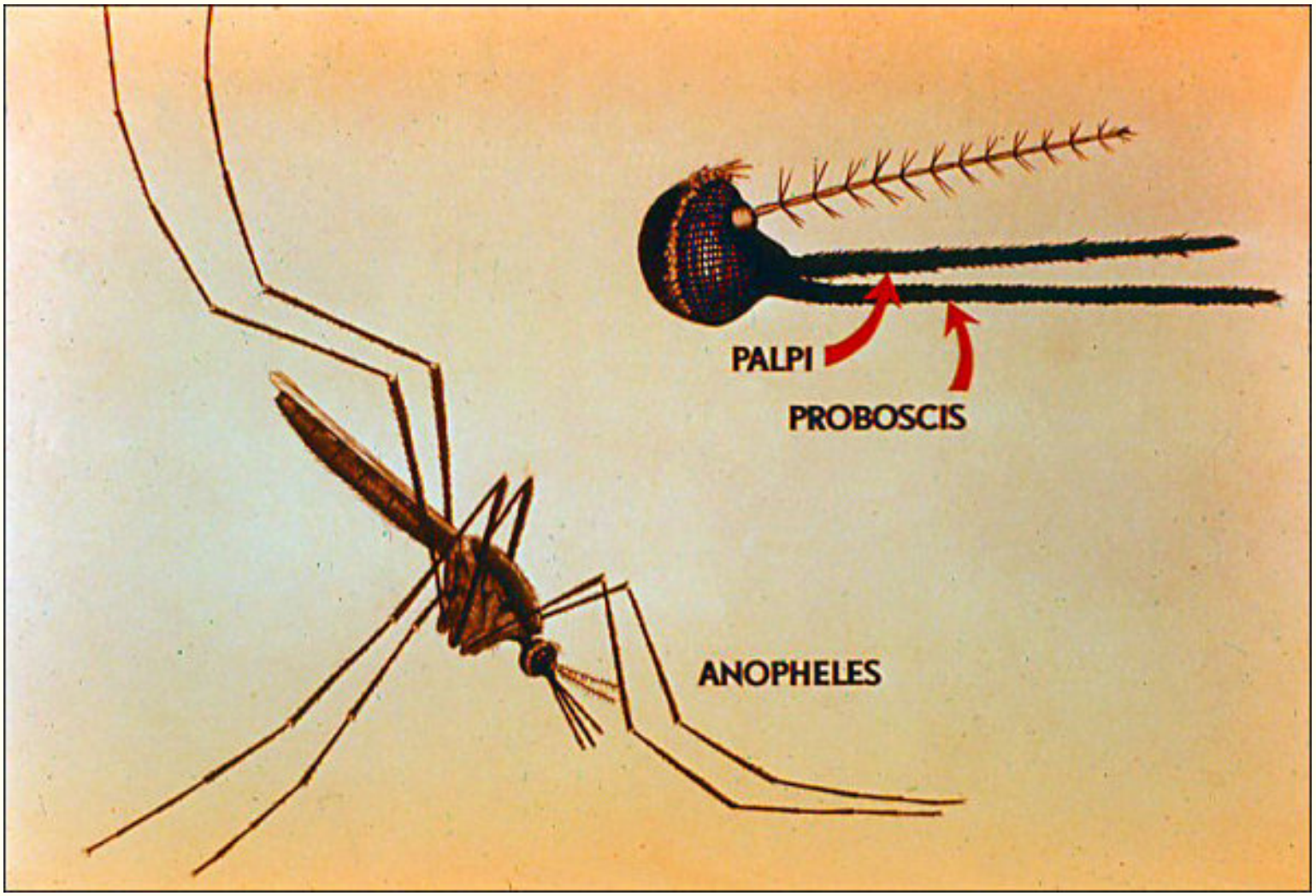

Anopheles - no other mosquitoes have palpi as long as the proboscis.

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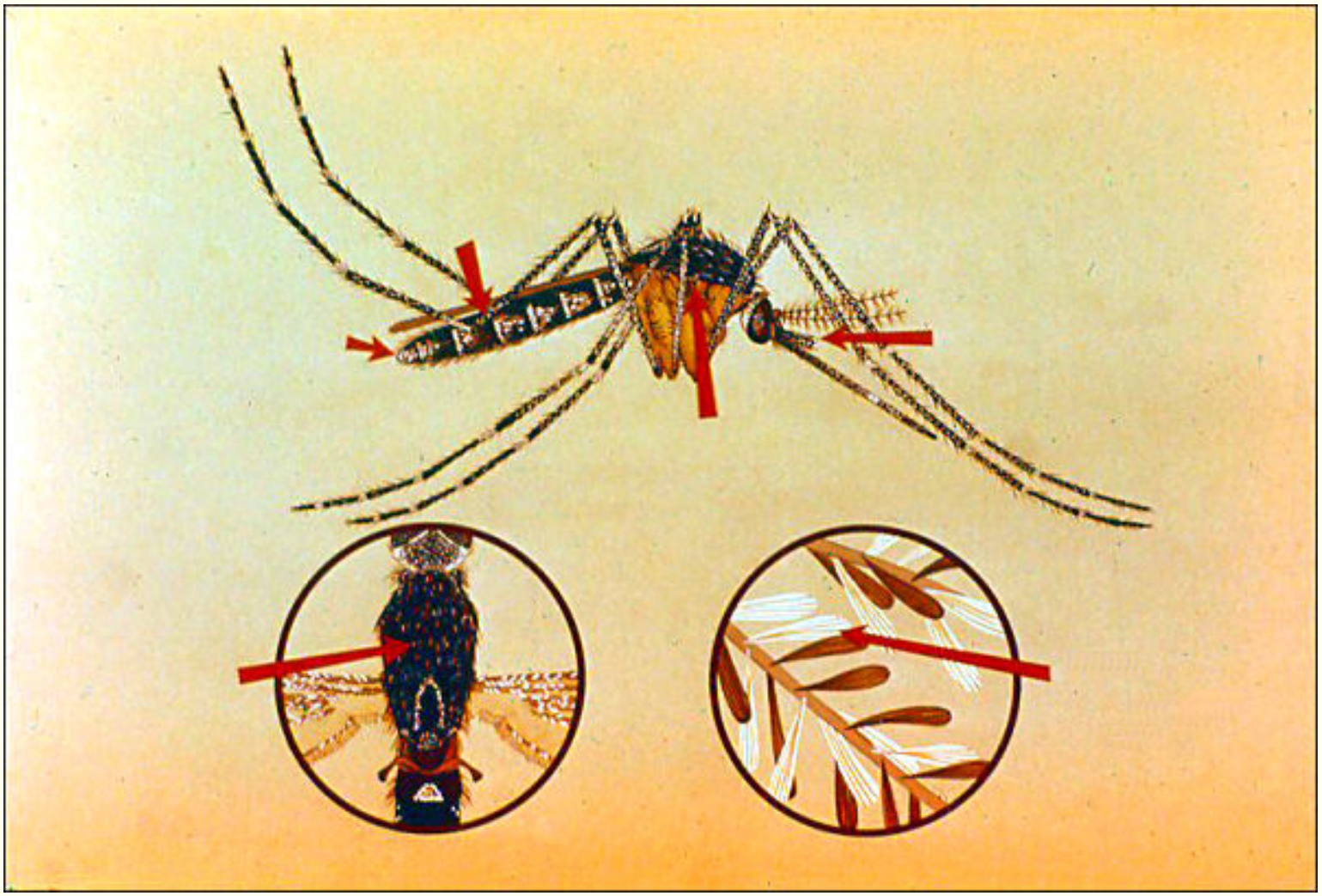

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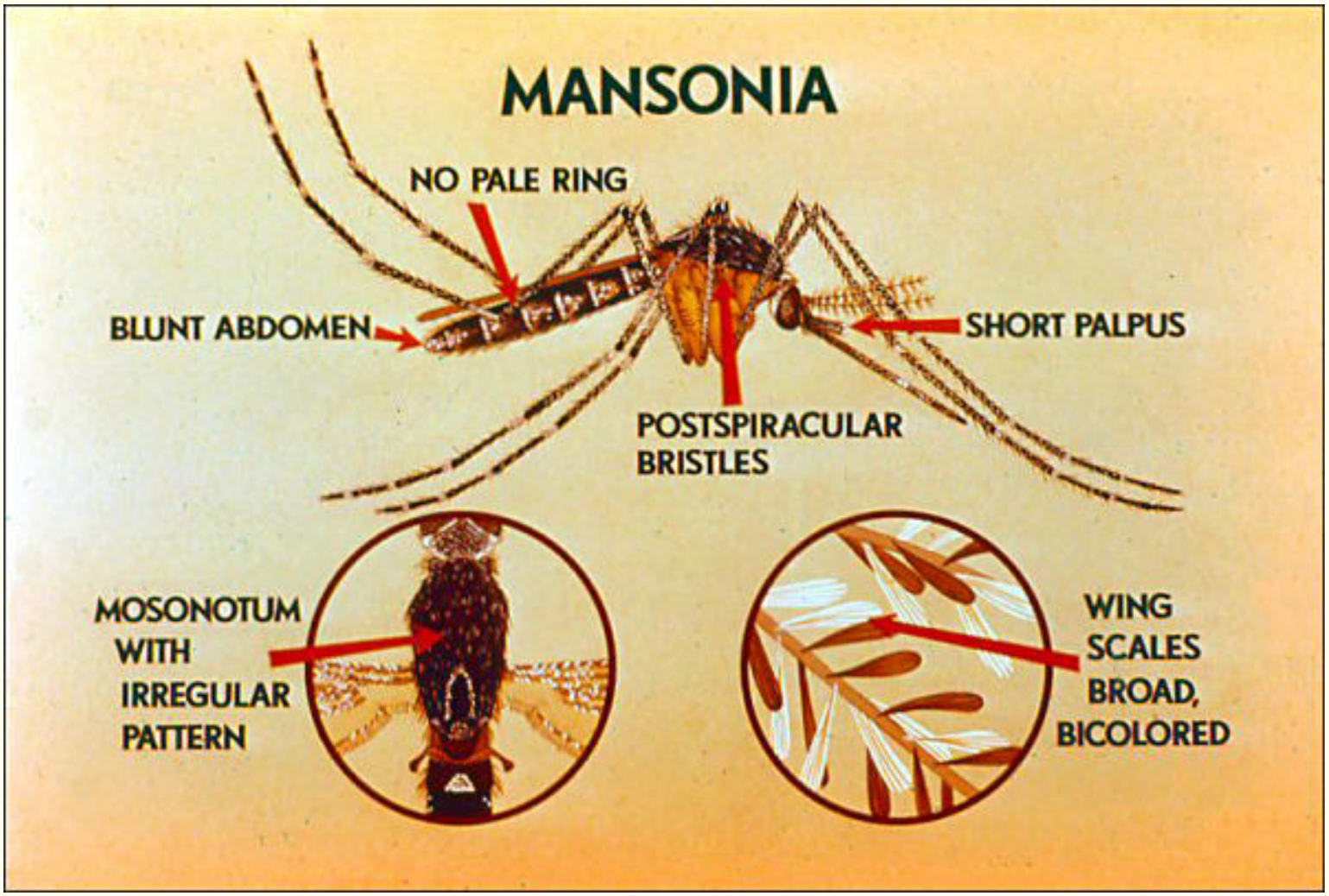

Mansonia also belongs to the group with blunt abdomens and to the subgroup with broad wing scales. It is distinguished from its close relative by having no subapical pale band on hind tibia and by the presence of postspiracular bristles.

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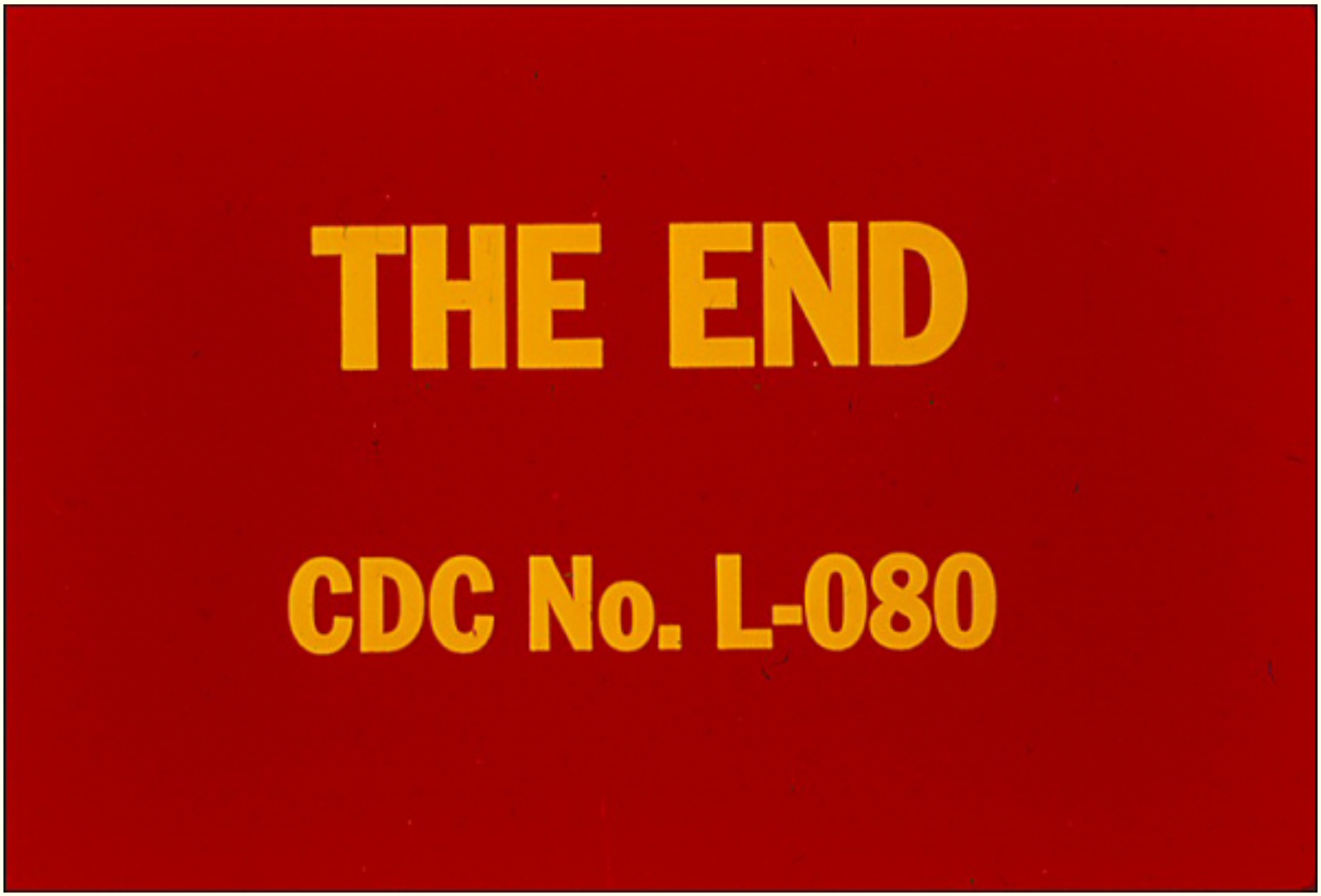

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