1724 (8252) Red Twin-spot Carpet *Xanthorhoe spadicearia* ([Denis & Schiffermüller], 1775) Common
1725 (8253) Dark-barred Twin-spot Carpet *Xanthorhoe ferrugata* (Clerck, 1759) Common

Diagnostic external characters

Those described by Waring *et al*. (2009) and Skinner (2009) hold true for the majority of examples of this pair. In earlier editions of these guides, the authors had stated that *ferrugata* can be distinguished from *spadicearia* by the presence of a notch in the inner edge of the median band on the forewing, in the costal half (although Waring *et al.* (2009) note that some individuals may be indistinguishable and this was intended to include the notch). Plant (2005), Dickerson (2008) and Townsend (2010) have shown this to be unreliable. Skou (1986) suggests that the median fascia is on average slightly narrower in *spadicearia*, and Baker (2007) suggests that the fascia is more deeply stepped in *ferrugata*. These trends may exist, but they are not definitive diagnostic features. Given the apparent steep decline in the abundance of *ferrugata*, highlighted by Fox *et al*. (2006), it is vital that this species is recorded accurately if its status is to be monitored effectively.

Identification using wing markings is discussed in greater detail by Townsend (2010). There is potential for confusion between *spadicearia* and both forms of *ferrugata*. Well-marked *spadicearia* are quite distinctive, but on worn moths, the purple or red forewing median band and other useful forewing characters may not be evident. These (especially the darkest examples) could be mistaken for the blackish-banded *ferrugata* f. *unidentaria*, which constitutes a large proportion of that species. Examples with the median band black or blackish with no trace of purple or red can probably be safely assigned to *ferrugata*, provided they are in good condition and other characters fit. However, if there is any doubt the genitalia should be checked.

The uncommon reddish-banded typical form of *ferrugata* is also likely to be confused with *spadicearia*. Again, forewing markings will rule it out in most cases (i.e. if they clearly indicate *spadicearia*) but if there is doubt because the wing markings appear inconclusive or the specimen is worn then the genitalia should be checked. Of the two forms of *ferrugata*, red-banded moths appear to constitute a small proportion of the population. Therefore, unless there are areas of Britain or Ireland where the converse is true, it is most likely to be seen alongside f. *unidentaria*.

Diagnostic morphological characters of the males

For males, full dissection is not necessary. The shape of the costal portion of the valva can be seen *in situ* by brushing away scales from the tip of the abdomen. This can be done on a soft abdomen or, with practice, after setting without detaching the abdomen from the specimen (Townsend, 2010). Plant (2005) notes that the uncus is very long in both species, and could be confused with the valval extensions if the scales are not cleared properly.

On valva, produced apical half of costal extension long, curved and pointed, extending well beyond tip of the valva, gradually tapered in apical half (Fig. 11, A). Basal half of costal valva extension relatively narrow. When *in situ*, the costal extension is bent inwards at 90° (Fig. 21, Plate 5)……*spadicearia*

On valva, produced apical half of costal extension short, curved and pointed, only projecting a short way beyond tip of valva (Fig. 12, A). Extension deeply excavate in apical half with a medial prominence and row of small teeth in the depression. Basal half broad……*ferrugata*

Diagnostic morphological characters of the females

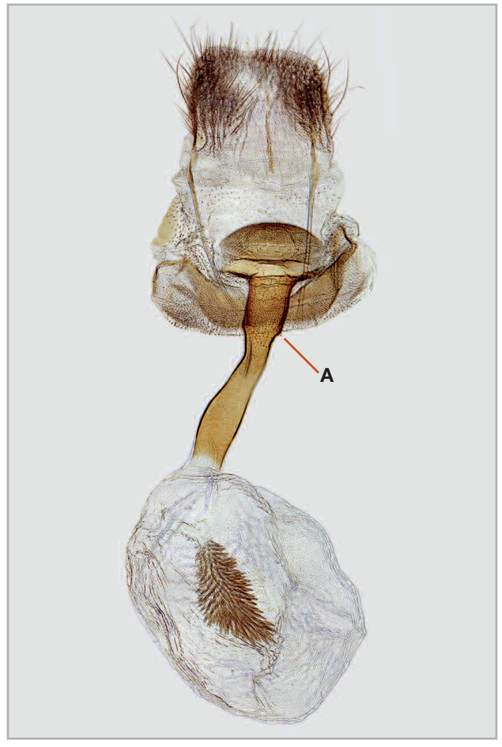
Ostium broad, shield-like (Fig.13, A)……*spadicearia*

Ostium relatively narrow, sides gently curved (Fig. 14, A)……*ferrugata*

11. *Xanthorhoe spadicearia* male

12. *Xanthorhoe ferrugata* male

13. *Xanthorhoe spadicearia* female



14. *Xanthorhoe ferrugata* female

Plate 3. Male and female genitalia of *Xanthorhoe spadicearia* and *X. ferrugata* (aedeagus not shown).