

**Pest Risk Assessment according to EPPO Standard PM 5/3 of the *Striga* spp.
described in the EPPO draft data sheet (*S. lutea*, *S. hermonthica*, *S. gesnerioides*)**

Decision-making scheme

1. Yes, the *Striga* spp. are clearly defined taxonomic entities.
3. The PRA area under consideration is the whole EPPO region.
4. No earlier PRA for the region exists.
7. The pests do not occur in the EPPO region.
9. Host plants occur (maize, other cereals, tobacco, legumes)
14. Some areas of the PRA area have ecoclimatic conditions comparable with those of the existing geographical distribution of the pests
15. The pests could possibly survive in a wider ecoclimatic zone
- 16/17. Though suitable conditions might exist in glasshouses, the hosts of *Striga* are not glasshouse crops
18. The *Striga* spp. certainly cause significant losses to the above-mentioned host plants in their natural range
19. No obvious other possibilities for damage or loss
20. Because *Striga* spp. are quarantine pests for other continents, their presence in the EPPO region could lead to additional export constraints.

It is concluded that *Striga* spp. could present a risk to the EPPO region.

Quantitative evaluation

1.1/1.2 *Striga* seeds could be carried on many pathways, especially with seeds of their hosts or in soil accompanying plants. In principle, they could be carried in bulk plant products (grain, fibres) or other products (wool), which are known to carry weed seeds. However, the EPPO region mostly does not import grain from countries where *Striga* spp. occur (except rice, not a good host). It is noteworthy that, despite the existence of various such pathways, we are not aware of any even casual record of a *Striga* in Europe (while thousands of other species have been brought in as casuals in this way).

Seeds

1.3 *Striga* seeds are likely to be associated with host seeds at origin

1.4/1.5 Though *Striga* spp. produce huge numbers of seeds, the concentration in host seed batches is not likely to be high, since *Striga* spp. should normally be adequately controlled in seed crops, or else seed crops are grown in areas where *Striga* spp. do not occur (*Striga* plants should not reach the stage of flowering under normal commercial practice)

1.6/1.7/1.8 *Striga* seeds are very likely to remain undetected because of their small size. They are very likely to survive normal transit conditions for seeds (but cannot multiply).

1.9/1.10 The areas where *Striga* spp. occur are not typically exporters of cereal seeds to the EPPO region (but *S. lutea* occurs in USA). Legume seeds are, however, produced in tropical countries. The EPPO secretariat is not informed of the situation with trade in tobacco seeds. In any case, the main risk would arise where seeds are produced directly for resale, rather than as high-grade seed for local multiplication (is not most maize seed, even of American cultivars, multiplied in Europe?). The distribution of the seeds in the EPPO region also depends on how the seed trade is structured.

1.12/1.13 When introduced with host seeds, *Striga* seeds are in ideal conditions for establishment.

Soil accompanying plants

1.3/1.4/1.5 Hosts of *Striga* are not typically traded as pot plants, so there is a relatively low risk of their being associated with them. Provided the plants are produced in conditions of good commercial practice, *Striga*, or weed hosts of *Striga*, should not be present to contaminate soil.

1.6/1.7/1.8 *Striga* seeds would be very likely to remain undetected in soil, and to survive (but not multiply).

1.9 Movement by this pathway is currently very limited, because most EPPO countries prohibit or severely restrict the import of plants with soil from the areas where *Striga* occur. The special requirements made for bonsai plants should normally exclude contamination with *Striga* seeds.

1.10-1.13 *Striga* seeds contaminating the soil of pot plants are not very likely to reach their hosts. However, the seeds are small, numerous and long-lived, and the possibility cannot be excluded.

Establishment

1.14/1.15 Maize is very widely cultivated in the EPPO region, and sorghum to a limited extent. Other European cereals are not typical hosts of *Striga*. Tobacco is cultivated in certain areas. Cowpea (the main legume host of *S. gesnerioides*) is not cultivated in the EPPO region; other legumes are not typical hosts.

1.19 Weed hosts like *Echinochloa* and *Digitaria* are widespread in the southern half of the EPPO region.

1.20 No part of the EPPO region is really tropical. However, *Striga* spp. have established in North and South Carolina (USA), in conditions which are more humid than those of the Mediterranean south of the EPPO region. Possibly the areas where cotton is grown in the Mediterranean region are more or less comparable (parts of Spain, Greece, Turkey, Egypt). Most of the areas of maize cultivation in the EPPO region have winters which could be presumed to be too cold and wet for survival of *Striga*.

1.22 *Orobancha* spp. somewhat resemble *Striga*, but are not parasites of *Poaceae*. It may be noted that *Orobancha* spp. are mostly not a problem in the EPPO region, but are of some importance in the eastern Mediterranean area (Egypt, Lebanon, Jordan, Turkey).

1.23 Natural enemies are not known to play any significant role in controlling *Striga* populations

1.24/1.25 In general, the crop environment is likely to be less favourable to *Striga* spp. in the EPPO region than in their countries of origin, but the difference is least marked in the area where *Striga* would be most likely to establish. Maize and sorghum cultivation depend for their economic viability on effective herbicide treatments.

1.26 The tropical life-cycle of *Striga* (which survives a hot dry season in the soil) is not well adapted to most of the EPPO region (where the season to be survived is a cold, often wet one).

1.27/1.28/1.29 *Striga* is likely to establish from low populations, and would be difficult to eradicate. There are no particular indications of genetic adaptability (host resistance is stable).

1.30 *Striga* spp. mostly occur, and are damaging, in crops in areas where they occur naturally in the wild. There have been introductions to other continents (notably to North America, New Zealand?; Japan?), but these have not, as far as one can tell, been very damaging. Central and South America, and Pacific islands, remain free.

2. Economic impact assessment

2.1 *Striga* spp. cause considerable economic loss in their existing natural range

2.4 The endangered area in the EPPO region seems likely to be limited to the southeast. It does not seem likely that *Striga* can survive in areas with cold winters.

2.5/2.6/2.7 Natural spread of this essentially soil-borne pest is not likely to be very rapid. Contamination of traded consignments, machinery, etc., and other human agencies, is more likely to spread the pest. *Striga* would not be easy to contain or eradicate.

2.8 Even in the areas of relatively extensive agriculture where *Striga* is most likely to survive, it does not seem likely that losses would be as severe as in the peasant agriculture of tropical Africa.

2.11 *Striga* spp. are regulated pests for many countries around the world. Their absence from the EPPO region has meant that they do not have to be taken into consideration by the seed export trade. However, the EPPO Secretariat is not aware that the possible presence of *Striga* seeds in internationally traded seed consignments anywhere presents great practical problems.

2.12-2.15 No comment

2.16 *Striga* can rather easily be controlled by avoiding planting hosts on contaminated land, by planting trap crops, and by normal weed control in crops (preventing any seed formation or build-up). The main unanswered question in this respect is whether *Striga* could establish and maintain itself in the EPPO region on wild plants or weeds. *Striga* are not known to be resistant to herbicides.

Conclusion

Overall, the replies of this pest risk assessment seem to be “not very likely”. *Striga* spp. are not very likely to be introduced by existing pathways, not very likely to establish in most of the EPPO region, and not very likely to be a serious problem in the parts where they might establish. Despite fairly free movement of seeds and other pathway commodities into most of the EPPO region, no *Striga* sp. has ever been reported. The most important hosts (maize and sorghum) are not grown on their largest scale in the EPPO region in the southeast where *Striga* could most easily establish. As obligate parasites, *Striga* spp. need hosts on which to persist, and are not particularly favoured by the conditions of Euromediterranean agriculture. Provided seed stocks can be kept free, there is little risk of widespread *Striga* infestation.

Nevertheless, it could be concluded that *S. lutea*, with its relatively wide geographical distribution and some history of spread, and its host preferences, stands out as the species which presents most risk for the EPPO region. It can also be added that EPPO countries have in general taken measures to avoid introduction of pests with soil from the tropical areas where *Striga* spp. mostly occur. The exclusion of semi-parasitic weeds such as *Striga* continues to be one of the justifications for such general measures applied to the import of soil.