

DISTRIBUTION, ABUNDANCE AND HOST TREE SPECIES OF MISTLETOE *Viscum album* L. (Viscaceae) ON THE ISLE OF WIGHT

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Abstract

A survey of the distribution and abundance of Mistletoe on the Isle of Wight was conducted from the winter of 2015/16 to the winter of 2021/22. The main host tree species recorded on the Isle of Wight comprised Poplar, Apple, Lime and Hawthorn. The main concentrations of Mistletoe were found in Carisbrooke, Gurnard, Newbridge and Quarr.

Analysis of the data indicates that Mistletoe does not appear to be affected by proximity to the coastline, but its distribution could be related to lower altitudes, and proximity to watercourses and orchards.

Keywords: *Viscum album*, Mistletoe, survey.

Introduction

Mistletoe is an evergreen hemiparasitic shrub that typically grows on the branches of trees and shrubs. Nationally, it is known to parasitise a range of species including, in broadly descending order of frequency, cultivated Apple (*Malus domestica*), Common Lime (*Tilia x europaea*), Hawthorn (*Crataegus monogyna*), hybrid Black-Poplar (*Populus x canadensis*), Maple (*Acer* spp.), Willow (*Salix* spp.), Crab Apple (*Malus sylvestris*) and False-acacia (*Robinia pseudoacacia*) (Briggs 2011, 2019 and 2021). Mistletoe is a dioecious species, with the female plants producing distinctive white berries which are dispersed by birds. The berries, and consequently the seeds, are spread either via droppings (with the seed passing through the gut of the bird) or possibly through bill-wiping (with the seed within the berry 'wiped' onto a suitable branch when a bird cleans its bill).

As Mistletoe retains its leaves year-round it is conspicuous, particularly in respect of larger individuals, within the branches of deciduous trees during the winter periods, when there is an absence of tree foliage. Larger specimens of Mistletoe tend to grow in spherical shapes and are referred to in several ways including 'balls', 'bunches' and 'clumps'. In this article, irrespective of their shape or size, they are referred to as 'clumps'.

Mistletoe can be found in most counties of England, particularly in the south and east; nevertheless, its core area comprises the adjoining counties of Herefordshire, Worcestershire and Gloucestershire. It is absent from most of Scotland, Wales, northern England, and the extreme south-west (Briggs 2011 and 2021). Fig. 1 provides a map of the distribution of Mistletoe within England and Wales based on data from the 1990s.

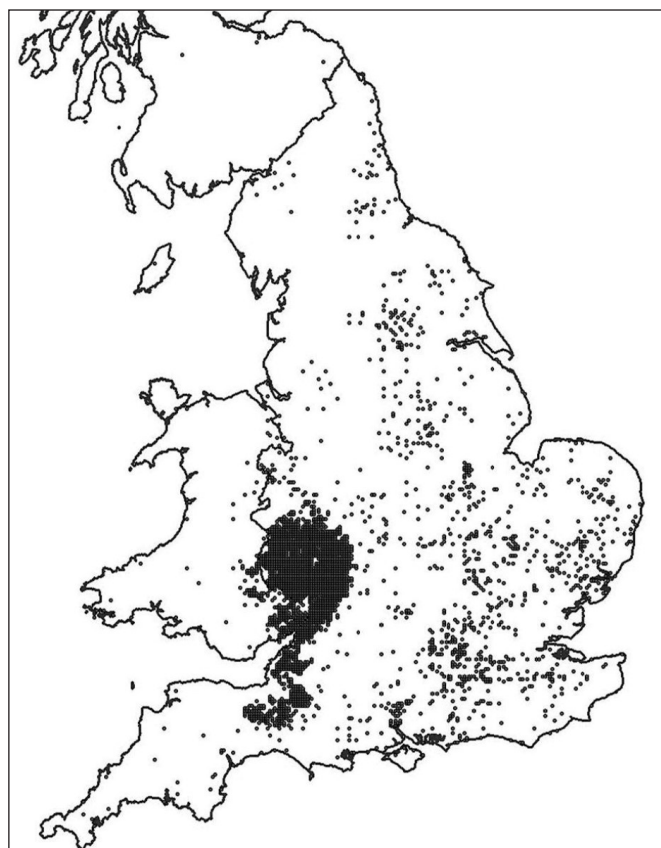


Fig 1: Distribution of *Viscum album* subsp. *album* (Mistletoe) in England and Wales, re-mapped from the 1990s Plantlife/BSBI data described in Briggs (1999). In Briggs, 2021, reproduced with permission.

Background to survey.

In March 2012, an annual county rookery survey of Oxfordshire was commenced by the author with the aim of recording the location of rookeries. The survey involved noting rookeries whilst driving around the county and then stopping at these locations to count the nests and to identify, where possible, the tree species in which the nests were constructed. Some rookeries were noted from a distance; however, on visiting the site to verify the exact location and tree species present, it was apparent the 'rookery' was a collection of Mistletoe clumps. Although not relevant to the rookery survey, the author noted the presence of Mistletoe incidentally.

Over successive winters, the number of Mistletoe records grew to the point that the author commenced an Oxfordshire Mistletoe survey in 2015 to gain a fuller understanding of the distribution of this species across the county. Since that year, and up to the winter of 2020/21, a total of 2,922 trees/shrubs have been found to support Mistletoe in Oxfordshire, with 16,660 clumps counted. Mistletoe has been noted on 23 identified host species with the most frequent being Common Lime followed by hybrid Black-Poplar, cultivated Apple, Hawthorn and Rowan (*Sorbus aucuparia*).

As the author had now developed an interest in Mistletoe, a survey of this species was commenced on the Isle of Wight during the winter of 2015/16. The aim of the survey was to record the locations of Mistletoe to assess its distribution and abundance on the Island.

Methods

Desk Study

To understand where the existing records of Mistletoe were on the Isle of Wight, a data search request was submitted to the Isle of Wight Local Records Centre (IWLRC) in November 2016. Additionally, a literature search of the Isle of Wight flora was undertaken to obtain further relevant Mistletoe data for the Island.

Field Survey

Between 2015 and early 2022, during the winter periods (generally from December until early April), Mistletoe was recorded (or attempted to be recorded) via visits to: a) the locations of where Mistletoe had been reported historically (based on the results of the desk study); b) areas where this species had been noted previously by the author whilst travelling around the Isle of Wight; and c) areas which appeared suitable to support Mistletoe (based on presence of suitable host species/habitat).

Where Mistletoe was found, the following attributes were noted:

- The number of Mistletoe clumps present in the tree, with the Mistletoe grouped into one of the following three size categories: small (wisps and up to c0.2m in diameter), medium (c0.2m to c0.99m in diameter), large (>1m in diameter); however, in practice, size was difficult to determine if the Mistletoe was distant from publicly accessible areas. It should be noted that counting clumps proved difficult in trees which were heavily festooned with Mistletoe; in these instances, the number present was estimated.
- The exact location of the tree in which the Mistletoe was growing was noted through either sketching a map into a notebook or through 'dropping a pin' on Google Maps using the aerial/satellite photograph function on an iPhone and then taking a screenshot.
- The identification of the host tree species (where possible). If a tree was unable to be identified during the winter, then it was revisited when the tree was in leaf to facilitate identification to species level.
- The general habitat within which the host tree was located was selected from the following habitat types (two or more of these could be selected where necessary):

Planted (presumed) line of trees, Residential garden, Copse, Roadside, Orchard, Scrub, Hedgerow, Churchyard.

Using the sketch maps, notes and the dropped pin on the aerial screenshot photograph from an iPhone, the locations of the host Mistletoe trees were plotted onto Google Earth™ on a laptop by placing a pin at the location of the tree. The information collected above, along with the date of the record, was added to the dropped pin. The records were subsequently extracted from Google Earth™, and converted into an Excel-readable file. The data were then manipulated to create a table with separate columns displaying the information collected above, along with the longitude and latitude of the dropped pin, for each host tree species.

Analysis

The Mistletoe data was uploaded to QGIS (a free open-



Fig. 2: Clump of Mistletoe on apple, in the foreground, with further clumps on hybrid black-poplar in the distance.

Photo: Keith Marston

source Geographic Information System (GIS) computer application) to run spatial analyses on the data. One element of these analyses was to assess if and how different variables may affect Mistletoe distribution and abundance. The variables that were selected for analysis included those that previous research (e.g. Briggs 2021) has indicated could affect Mistletoe distribution, and comprised the following:

- 1) Distance from the Mistletoe records to the nearest watercourse;
- 2) Distance from the Mistletoe records to the nearest coastline;
- 3) Distance from the Mistletoe records to the nearest orchard;
- 4) Height above sea level of the host tree. This was calculated by importing LIDAR data (from the Environment Agency (2019) under the Open Government Licence v3.0) into QGIS.

To attempt to understand if and how the above variables could affect Mistletoe distribution, the QGIS programme was used to create points at 100m intervals across the Island, with the programme generating 38,250 of these points across the Isle of Wight. These points were then subject to the same analyses as the Mistletoe data. As an example, the height above sea level of each of the 38,250 points was calculated in QGIS, with the same analysis run for each Mistletoe record. The two sets of data were then placed into the same 5m height bands. It would be expected that if height above sea level did not affect Mistletoe presence, then the frequency of the two sets of data within each height band would broadly be consistent.

Another analysis run in QGIS was the creation of 'heatmaps', with this exercise helpful in understanding where the hotspots of Mistletoe are on the Isle of Wight. Heatmaps are a useful tool to help visualise where higher densities of Mistletoe are present, with the darker the colour, the higher the concentration. For the purposes of this exercise, and to give a broad indication of prevalence, QGIS was programmed to produce heatmaps based on a 3.5km radius from each Mistletoe data point.

Results

Desk study

Background records

IWLRC provided 35 Mistletoe records for the Isle of Wight, with these spanning the period between 2000 and 2015. Some records included six or eight figure grid references, whilst others were at a coarser level with only 1km or tetrad locations provided. The location with the highest number of records was Carisbrooke (7 records), followed by Quarr (5), and then Gurnard (3). The remaining locations (including Ashe, Binstead, Bowcombe, Sandown and Shanklin) had one or two records.

Literature review

Bromfield (1856) described Mistletoe as "extremely rare in this island [Isle of Wight]" with four records provided as follows: 1) woodland near Apse Farm; 2) one clump on an apple tree in the grounds of Osbourne House in East Cowes; 3) Calbourne; and 4) Mount Pleasant in Newport.

Whereas Nicholson (1932) stated: "Mistleto [sic] appears not to have been recorded as occurring in the Isle Wight..."

The following paragraphs are extracts from the two most recent Isle of Wight flora publications regarding Mistletoe:

Bevis, J., Kettell, R. & Shepard, B. (1978) "Flowering Feb/Apr. Fruiting Nov/Dec. A perennial evergreen parasite. Sufficiently rare in the last century to name the few stations in which it was known and only apple is specifically mentioned as host. Still apparently quite rare with us today and almost unknown on any tree other than the apple. In the garden of "Moro" at Carisbrooke, Mistletoe persisted on the branch of an Acacia (*Robinia pseudoacacia*) for many years, but in 1970 the branch of the tree died. On birch at Watergate, Newport."

Pope, C., Snow, L. & Allen, D. (2003) "Very local, with a distribution showing a particular concentration of sites around Carisbrooke, Northwood, Ryde westwards to Quarr, Bembridge and Arthur's Hill, Shanklin. Bromfield (1856) found this plant to be extremely rare and he quotes just four records, the first in 1841. There are few subsequent records until the mid twentieth century and many of these relate to deliberate introductions. After

this, records increase but are always centred around particular sites. This pattern suggests that, on the Island, the plant originates from introductions by the Victorians and Edwardians into their orchards and that the plant has subsequently spread to neighbouring trees.

The host species recorded, with the number of post 1994 records, are apple (24), hybrid black-poplar (13), lime (9), hawthorn (5), false-acacia (4), white willow (1), field maple (1), almond (1) and *Chaenomeles* (1)."

Field Survey

Overview. During the course of the Mistletoe survey, a total of 761 clumps of Mistletoe were recorded on 129 host trees on the Isle of Wight. Apart from four records, the author conducted the recording of the Mistletoe as well as visiting each Mistletoe location as provided in the data from the IWLRC. Fig. 3 below provides the location of each Mistletoe encountered during the survey.

In terms of tetrads (2km x 2km squares), Mistletoe was found in 25 tetrads with the four most densely populated tetrads comprising SZ59R, SZ48D, SZ48Z and SZ49S.

Fig. 4 shows the number of clumps recorded per tree, with this varying between one and an estimated 53 clumps, with a median of three clumps per host tree. Over 34% of the host trees supported a single clump of Mistletoe, with 13.2% supporting two clumps. Following this, the number of Mistletoe clumps per host tree swiftly tails off, with the highest number of Mistletoe clumps, a count of 53, located in Carisbrooke on a lime tree. Whilst conducting the survey, this tree was felled; the reason for the felling is unknown.

Host tree species. Fig. 5 shows the number of trees of each species which hosts Mistletoe. Of the 129 host trees recorded, a positive identification was made for all but four; these trees comprised a possible Cherry, a possible Elm, and two trees where identification was not attempted due to their distance from publicly accessible areas.

Poplar was the most common host species for Mistletoe on the Isle of Wight, comprising 53.3% of the infested trees. All examples of this species group on the Island appeared to be hybrid Black-Poplar. The highest number of clumps in a tree of this species was 39, found at Quarr.

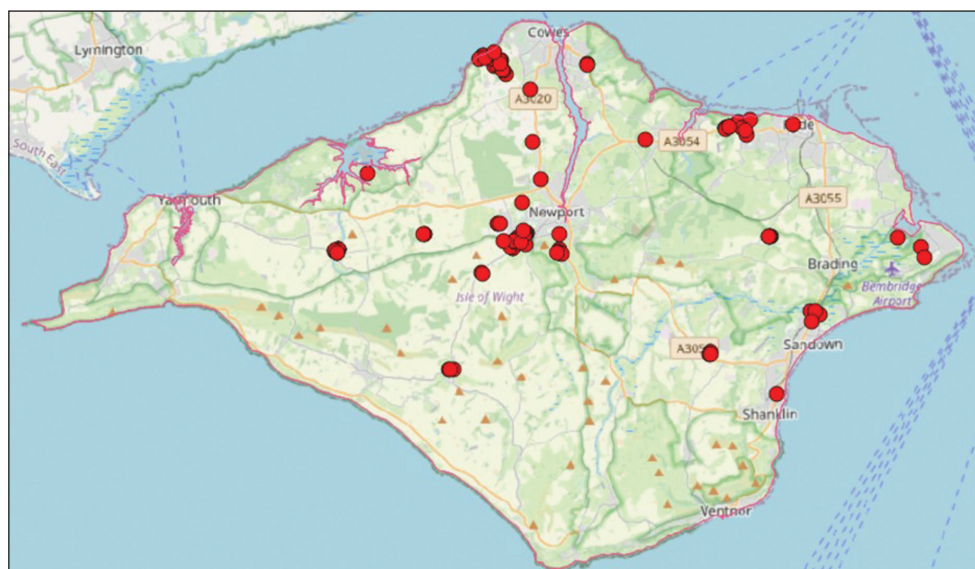


Fig. 3: Map of the locations of Mistletoe (red dot) recorded on the Isle of Wight between 2015 and 2021.

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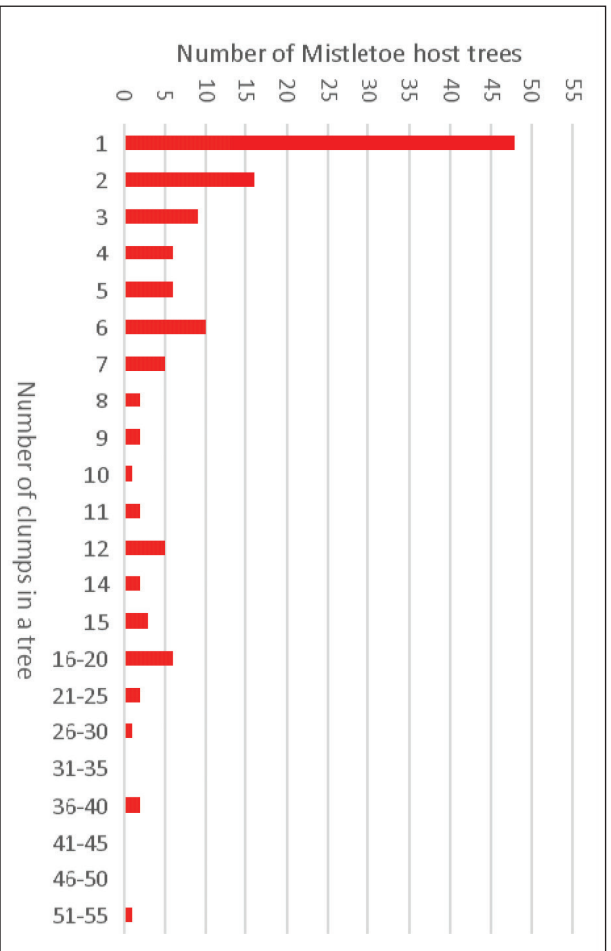


Fig. 4: The number of Mistletoe clumps counted on individual host trees on the Isle of Wight.

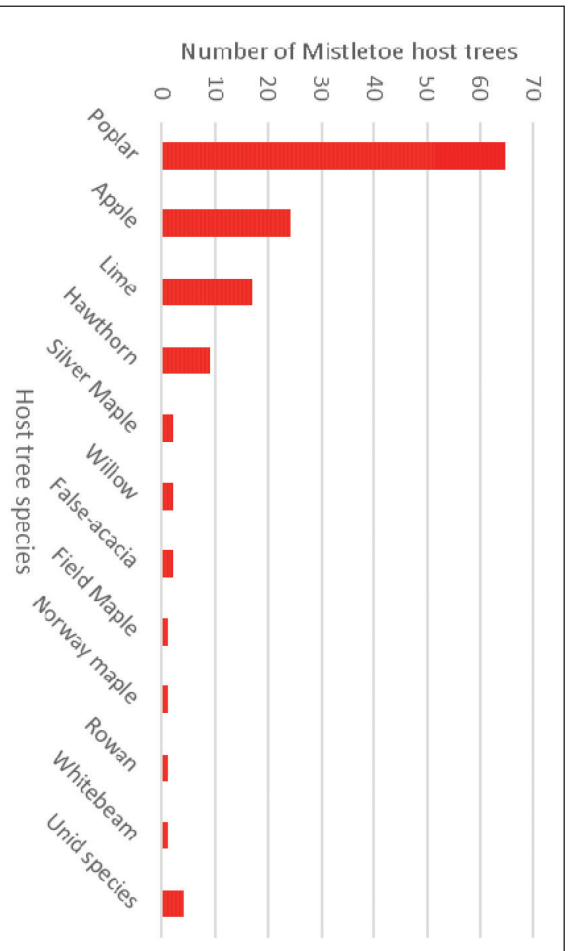


Fig. 5: The number of trees bearing Mistletoe per host tree species on the Isle of Wight.



Fig. 6: Mistletoe on hybrid Black-Poplar at Watchingswell
Photo: Keith Marston

Apple, mainly cultivated trees, was the second most common host species comprising 18% of infested trees. This species is likely to be under-recorded due to the low-growing nature of the tree (making it less prominent to be seen from a distance), along with its preponderance for growing in residential gardens (making it difficult to be seen over garden fences and walls, plus privacy issues with looking into residents' gardens with binoculars). There is the possibility that some of the Mistletoe recorded on this species has been 'planted'. The highest number of clumps in a tree of this species was 18, which was found in Newbridge.

Common Lime was the third most common host species comprising 11.5% of host trees on the Isle of Wight. Due to the generally tall growing nature of this species when mature, Mistletoe growing on this species can be readily viewed from a distance, and therefore confidence is high that all incidences of Mistletoe in this species have been recorded. The highest number of clumps in a tree of this species was 53, found in Carisbrooke.

Hawthorn was the fourth most common host tree species comprising 7.4% of host tree species. As this species is typically low-growing, it could be overlooked and therefore there is the possibility that it is under-recorded. The highest number of clumps in a tree of this species was 14, found in Gurnard.

The remaining Mistletoe host tree species comprised

Table 1: Habitats in which Mistletoe was found

It should be noted that as more than one habitat could be selected for each tree, the total number in the column equates to more than the number of host trees encountered on the Isle of Wight.

Habitat	Number of Mistletoe host trees
Planted line of trees	56
Residential garden	36
Copse	27
Roadside	17
Orchard	3
Scrub	2
Hedgerow	2
Churchyard	1

Silver Maple (*Acer saccharinum*), Willow, False-acacia, Field Maple (*Acer campestre*), Norway Maple (*Acer platanoides*), Rowan and Whitebeam (putative *Sorbus aria*) with no more than two trees of each of these species found to be supporting Mistletoe.

Habitat. Each host tree species was assigned to one or more habitat types based on the location of the tree. Table 1 below shows the number of Mistletoe host trees within each habitat type. The most frequent habitat in which a Mistletoe host tree species was encountered was 'Planted (presumed) line of trees' followed by 'residential garden' then 'copse'.

Host tree location

Although Fig. 3 shows the distribution of Mistletoe across the Isle of Wight, it is difficult to understand from this map exactly where Mistletoe is more prevalent.

Table 2: The number of Mistletoe-infested trees and the number of Mistletoe clumps encountered within villages and towns on the Isle of Wight.

Closest village/town	Number of infested trees	Number of Mistletoe clumps
Carisbrooke	23	137
Gurnard	22	102
Newbridge	17	147
Quarr	14	173
Shide	7	58
East Cowes	7	9
Ashey	5	11
Sandown	5	16
Bembridge	3	9
Binstead	3	14
Gunville	3	10
Parkhurst	3	6
Shorwell	3	18
Upper Watchingwell	3	33
Winford	3	4
Bowcombe	2	2
Newtown	2	2
Northwood	1	2
Ryde	1	1
Shanklin	1	5
Wootton	1	2

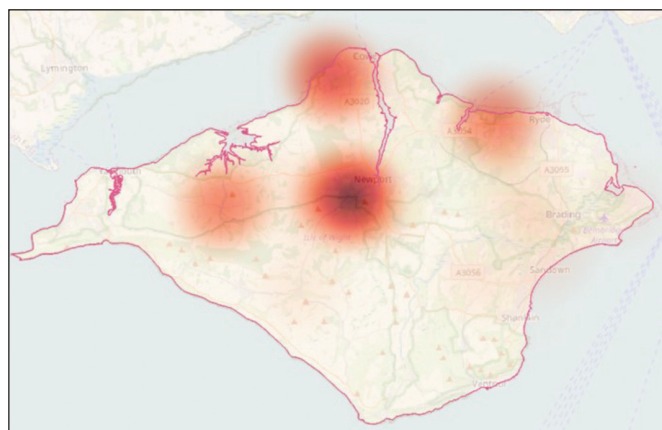


Fig. 7: Heatmap based on the number of host trees supporting Mistletoe on the Isle of Wight.

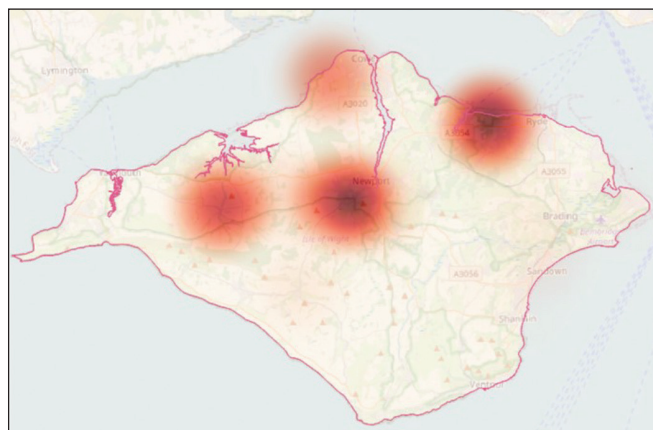


Fig. 8: Heatmap based on the number of Mistletoe clumps on the Isle of Wight.

Fig. 7 provides a heatmap based on the number of host trees supporting Mistletoe, and with Fig. 8 a heatmap based on the number of Mistletoe clumps.

Fig. 7 identifies that there are relatively few trees around the Quarr area, the north-eastern concentration of Mistletoe, hosting Mistletoe as compared to Carisbrooke at the centre; however, Fig. 8 identifies that the number of Mistletoe clumps at Quarr is relatively high, which therefore indicates that there are a high number of clumps per tree within a relatively small area.

To understand further where Mistletoe is located on the Isle of Wight, the number of Mistletoe host trees and the number of Mistletoe clumps, were grouped to the nearest town/ or village, and then counted. Although this is a rather coarse method of identifying the areas where Mistletoe has been recorded, it nevertheless gives a broad indication of presence and abundance. As shown by the heatmaps (Figs. 7 and 8), and Table 2, the main Mistletoe localities on the Isle of Wight, both by number of host trees and number of Mistletoe clumps, are Carisbrooke, Gurnard, Newbridge and Quarr.

Other analyses

The following provides a summary of the various analyses, using the results from QGIS, of the Mistletoe data collected on the Isle of Wight.

Proximity to coastline

Fig. 9 shows the number of host Mistletoe trees in distance bands of 50m from the nearest coastline/ estuary. The distance of Mistletoe host trees from the coastline ranges between 16.9 metres (in Gurnard) and 4.3km (in Ashey). The median distance of Mistletoe to the coastline is 1.33km.

Fig. 9 also provides the distance from each of the 38,250 data points, as created by QGIS, across the Island to the nearest coastline to aid placing the results in context.

Distance to watercourse

Fig. 10 provides the number of host Mistletoe trees in distance bands of 50m from a watercourse. The distance of a host tree from a watercourse ranges from

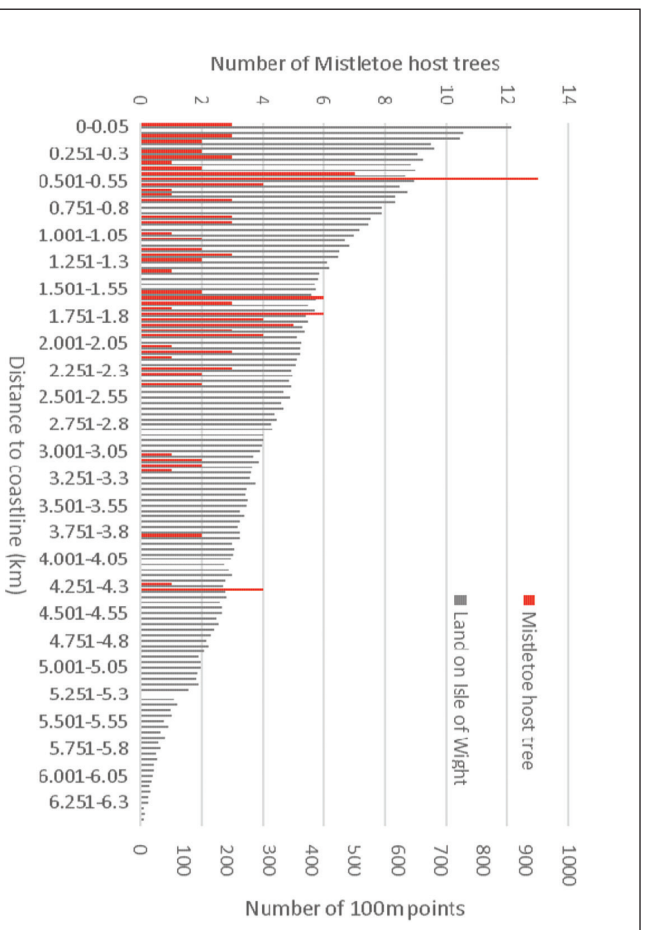


Fig. 9: The number of Mistletoe host trees within distance bands from the coastline.

2.5m to 1.1km with the median distance calculated at 177.7m. The 38,250 artificial points created by QGIS were measured to the nearest watercourse, and then grouped into the same distance bands as per the Mistletoe data.

Height above sea level

Fig. 11 shows the number of host Mistletoe trees in height bands of 5m above sea level. The height ranges of the host trees were recorded as between 0.62m and 77.2m with the median height calculated at 26m.

Proximity to orchards

Fig. 12 provides distance bands of the Mistletoe host tree to the nearest orchard (as provided by MAGIC: Multi-Agency Geographic Information Centre). The distances range from 0m (i.e. host tree located within an orchard) to 1.8km; the median distance between a Mistletoe host tree and the nearest orchard is 238.6m.

Distance to nearest neighbour

Fig. 13 shows the distance from a tree supporting Mistletoe to another supporting Mistletoe in distance bands. The graph highlights that a significant majority of host trees are located within 50m of another host tree, with the median distance to a neighbouring tree calculated as 25.3m. This indicates that Mistletoe appears to grow in clusters (which is also apparent based on the heatmaps at Figs. 7 and 8). The host tree growing furthest from another host tree was found on Lushington Hill with this tree being an apple tree in a residential garden.

Discussion

Host Tree species. It is difficult to draw conclusions about the factors affecting the distribution and abundance of Mistletoe on the Isle of Wight; nevertheless, the analyses undertaken above appear to shed some light on this matter. Mistletoe appears to have a strong preference for parasitising non-native (and probably planted) tree species, which is likely to explain the higher occurrence of man-made habitats in which the host tree species are found growing (e.g. residential gardens). Further, this may also explain why a high proportion of Mistletoe records are found in the centre, north and east of

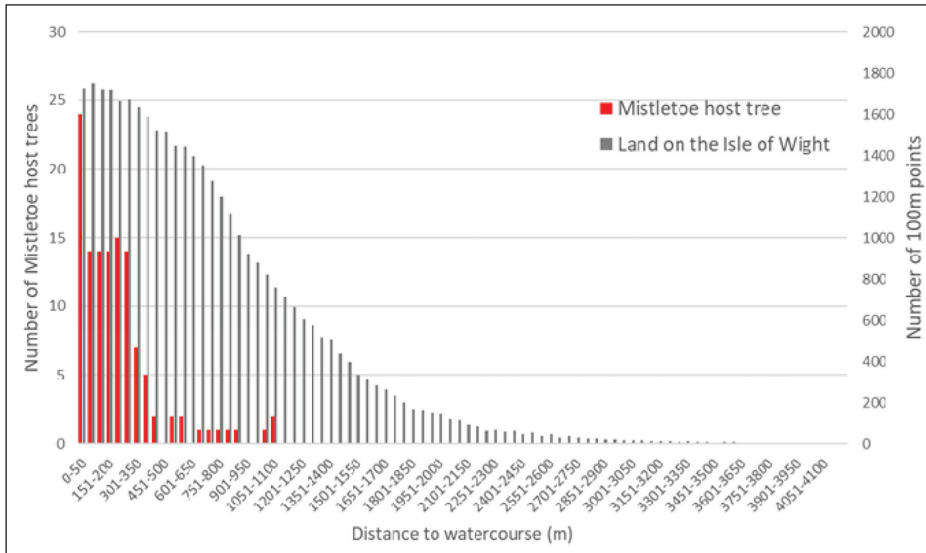


Fig. 10: The number of Mistletoe host trees within distance bands from the nearest watercourse, on the Isle of Wight, with the distance for land on the Island also provided.

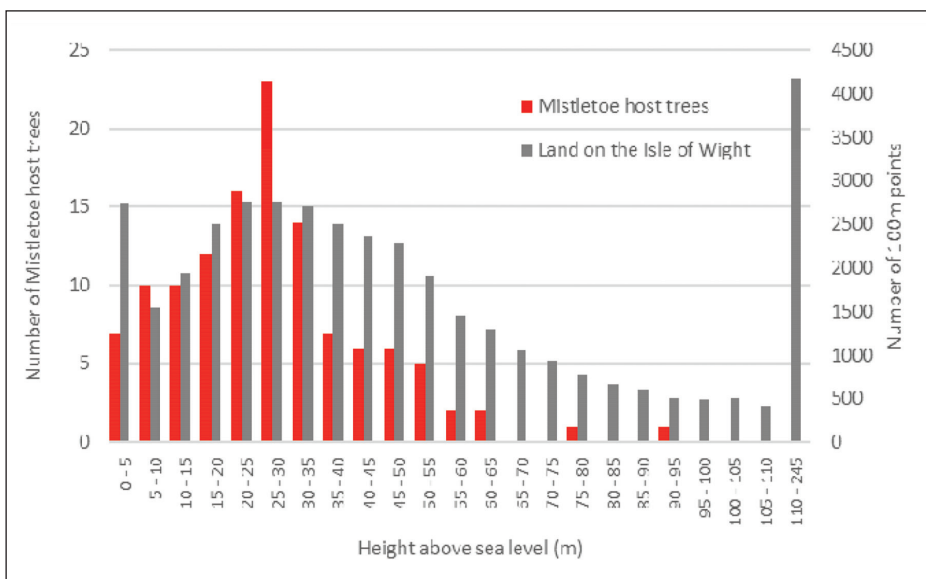


Fig. 11: The number of Mistletoe host trees in height bands above sea level, with the land height of the Island also shown.

the Island where the major towns are predominately situated. Indeed, the distribution map highlights a paucity of records in the less populated rural south of the Island. This pattern could also be explained by the characteristics of the southern part of Island; here the dominant land-use is intensive arable farmland with large, open fields bounded by a sparse, scrubby network of hedgerows, with wind-profiled trees (Natural England, 1994). It would appear, along with the likely paucity of non-native tree species, that the conditions and characteristics of these areas are not conducive for Mistletoe establishment and/or growth.

Apart from Hawthorn, Willow, Rowan and Field Maple, the remaining Mistletoe host tree species encountered on the Isle of Wight appear to be either non-native to the UK or would not typically occur naturally (e.g. Common Lime, hybrid Black-Poplar). Indeed, this pattern of Mistletoe using non-native or non-naturally occurring tree species also appears to be reflected in the results of the Mistletoe study conducted in Oxfordshire by this author, as well as being reported by Briggs (2021). Table 3 shows the number of Mistletoe host tree species recorded in Oxfordshire, with the numbers provided for the Isle of Wight for comparison.

It is unclear why certain species are favoured when there

is a range of species for Mistletoe to grow on, particularly those abundant on the Island (and in southern Britain) such as Pedunculate Oak (*Quercus robur*), Ash (*Fraxinus excelsior*) and Beech (*Fagus sylvatica*). Possible reasons for the pattern of parasitisation are that: a) native species such as Oak, Ash and Beech have largely developed an immune response to Mistletoe rooting; and/or b) the trees do not offer suitable foraging opportunities for birds such as Blackcap (*Sylvia atricapilla*) and Mistle Thrush (*Turdus viscivorus*) onto which they could then bill wipe or deposit droppings.

It is considered that the former reason is likely to play a greater significance as although Oak and Ash do not offer significant winter foraging opportunities for Blackcap and Mistle Thrush, these species could still use these trees to bill wipe and to produce droppings in.

Birds

Staying with birds, the known vectors of Mistletoe seed dispersal are Mistle Thrush and Blackcap. The former species spreads seeds through the deposition of droppings, and the Blackcap by bill wiping the seed onto suitable branches. The recent increase in wintering Blackcaps in the UK (Balmer 2013) could potentially aid in increasing the spread and abundance of Mistletoe in this country due to Blackcaps' preference for berries

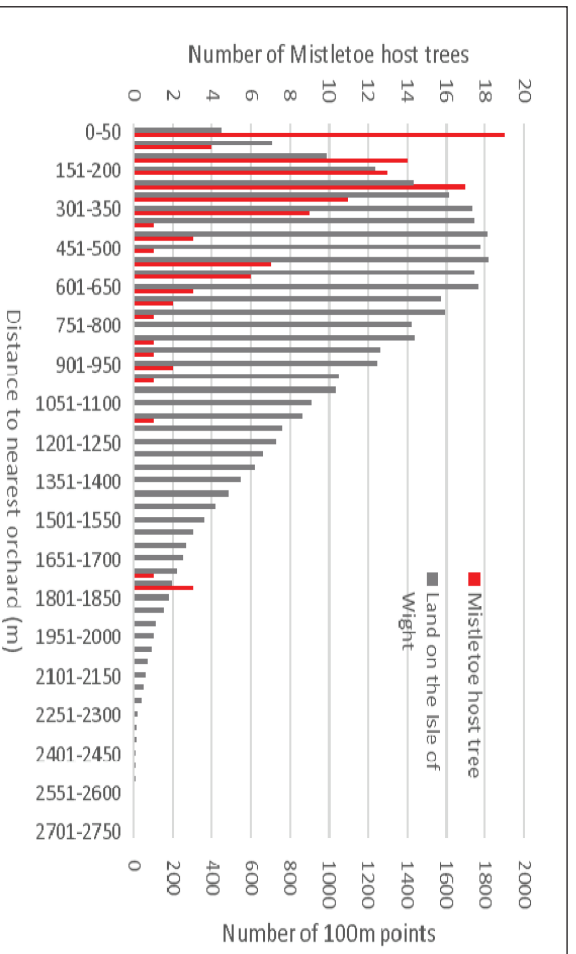


Fig. 12: The number of Mistletoe host trees within distance bands from the nearest orchard, with the distance to orchards for all the Island also provided.

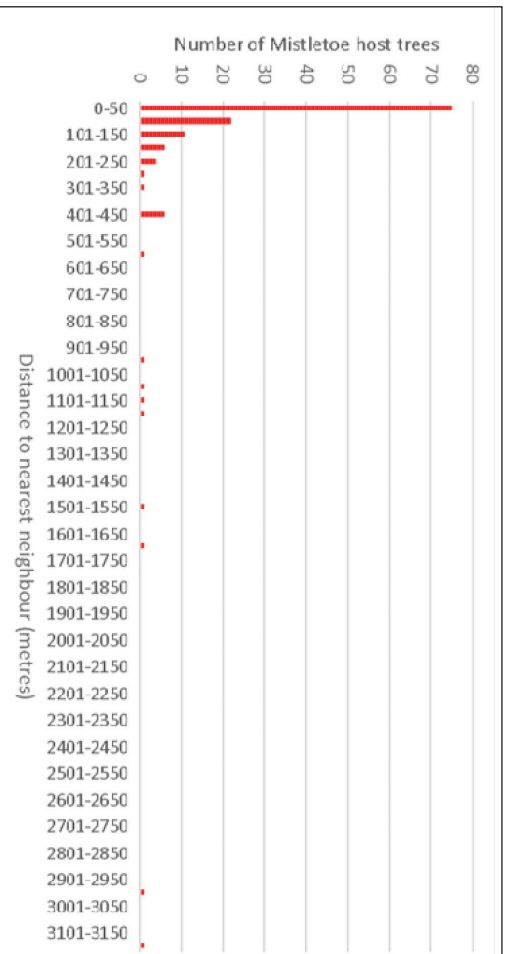


Fig. 13: The number of Mistletoe host trees within distance bands to the nearest Mistletoe host tree.

during the winter months (during the summer they tend to consume insects). Blackcaps are particularly prevalent in the Severn Valley which also has the highest abundance of Mistletoe in the UK. However, it is difficult to determine whether one species has led to the increase or abundance of the other (or if there is no correlation). Reviewing Bird Atlas data shows a relatively low abundance of wintering Blackcaps on the Isle of Wight, and recent Isle of Wight bird reports highlights that the mean number of Blackcaps recorded on the Island in January and February over the previous 15 years is low at around 10 individuals annually, so at present they are unlikely to be a significant factor here.

Watercourses: The analysis appears to indicate a correlation between presence of Mistletoe and proximity to watercourses. Possible reasons for this preference could be due to factors such as higher levels of humidity or the shelter of a valley in which the watercourse flows providing enhanced growing conditions for Mistletoe or its host trees.

Orchards: Another potential factor that could affect Mistletoe occurrence is orchards. In Briggs (2021), reference is made to the previous popular belief that Mistletoe presence coincides with orchards; however, Briggs indicates that this is coincidental, and that Mistletoe and apple appear to prefer the same climatic

conditions. Indeed, based on the Isle of Wight Mistletoe data, some Mistletoe occurs within or close to orchards; however, other examples are located at some distance (although the occurrence of historic orchards cannot be ruled out). It is possible that Mistletoe could have been historically introduced to apple trees and from there they have spread to suitable trees within the vicinity via natural means (i.e. birds).

Coastline and height above sea level. In respect of the other Mistletoe analyses undertaken, the data appears to show that factors such as proximity to coastline, and height above sea level do not affect Mistletoe distribution on the Isle of Wight.

It has been shown that most Mistletoe populations occur below 200m (Briggs, 2021) and as the maximum height of the Isle of Wight is 241m, this factor is unlikely to be strongly reflected on the Island. Nevertheless, the incidence of Mistletoe on the Island above 65m is rare, and this could be due to the lack of tree cover and/or the lack of suitable host tree species at these heights. A relatively small amount of the Island occurs above 65m and these higher altitude areas are largely located in the southern half of the Island, which as previously discussed, has environmental conditions less conducive for Mistletoe establishment and/or growth.

Further analysis. The above are 'first pass' analyses

Table 3: Comparison of the Mistletoe host tree species between Oxfordshire and the Isle of Wight.

Species	Oxfordshire		Isle of Wight	
	Number of trees	%	Number of trees	%
Lime	982	33.6	17	11.5
Poplar	553	18.9	65	53.3
Apple	378	12.9	24	18.0
Hawthorn	365	12.5	9	7.4
Rowan	180	6.2	1	0.8
False- acacia	132	4.5	2	0.8
Norway Maple	69	2.4	1	0.8
Willow	66	2.3	2	1.6
Silver Birch	10	0.3	0	1.6
Silver Maple	7	0.2	2	1.6
Field Maple	6	0.2	1	0.8
Alder	5	0.2	0	0.0
Sycamore	5	0.2	0	0
Whitebeam ^	0	0	1	0.8
Other species *	25	0.9	0	0.0
Species unidentified	139	4.8	4	3.3

^ Putative species: Swedish Whitebeam

* For the Oxfordshire survey, other species (comprising those where there have been no more than five occurrences where Mistletoe has been recorded) include: Horse-Chestnut *Aesculus hippocastanum*, Ash, Hazel *Corylus avellana*, Grey Alder *Alnus incana*, Haw-Medlar *Mespilus germanica* x *Crataegus laevigata* = *X Crataemespilus grandiflora*, Chinese Willow *Salix matsudana*, Japanese Hop-Hornbeam *Ostrya japonica* and Handkerchief Tree *Davidia involucrata*.

to understand if they could be implicated in affecting Mistletoe distribution/abundance on the Isle of Wight. To confirm or to have more certainty in the conclusions drawn from the various factors, further analysis would be required as no statistical tests were undertaken for this article. Further, additional data collection and/or analyses that could be undertaken to understand if they could also be implicated as possible influencers of Mistletoe distribution include: 1) size of the host tree (both height and trunk diameter); 2) age of the tree; 3) geology at the location of the host tree; 4) soil type at the location of the host tree; and 5) human population density within the vicinity of the host tree.

Review against recent Flora

Returning to the most recent Isle of Wight Flora (2003), the Mistletoe account within this publication is largely consistent with the results of this Mistletoe survey. The exceptions to this are that some locations with a high density of Mistletoe clumps are omitted (Gurnard, Newbridge and Shide). In addition, the host tree species composition is slightly different with the most frequently encountered host tree species during the recent survey comprising Poplar, followed by Apple, Lime, and Hawthorn.

A review against the historic records could indicate that Mistletoe has increased on the Island over the

past century or so; however, it is unknown the extent and coverage of the previous publications/data, and therefore if this survey does show a genuine population increase in Mistletoe.

Future of Mistletoe

It is interesting to posit what the future holds for Mistletoe on the Isle of Wight. Recent predictions (Jeffree & Jeffree, 1996) indicate that Mistletoe will increase in the east of the country due to milder winters. However, if the weather also becomes windier (one possible climate change effect) then this could lead to a greater likelihood of Mistletoe clumps being blown down. Although climate change could be a possible future influencer of abundance and distribution on the Island, the largest limiting factors for any increases on the Isle of Wight are likely to be due to the relatively limited number of suitable host trees, and the ability for Mistletoe to colonise new suitable trees distant from its core areas.

Due to the relative paucity of Mistletoe across the Isle of Wight it is considered that it should be relatively easy for the survey to be repeated in the future in order to monitor any changes in this species' distribution and abundance. All Mistletoe records as part of this survey have been provided to the IWLRC to aid in the undertaking of future studies. Nevertheless, it is anticipated that the author will maintain his Mistletoe database into the future following any new (or lost) Mistletoe records to gain an on-going understanding of any changes to the status of Mistletoe on the Isle of Wight.

Conclusion

Based on the analyses undertaken it would appear that Mistletoe distribution is affected by proximity to: 1) watercourses; 2) orchards; 3) existing Mistletoe populations; and 4) man-made habitats. Further, the absence of Mistletoe from large parts of the southern half of the Island appears to be due to a combination of inter-related factors: the paucity of suitable host trees; the lack of significant urban centres; the low level of tree cover; and the general high elevation of the land.

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Orchard data was obtained via <https://magic.defra.gov.uk>

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