

20/04/2024



CONSERVATOIRE
BOTANIQUE NATIONAL
BREST

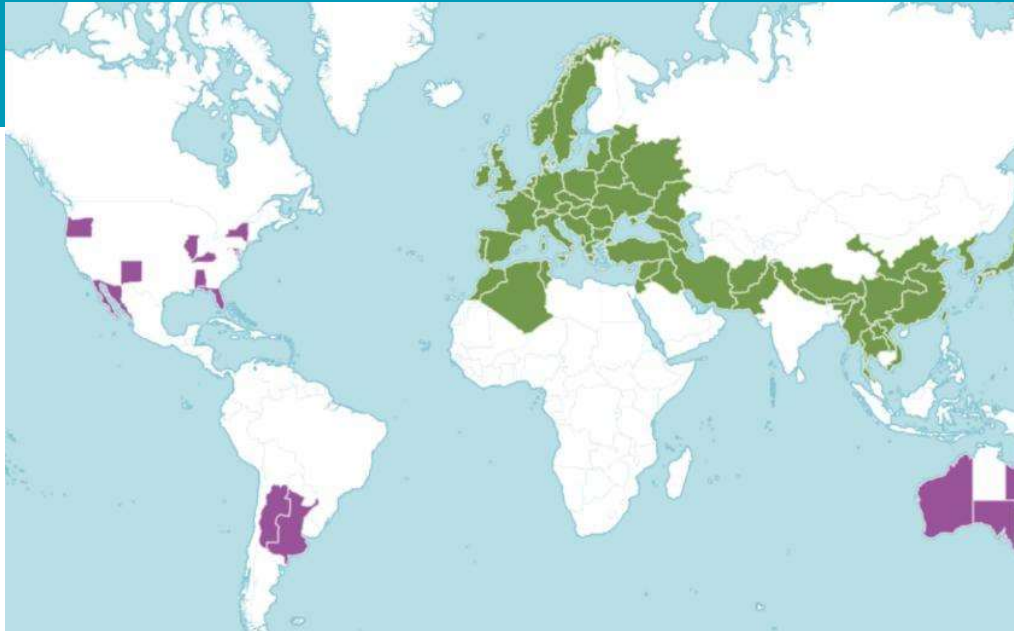
Aide à la détermination de groupes difficiles

Le genre *Hedera* dans
le massif armoricain et
ses marges

Réunion des
correspondant.e.s,
20/04/2024

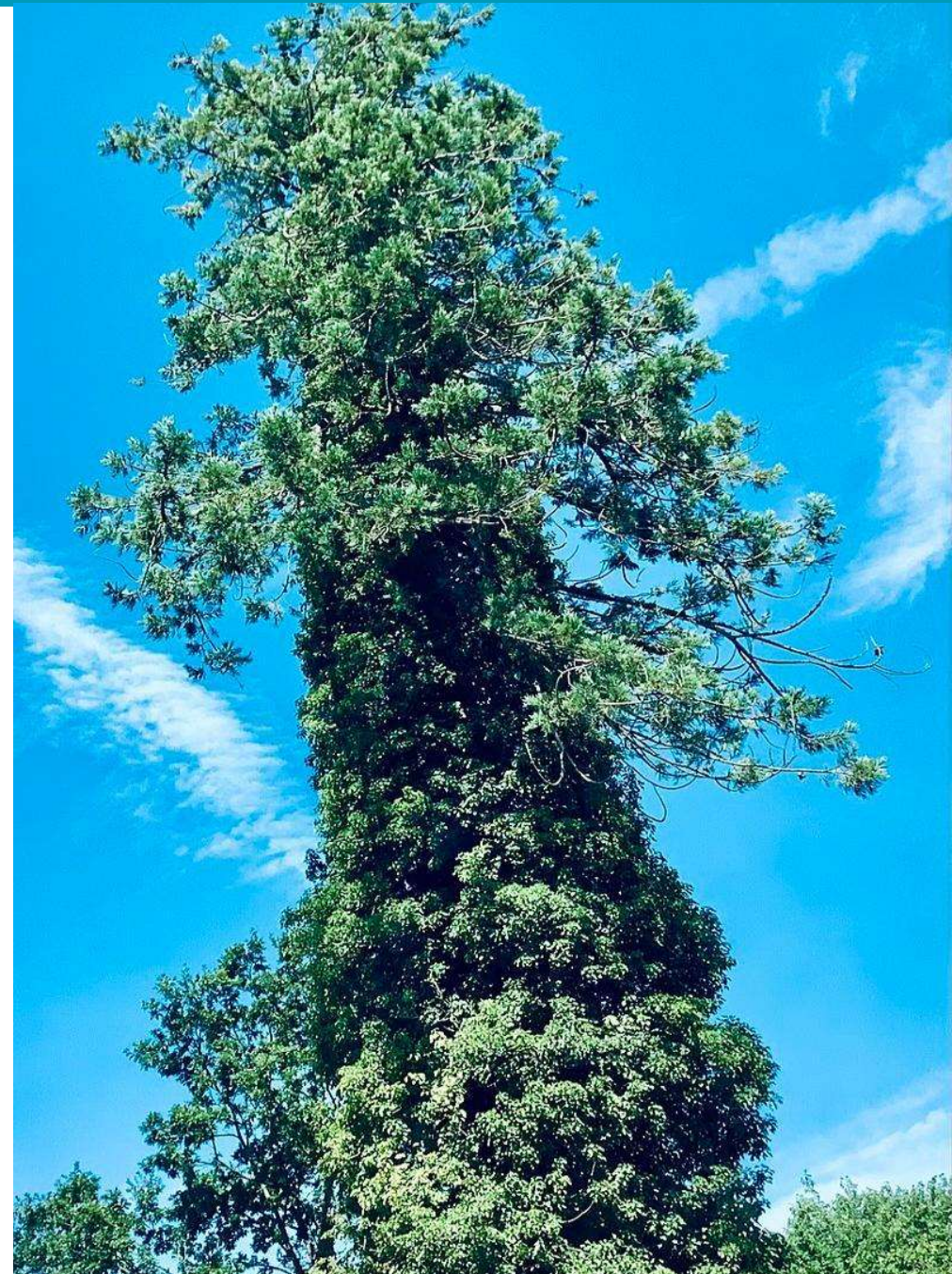


Aurélien Bour

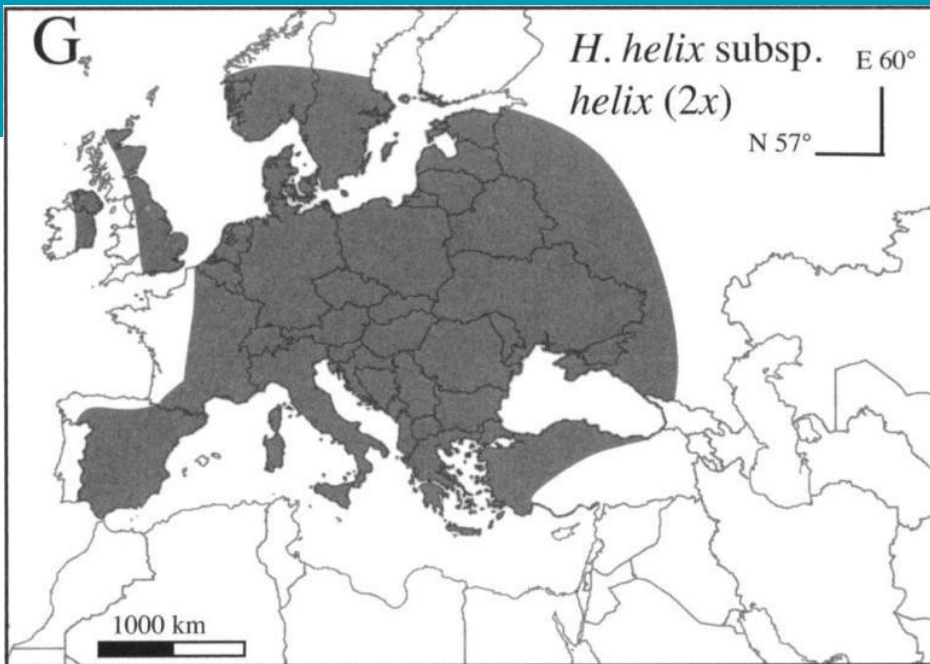


- Genre *Hedera*

- 17 espèces
- 2 hybrides
- Origine eurasiatique
- Centre de diversité Méditerranée-Macaronésie
- Invasif dans de nombreux pays
- Complexe polyploïde
- Taxinomie et identification complexe
- De nombreux cultivars différents



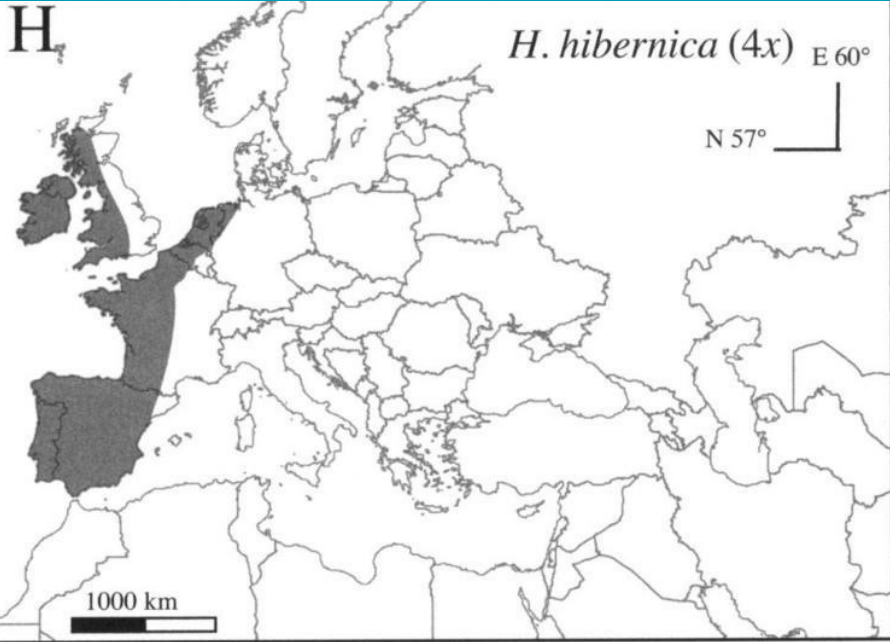
**DIAPORAMA DES ESPÈCES CONNUES
DANS LE MASSIF ARMORICAIN ET SES
MARGES**



- *Hedera helix* L.

- La plus courante
- Indigène (?)
- Sous-bois, zones ombragée, très polymorphe
- Très cultivée, sélectionnée
- De nombreux cultivars différents
- Diploïde
- Eurasiatique



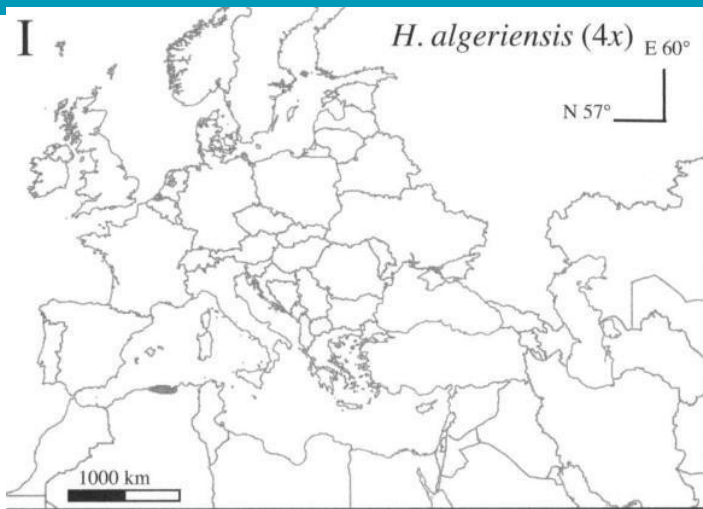


- *Hedera hibernica* Poit.

- Très courante, largement sous-observée
- Indigène
- Littoral, forêts humides, très polymorphe
- Majoritaire sur le littoral atlantique et dans les Monts d'Arrée
- Très cultivée, sélectionnée
- De nombreux cultivars différents
- Tétraploïde
- D'origine hybride (*H. canariensis* × *H. helix*)



ESPÈCES À RECHERCHER



- *Hedera algeriensis* Rantonnet ex C.Morren

- Endémique d'Algérie
- Taxon d'origine méditerranéenne
- Groupe des lierres à poils peltés (+ de 10 rayons larges)
- Très cultivé en couvre-sol
- Parfois échappé
- Identification complexe (confondu avec *H. canariensis* et *H. azorica*)
- Observé à Saint-Brévin par Dominique Chagneau

Dominique Chagneau





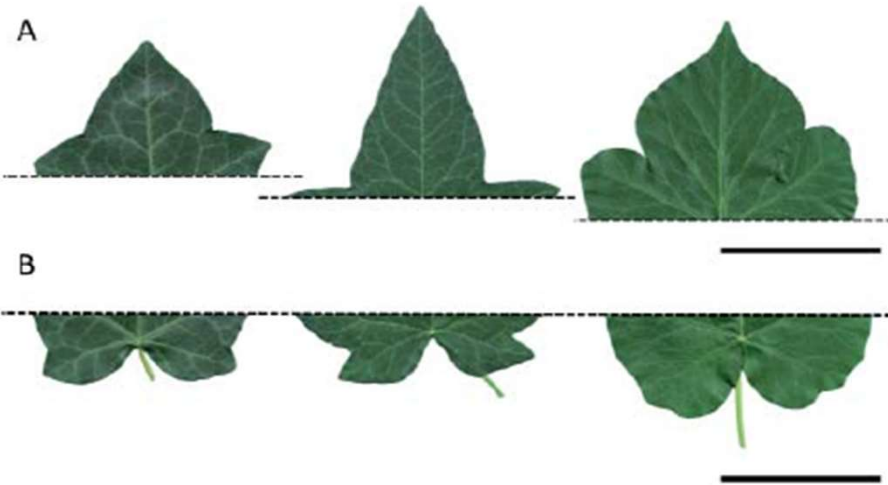
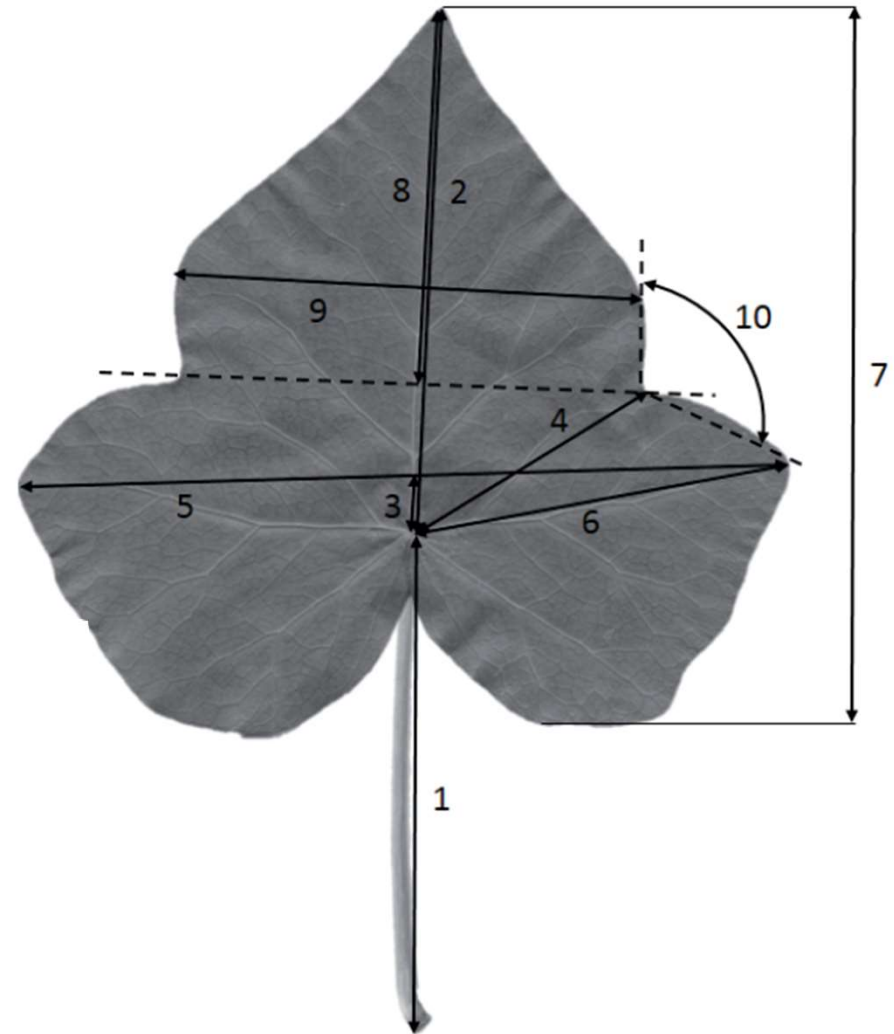
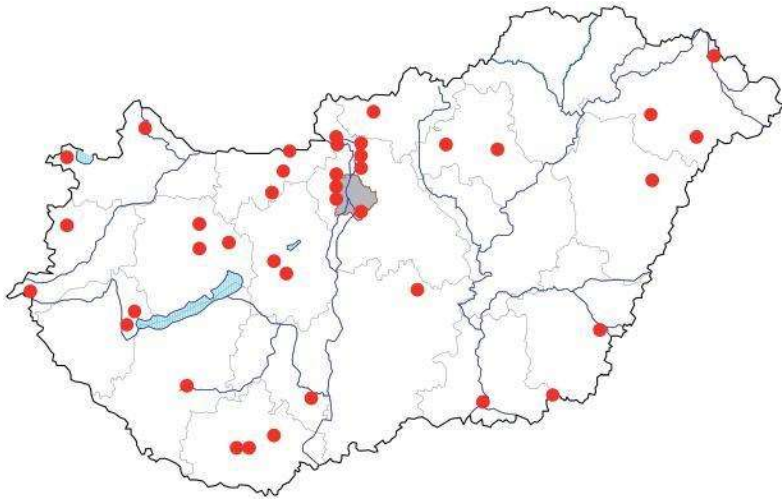
- *Hedera crebrescens* M.Bényei-Himmer & M.Höhn
- Décrit en 2017 de Hongrie, déjà observé dans une grosse partie de l'Europe
- Proche d'*H. hibernica* dans lequel il était inclut
- Cultivé et échappé, déjà considéré comme invasif
- Défini par des caractères morphométriques sur les lobes
- Infrutescence à ombelle unique

Bényei-Himmer, M., Tóth, E. Gy., Lengyel, Sz., Pintér, I., Bisztray, Gy. D. & Höhn, M. (2017):
Hedera crebrescens (Araliaceae) a newly identified diploid taxon and triploid ivies from Hungary.
 – *Studia bot. hung.* **48**(2): 225–252.



M.Bényei-Himmer

HERBARIUM MUSEUM HIST. NAT. HUNG. BUDAPEST
 Flora Hungarica
 No.
Hedera crebrescens HIMMER-HÖHN
 HOLOTYPE
 Gyűlés helye: 1118 Budapest, Balai Arborétum
 Március 31-44. A. épület előtt
 Gyűlés időpontja: 2015. október 03.
 Gyűjtő neve: Bényei-Himmer Márta
 Meghatározó neve: Bényei-Himmer Márta



Hedera crebescens
M.Bényei-Himmer & M.Höhn

Fig. 4. Leaf characters on the emerging shoots of *Hedera hibernica* (left) *H. helix* (central) and *H. crebescens* (right), Scale bars=(A, B) 50 mm. A: apical lobe (triangular, elongate, dome-shaped) B: leaf base (open, open, overlapping sites).

- *Hedera × soroksarensis* M.Bényei-Himmer & M.Höhn
 - Hybride stérile *H. hibernica* × *H. helix*
 - Existe en présence des parents mais difficile à détecter
 - Répandu en culture sous plusieurs noms de cultivars :
 - *Hedera helix* 'Woerner'
 - *Hedera helix* 'Remscheid' (synonyme de 'Woerner')
 - *Hedera* 'Negro'



M.Bényei-Himmer

Fig. 9. The holotype specimen of the triploid *Hedera* taxa: *H. × soroksarensis*.

- *Hedera* × *schmidtii* M.Bényei-Himmer
- *Hedera helix* 'Nagybörzsöny'
- Différences mineures d'avec *H.* × *soroksarensis*
- Combinaison déjà décrite : isonyme nomenclatural (Art. 6 Note 2 du Code International de Nomenclature)

M.Bényei-Himmer



Fig. 13. The holotype specimen of the triploid *Hedera* taxa: *Hedera* × *schmidtii*.



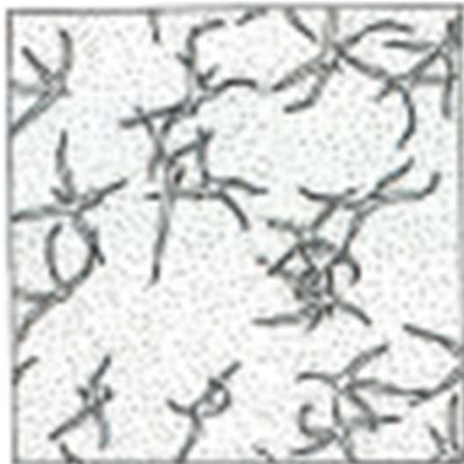
Fig. 12. Creeping shoots: A: *Hedera* × *soroksarensis* with the dark green leaves, B: *Hedera* × *schmidtii* with slightly triangular emerald leaves with small lobes.

- aa Leaves are triangular, dark green with white veins
 *Hedera* × *schmidtii* M. Bényei-Himmer (Figs 12, 13)
- bb Leaves are dark green to black with light green veins having 5 lobes
 *Hedera* × *soroksarensis* M. Bényei-Himmer et M. Höhn (Fig. 9, 12)

**DISTINCTION DES ESPÈCES DU GROUPE
CREBRESCENS-HELIX-HIBERNICA**

1. Trichomes stellate, large (0.5-1 mm), with fewer than 10 rays, white in color 2
- 1'. Trichomes scale-like, small (0.1-0.4 mm), generally with more than 10 rays, reddish brown or white in color 6
2. Trichomes parallel to leaf surface 3
- 2'. Trichomes at a right angle to leaf surface 4
3. Length from leaf base to first sinus 2.5-4 cm, juvenile leaves located 6-8 nodes below the apex large (6-9 cm across), 5-lobed, petioles long (5-12 cm), rhizomes absent **H. hibernica**
- 3'. Length from leaf base to first sinus 1.5-2 cm, juvenile leaves located 6-8 nodes below the apex smaller (3.5-6.5 cm across), 3-5-lobed, petioles short (3.5-5.5 cm), rhizomes present **H. helix** subsp. **rhizomatifera**
4. Mature fruits orange/yellow, found only in Italy and western Transcaucasia **H. helix** f. **poetarum**
- 4'. Mature fruits black, found throughout Europe or the Azores 5
5. Juvenile leaves located 6-8 nodes below the apex large (5-8 cm across), 3-5/-7-lobed, with few to no white markings on the veins, length from leaf base to first sinus 2-4 cm **H. azorica**
- 5'. Juvenile leaves located 6-8 nodes below the apex smaller (3-6 cm across) and usually 5-lobed, with white markings on the veins, length from leaf base to first sinus 1-2 cm **H. helix** subsp. **helix**

- Limbe à poils étoilés (à examiner à la face inf. du limbe, si possible en dehors des nervures principales) gén. blanchâtres, à branches dirigées dans des directions variées, en partie au moins dressées obliquement (fig. 171.1) ; face sup. du limbe souvent marquée d'un réseau de lignes vert pâle à argentées correspondant aux nervures. Odeur faible et un peu âcre au froissement des feuilles **1. Hedera helix**
- Limbe à poils étoilés (à examiner dans les conditions indiquées ci-dessus) souvent un peu teintés de paille ou de brun roussâtre, à branches dirigées pour la plupart parallèlement à la surface foliaire (fig. 171.2) ; face sup. du limbe gén. de couleur à peu près uniforme. Odeur plus prononcée, agréable **2. H. hibernica**

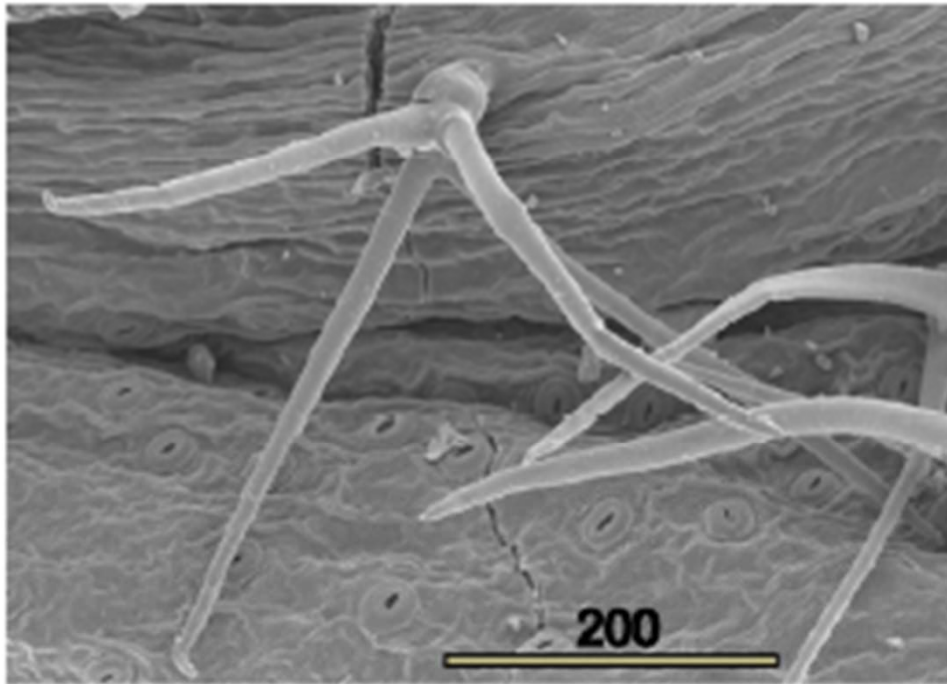
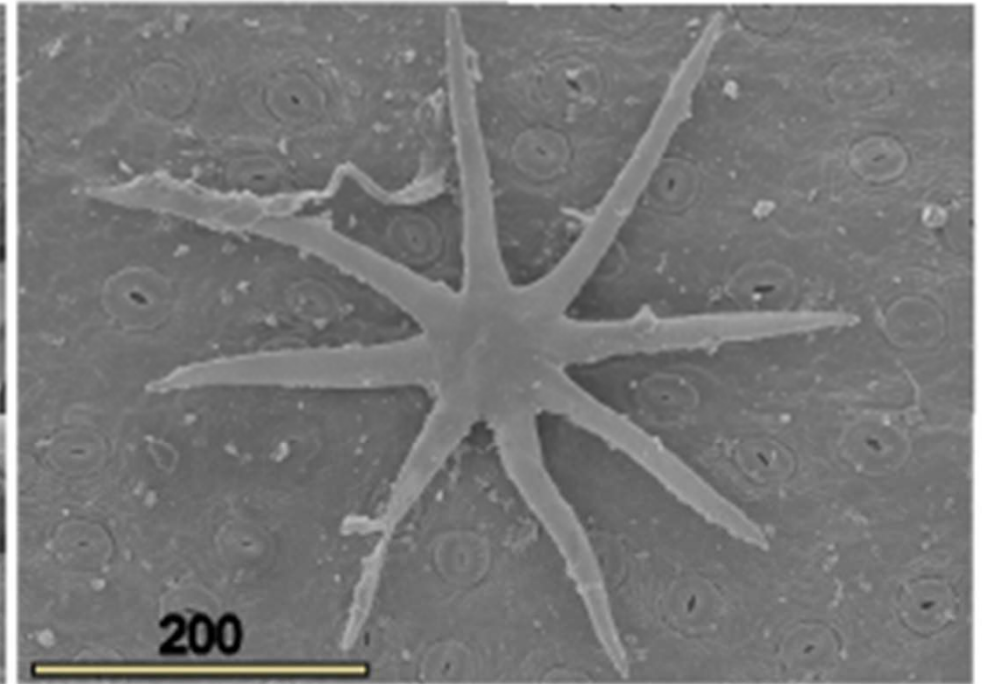


— 171.1
Face inf. du limbe, à poils étoilés à branches dirigées dans des directions variées



— 171.2
Face inf. du limbe, à poils étoilés à branches dirigées pour la plupart parallèlement à la surface

- 2** – Poils des rameaux stériles majoritairement stipités et à rayons \pm obliquement dressés, donnant au rameau un aspect tomenteux; feuilles des rameaux stériles à veines pâles bien marquées à la face supérieure ***H. helix*** L. [incl. subsp. *poetarum* Nyman = *H. chrysocarpa* Walsh]
Ph L — VIII-X — → 300 dm — toute la Fr.; 0-1200 m — bois (sous-bois et épiphyte), rocaïles ombragées, vieux murs — *Paléotempéré* — *H. helic-is, -i*
Note – La morphe à fruits jaunes d'origine orientale (« subsp. *poetarum* »), cultivée et rarement échappée, n'a qu'une valeur de forme individuelle.
- 2'** – Poils des rameaux stériles majoritairement subsessiles et à rayons appliqués à l'épiderme, donnant au rameau un aspect farineux; feuilles des rameaux stériles à veines pâles peu marquées ou manquantes à la face supérieure ***H. hibernica*** (G. Kirchn.) D.C. Bean [*H. helix* subsp. *hibernica* (G. Kirchn.) D.C. Mc Clintock, *H. canariensis auct. p.p.*]
Ph L — VIII-X — → 300 dm — littoral Manche et Atl., SO; 0-600 m; ailleurs souvent planté et facilement échappé — rochers et sous-bois en ambiance aérohygrophile (à l'état spontané), bois, vieux murs — *Atl.* — *H. hibemic-ae, -o*

Hedera helix*Hedera hibernica*

Coca-de-la-Iglesia, M., Gallego-Narbón, A., Alonso, A., Valcárcel, V., 2024. High rate of species misidentification reduces the taxonomic certainty of European biodiversity databases of ivies (*Hedera* L.). *Sci Rep* 14, 4876. <https://doi.org/10.1038/s41598-024-54735-0>

- 1a Trichomes are greyish, stellate with 4–10 rays 2
- 1b Trichomes are yellowish brown, flat, scale-like (squamiform), in bundles 5
- 2a Trichomes are not emerging from the plane of the leaf, rays of the trichomes face two directions (bifurcate). Leaves on the ground creeping shoots are pentagonal with five equal sized lobes. Leaf blades are funnel shaped, 8–10 cm, dark green. The petiole is very long, even 20 cm in length. Leaves does not change colour during winter. The vertically emerging shoots have three to five lobes, and are wider than longer. The leaves of the flowering, fruiting shoots are oval with acuminate apex (pointed) tip. The inflorescence is a loose and compound corymb. The species is flowering in late September or October. The fruits are developing from the lateral umbels, frequently remain immature. Tetraploid species, its cultivars are widely planted *H. hibernica* (Kirschner) Bean (Fig. 8A) 3
- 2b Trichomes emerge from the plane of the leaf 3
- 3a The inflorescence axis is 3–5 cm long, the fruits develop only from the terminal umbel. The lateral umbels decay and fall after flowering. The leaves of the ground creeping shoots are 5–8 cm in diameter and slightly lobed with three lobes at the leaf base (triangular). Leaves are bright green, the veins are light green. The vertically emerging shoots have leaves with 3–5 lobes with a broad central lobe. This dome-shaped broad lobe is much more developed than the lateral lobes (Fig. 4A). The leaves of the flowering, fruiting shoots are heart shaped with cordate leaf base. The leaf blade is large, 10–16 cm long, the trichomes have 7–12 rays. The axis of the inflorescence is short, squat of 3–5 cm with few lateral umbels. Under the terminal umbel on the central axis always one lonely flower develops (Fig. 5D). The pedicel of the flowers are short –1 cm, therefore the ripening fruits are densely packed. Flowering period is from late August to September. The fruits are dark green and becoming black when ripen. Fruits have 3–5 seed. The generative (adult) stage develops early, even on the ground level. In wintertime leaves can change their colour to claret on the sun, but the veins remain green. During very cold winters the leaves freeze and fall, but the shoots survive. Diploid taxon. Widely planted, but spreads also spontaneously and tends to be invasive *H. crebescens* M. Bényei-Himmer et M. Höhn (Figs 2, 5) 4
- 3b The axis of the inflorescence is longer, fruits develop (even) from the lateral umbel 4
- 4a The leaves of the ground creeping shoots greatly vary. The colour of the leaves can be different from bright green to dark green, often with white veins. Number of leaf lobes can vary between 3–7 and leaf base can be cordate or truncate, with elongate central lobe. Stellate trichomes have 4–10 rays, and multicellular branched trichomes can also appear. The leaves of the generative (adult stage) shoots are elongate, oval with a cuneate leaf base. The length of the inflorescence axis is 6–9 cm long, often third-order branching, in some case with bracts. Flowering period lasts from August until October. Fruits diverse with 1–3 seeds. The protruding discus is frequent. Generative shoots only at elevating age. Leaves do not freeze even during cold winters. Many cultivars are widely planted. Native diploid taxa *H. helix* L. (Fig. 8B) 4
- Triploids considered most probably hybrids between *H. helix* and *H. hibernica*. These triploid specimens were previously treated as *H. helix* or *H. hibernica* and classified among cultivated ivy varieties.
- aa Leaves are triangular, dark green with white veins 4

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 – *Studia bot. hung.* **48**(2): 225–252.

	<i>H. crebrescens</i>	<i>H. helix</i>	<i>H. hibernica</i>
ploidy level	diploid	diploid	tetraploid
shoot	reddish green	brownish green	green
leaves			
– vegetative creeping shoot	leaf blade triangular, leaf base slightly overlapping	nervation white, 3–5 lobed, not overlapping leaf base	5 lobes, not overlapping leaf base
– vegetative emerging shoot	3–5 lobes, lateral lobes obtuse, apical lobe dome-shaped	3–7 lobes, apical lobe elongate	5 lobes, apical lobe triangular or with parallel margins, not dome-shaped
leaves on reproductive shoot	heart shaped, leaf-base cordate	elongate or oval, leaf-base cuneate	triangular-ovate, leaf-base truncate
hairs	white, stellate, always appressed	white, stellate	white, stellate, erect, rays in two directions
inflorescence	main axis thick, 3–5 cm, flowers crowded, one flower below the apical umbel, apical umbel fruiting	main axis 6–9 cm, sparse, third ranking umbels present, lateral umbels fruiting	main axis 8–10 cm, sparse, third ranking umbels present, rarely fruiting
flowering months	September–October	August–October	October–November
fruits	slightly flattened, globose, not protruding discus	reniform, protruding discus	rarely fertile, not protruding discus
seed production	4–5 seeds/fruit, 114 fruits/ramet	1–3 seeds/fruit, 41 fruits/ramet	0–2 seeds/fruit, 51 fruits/ramet
germination	82%	42%	no data available
hardiness	frost sensitive	winter hardy	slightly winter hardy
nature conservation status	propagating, invasive	natural	cultivated

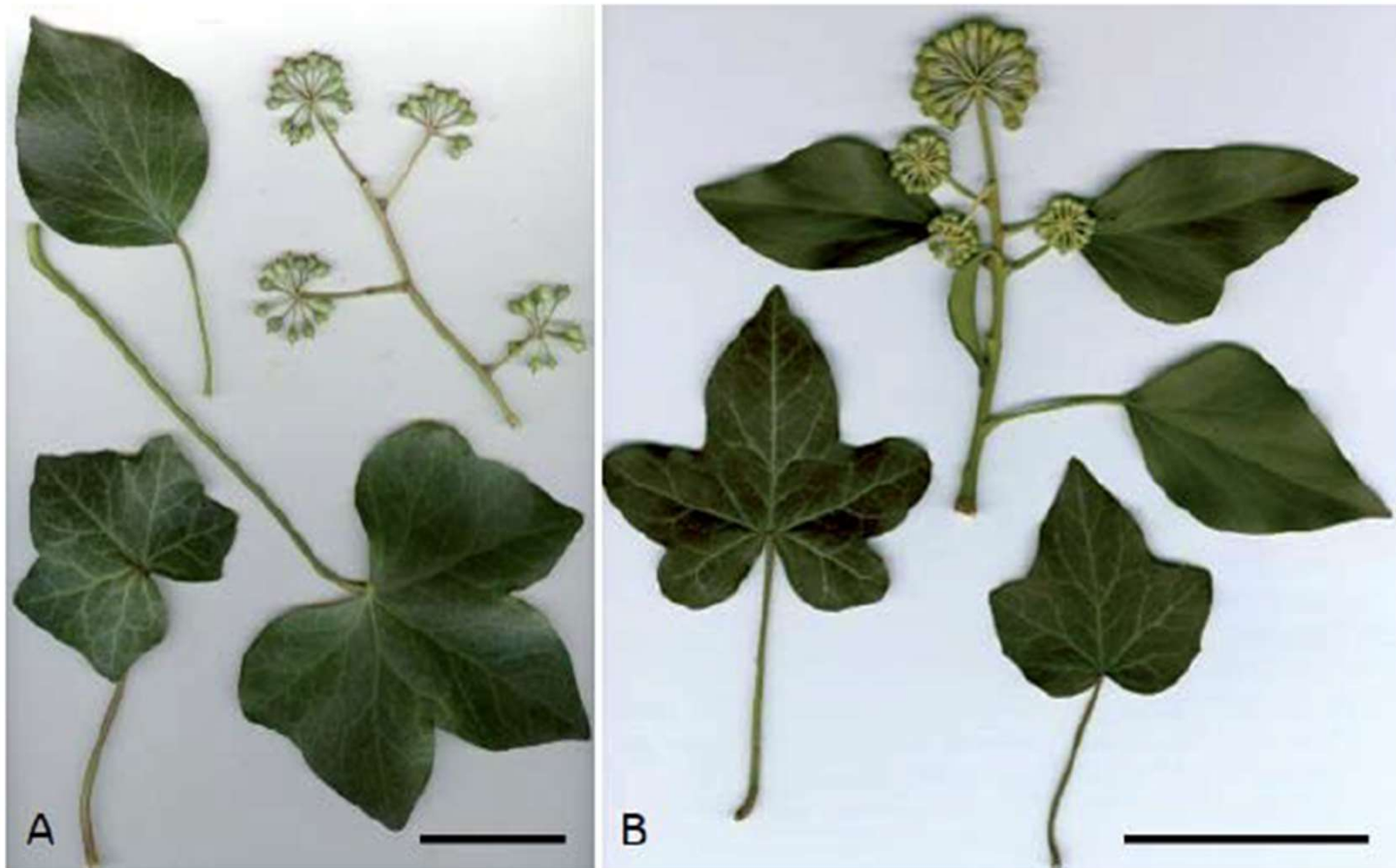


Fig. 8. Morphological variability of leaves of *Hedera hibernica* A: leaf on the creeping shoot (bottom left), vertically emerging shoot (bottom right), generative shoot (top center) and *Hedera helix* subsp. *helix*; B: leaf on the creeping shoot (bottom right), vertically emerging shoot (bottom left), generative shoot (top center). Scale bars = (A, B) 50 mm.

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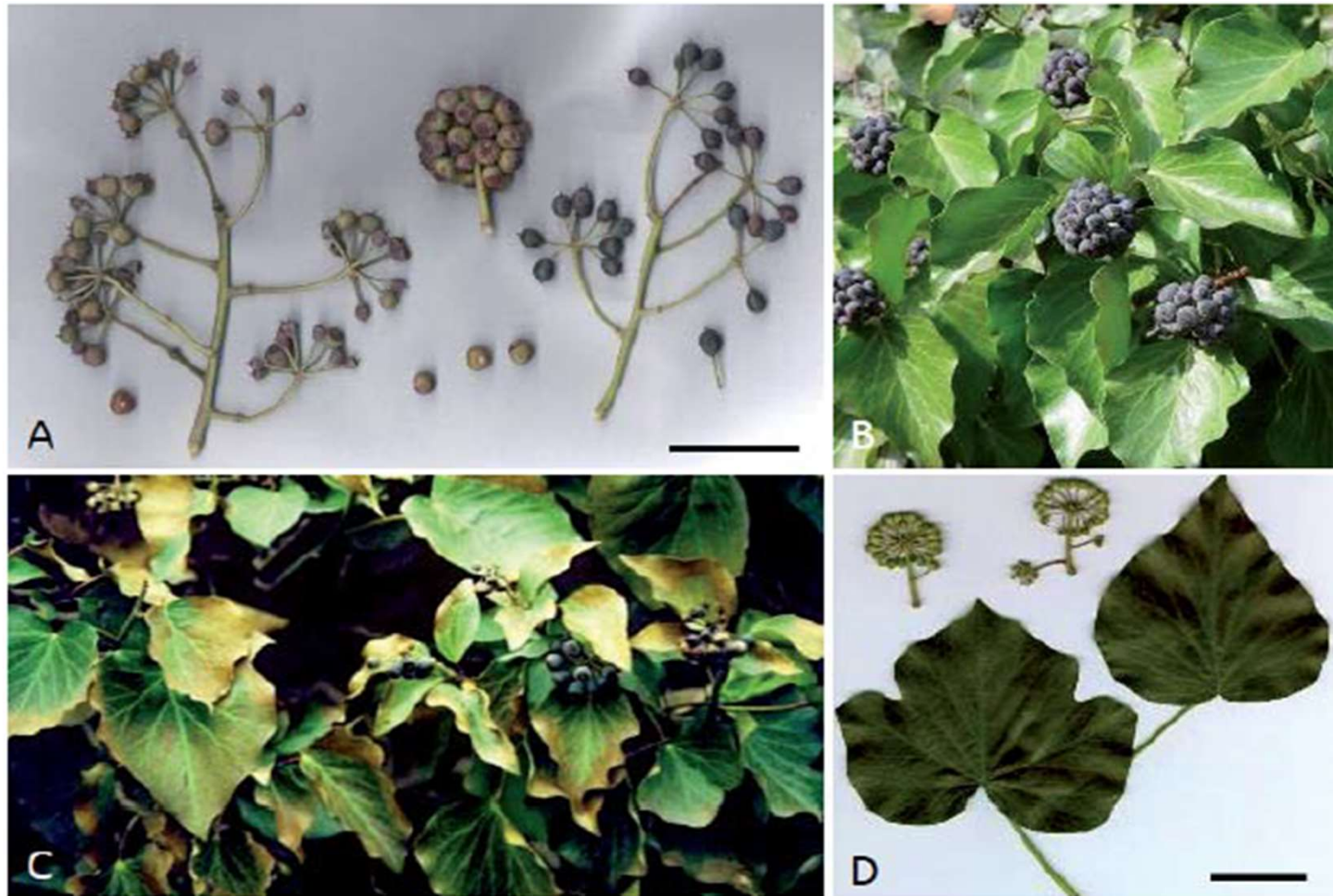


Fig. 5. Morphological characteristics of *Hedera crebrescens* (A: comparison of fruiting shoots of *H. hibernica* (left), *H. crebrescens* (only the apical inflorescence developed) (center) and *H. helix* (right), B: ripening fruits of *H. crebrescens*, and (C): early winter frost damage of *H. crebrescens* D: main morphological characteristics (inflorescence and leaves) of *H. crebrescens*. Scale bars = (A, D) 50 mm.

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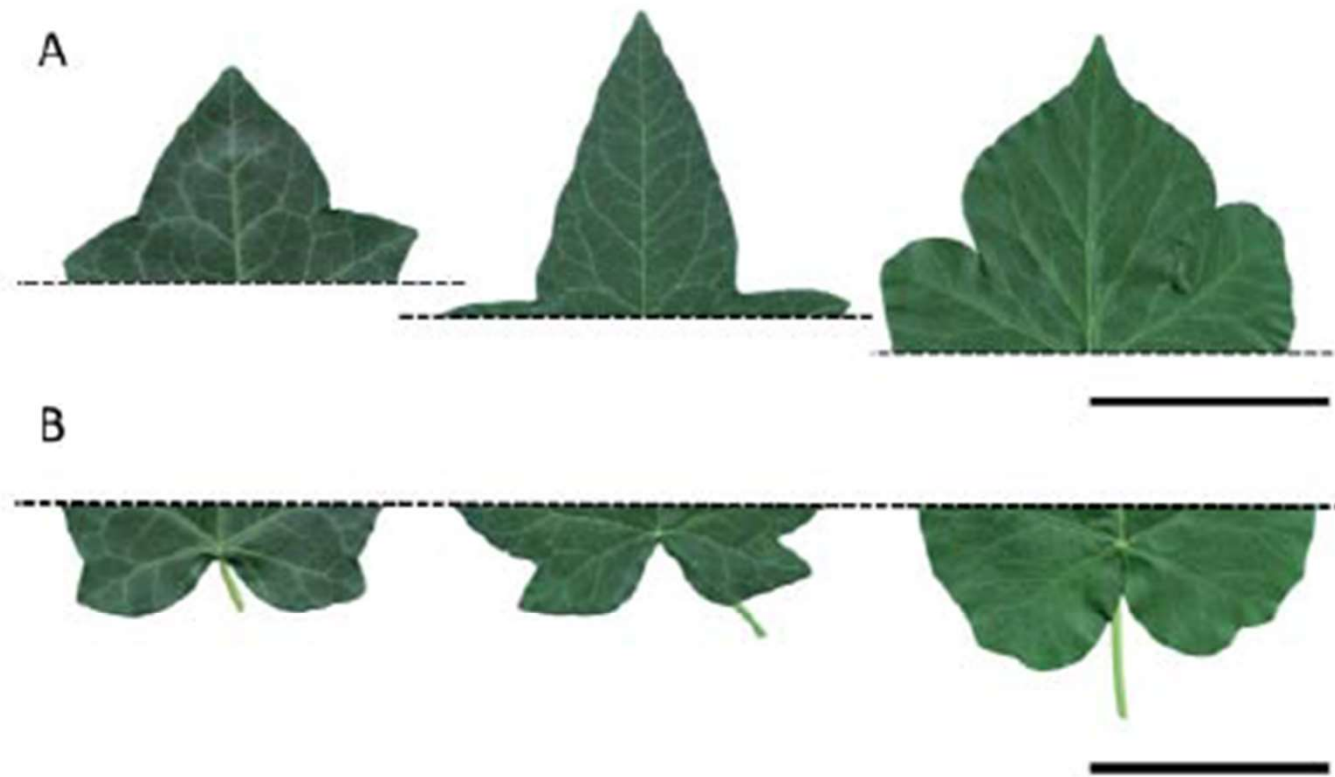


Fig. 4. Leaf characters on the emerging shoots of *Hedera hibernica* (left) *H. helix* (central) and *H. crebescens* (right), Scale bars=(A, B) 50 mm. A: apical lobe (triangular, elongate, dome-shaped) B: leaf base (open, open, overlapping sites).

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- *Hedera helix*

- Poils blancs
- Rayons des poils étalés / éloignés de l'épiderme
- Sinus des lobes profonds
- Nervures bien marquées

Attention! Plutôt à l'intérieur des terres

- Poils des jeunes tiges souvent à aspect « ébouriffé »
- Photos inversées dans Guillemot, V., 2023. Flore du Massif armoricain et ses marges.
- Certains auteurs basent les critères sur les poils des feuilles, d'autres sur les poils des tiges

- *Hedera hibernica*

- Poils couleur paille, centre roux
- Rayons des poils appliqués à l'épiderme
- Sinus des lobes peu profonds
- Nervures peu marquées
- Plutôt sur le littoral ou en ambiance humide



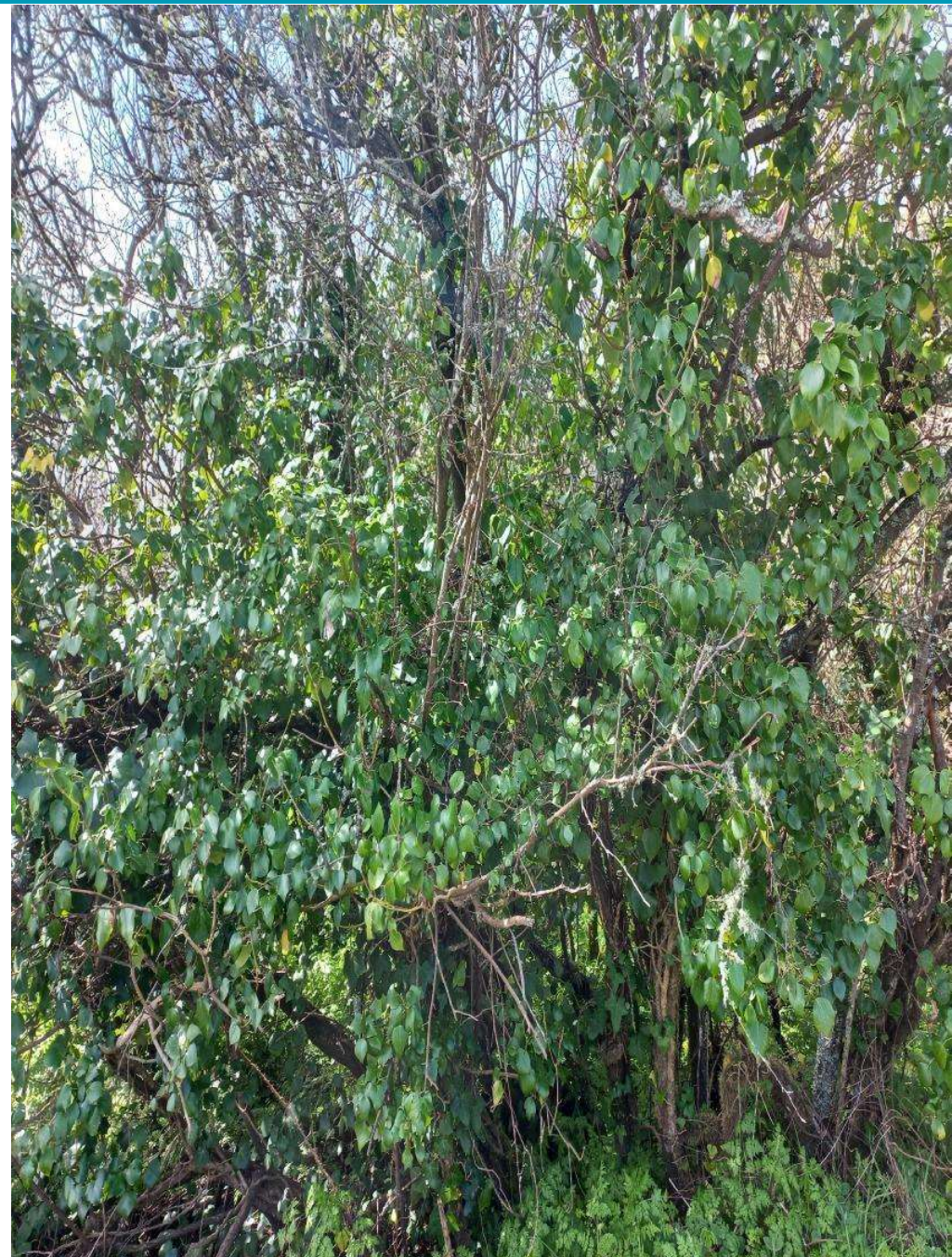
HABITAT LITTORAL





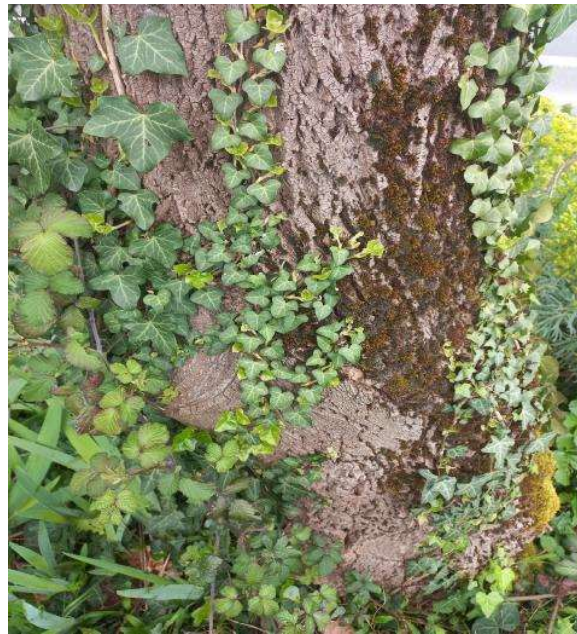
HABITAT FORESTIER



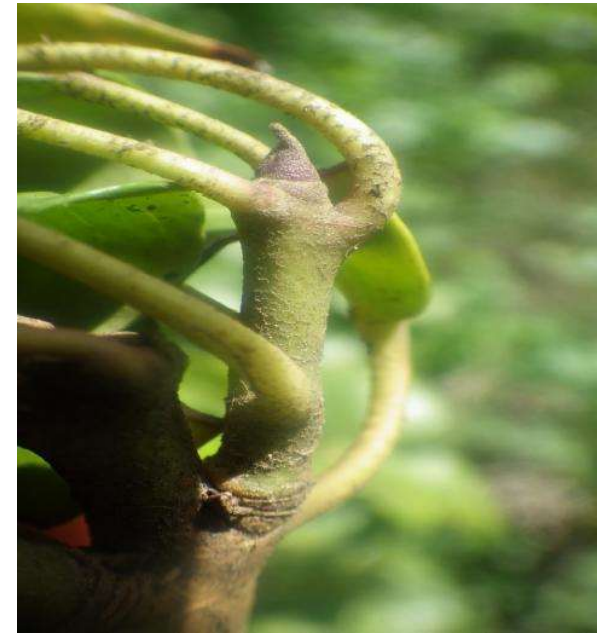


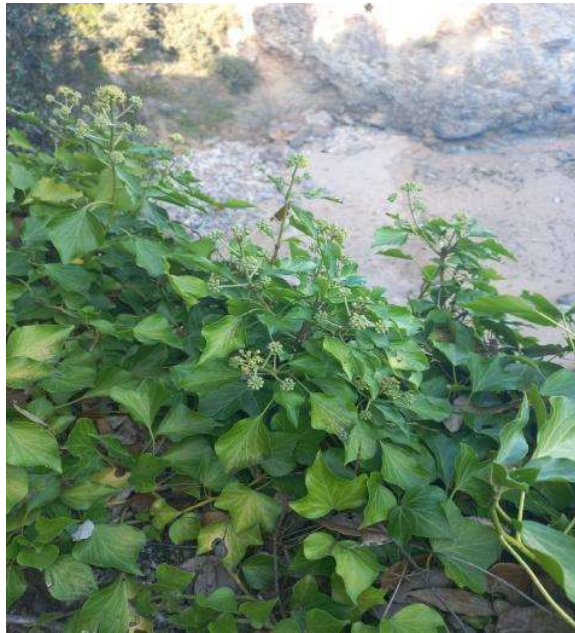
**PORTFOLIO : CARACTÈRES
MORPHOLOGIQUES**

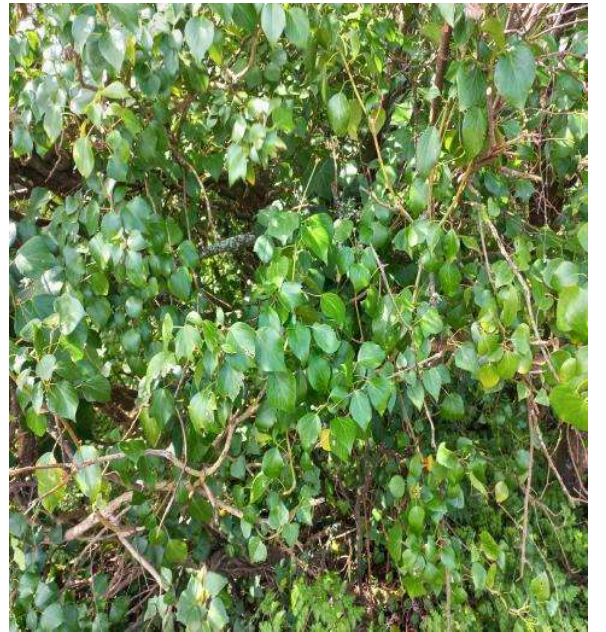
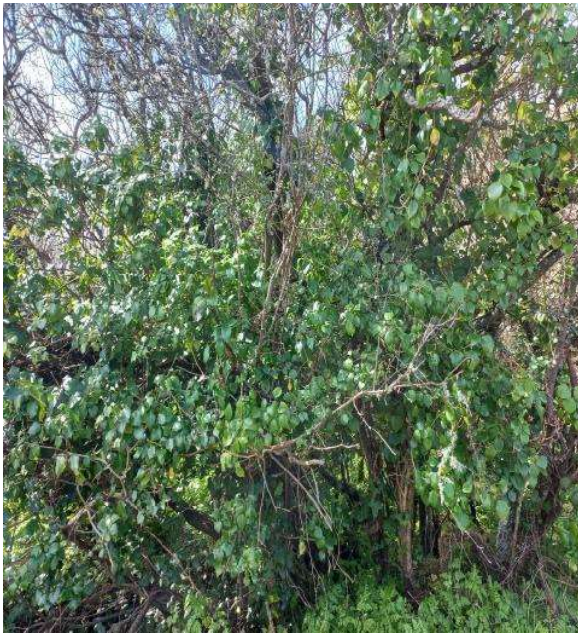




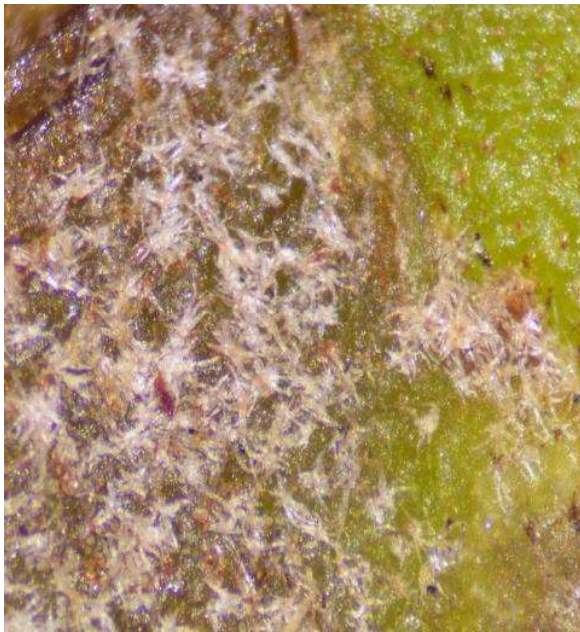




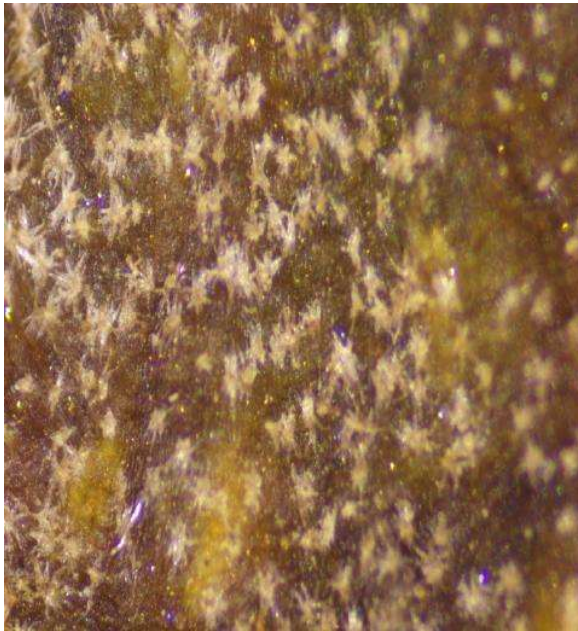


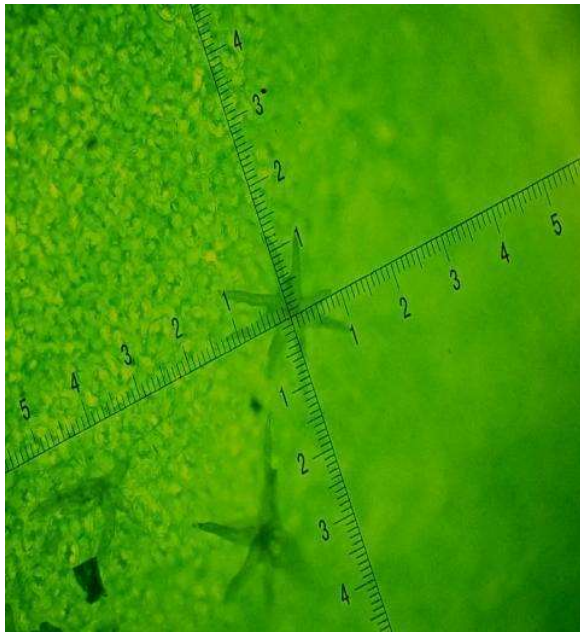


PORTFOLIO : TRICHOMES

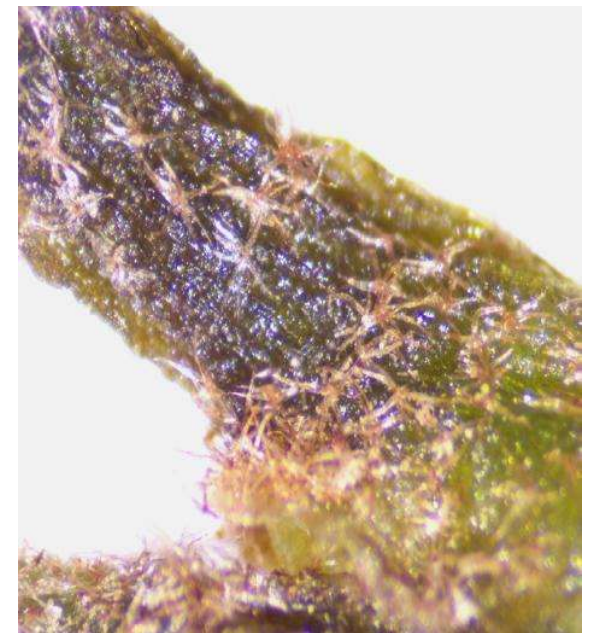


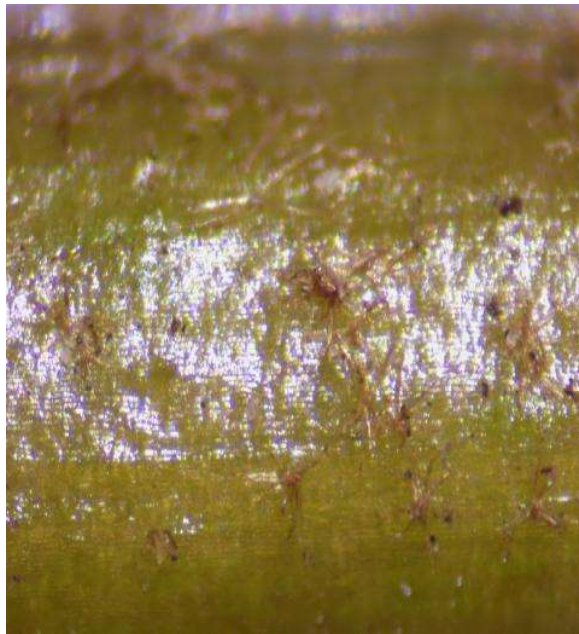












POUR ÉLARGIR LE DÉBAT

- Coca-de-la-Iglesia, M., Gallego-Narbón, A., Alonso, A., Valcárcel, V., 2024. High rate of species misidentification reduces the taxonomic certainty of European biodiversity databases of ivies (*Hedera* L.). *Sci Rep* 14, 4876. <https://doi.org/10.1038/s41598-024-54735-0>

	N	Correct:Incorrect identifications	Correct identifications	Incorrect identifications				
				Total	Mis	NoIden	Hard	Soft
Total	1011	538:473*	538	473	180	190	26	77
			53%	47%	18%	19%	3%	8%
Regions with low uncertainty	449	321:128****	321	128	30	45	9	44
			71%	29%	7%	10%	2%	10%
Regions with high uncertainty	556	213:343****	213	343	149	144	17	33
			38%	62%	27%	26%	3%	6%
<i>H. azorica</i>	53	19:34 ^{m.s.}	14	26	19	6	0	1
			35%	65%	48%	15%	0%	3%
<i>H. canariensis</i>	53	19:34*	19	34	4	9	0	21
			36%	64%	8%	17%	0%	40%
<i>H. helix</i>	619	475:144****	475	144	12	82	0	50
			77%	23%	2%	13%	0%	8%
<i>H. hibernica</i>	222	24:198****	24	198	121	70	4	3
			11%	89%	55%	32%	2%	1%
<i>H. iberica</i>	55	1:54****	1	54	20	20	13	1
			2%	98%	36%	36%	24%	2%
<i>H. maderensis</i>	22	5:17**	5	17	4	3	9	1
			23%	77%	18%	14%	41%	5%

Table 1. Error patterns of *Hedera* species identification (types and rates in %) obtained from TaxRev without records originally identified by *Hedera* taxonomists. This information is provided for the whole dataset (N = 1011 records), per geographical region according to the expected taxonomic uncertainty (“Low” in regions with only one ivy species vs. “High” in regions with 2 or 3 spp. sharing range boundaries; N = 1005) and per species. Significant p-values from Chi-squared test are indicated as: ****p ≤ 0.0001, ***p ≤ 0.001, **p ≤ 0.01, *p ≤ 0.05, ", whereas p ≤ 0.08 are indicated as m.s. (marginal significant) and p > 0.08 as n.s. (not significant). Mis: incorrect identifications attributed to misidentifications; NoIden: lack of original identification at the species level. Hard: incorrect identifications attributed to hard taxonomic changes (changes that cannot be validated with standard procedures of taxonomic validations). Soft: incorrect identifications attributed to soft taxonomic changes (changes that can be validated with standard procedures of taxonomic validations).



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