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The genus *Inonotus sensu lato* in Iran, with keys to *Inocutis* and *Mensularia* worldwide

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Inonotus plorans, previously known only from Algeria and Morocco, is now reported from NW Iran. The known southern distribution of *Inocutis rheades* is extended to southern Iran, and *Mensularia nodulosa* is reported as new to Iran. A key to ten species of *Inonotus s. lato* occurring in Iran is provided. Most of the species are illustrated and their spore and setal dimensions are given. The earlier reports of *I. radiatus* and *Mensularia hastifera* from Iran turned out to be misidentifications. Keys to the accepted species of *Inocutis* and *Mensularia* are provided.

Key words: Basidiomycota, Hymenochaetaceae, polypore, taxonomy

The genus *Inonotus*, with some 101 species in its wider sense (Ryvarden 2005), is polyphyletic, and many recent DNA analyses support its dividing into more homogenous taxa (Wagner & Fischer 2001, 2002, Larsson *et al*. 2006). Some of these segregates continuously receive good branch support in molecular studies (e.g. *Inocutis* and *Mensularia*), while some are not fully supported (e.g. *Phaeoporus* and *Pseudoinonotus*) (cf. Wagner & Fischer 2001, 2002, Decock *et al*. 2005, Jeong *et al*. 2005). The two latter genera are also morphologically poorly delimited (*see* also Spirin *et al*. 2006).

The genus *Inocutis* was described by Fiasson and Niemelä (1984) to comprise annual species with ellipsoid, yellowish to brownish non-dextrinoid basidiospores and a monomitic hyphal system (Fiasson 1982). Previously two subtropical species, *Inonotus ludovicianus* and *I. jamaicensis*, were considered to lack the mycelial core (Wagner & Fischer 2002), but later a rudimentary core was found in *I. jamaicensis* by Martínez (2006). Among the species, apparently only *Inocutis subdryophila* occurs on conifers (Dai & Yuan 2005). Eight species have been accepted in the genus and are keyed here. None of the species is known from Australia or from sub-Saharan Africa.

The genus *Mensularia* includes annual species with ventricose hymenial setae and small, strongly cyanophilous and weakly dextrinoid basidiospores. Four species have been accepted in the genus and are keyed here. None of the species is known from Africa or Australia (e.g. May *et al*. 2007) and all species grow on angiosperms.

Inonotus s. stricto has five representatives in Iran: *I. cuticularis*, *I. hispidus*, *I. nidus-pici*, *I. obliquus* and *I. plorans*. *Inonotus plorans* seems

to have characters of both *Inocutis* (no setae) and *Inonotus* (no core). However, it has a derived position within the *Inonotus s. stricto* clade and not in *Inocutis* (*see* Wagner & Fischer 2002).

Material and methods

The study is based on examination of the Iranian material preserved in the fungal herbarium of the Plant Pests and Diseases Research Institute (Fungus collection of the Ministry of Jihad-e Agriculture, IRAN) in Iran, material collected by the first author, Iranian specimens in Gothenburg (GB), and literature records. Additional examined specimens are in the Botanical Museum of the University of Helsinki (H).

Specimens were studied in Cotton Blue in lactic acid (CB) and some in Melzer's reagent (IKI). In the text and keys CB+ means cyanophily, CB– a negative reaction. IKI– denotes no reaction in Melzer's reagent (no dextrinoidy or amyloidy reaction). The measurements of spores and setae given in Tables 1 and 2 were made in Cotton Blue, measurements of setae refering to hymenial setae. Five percent of the measurements were excluded from each end of the variation range and are presented in parentheses. The following abbreviations are used for: n = the number of spores or setae measured from the given number of specimens, L = mean length, W = mean width, and Q = mean value of the L/W ratio. Measurements were made at ×1000 magnification with a Leica Biomed light microscope from hand cut sections mounted in CB. Drawings were made in CB using a drawing tube. Notes on key characters of the species, host preference in Iran and known distribution are given. The two new records for Iran are marked with an asterisk. The abbreviations MGH and HK refer to the authors of this paper. For *I. dryadeus* and *I. obliquus* no material from Iran was available, and the material of *I. nidus-pici* is very poor. Therefore these species are lacking in Tables 1 and 2, and are not illustrated.

Key to the species of *Inonotus s. lato* in Iran

1. Basidiocarp with a core, setae absent 2
1. Basidiocarp without a core, setae present (absent only in *I. plorans*) 4
2. Basidiospores CB+, 6.8–8.5 × 5–6.5 μm .. *Inocutis levis*
2. Basidiospores usually CB–, 4.5–7 × 3–6 μm 3
3. Basidiospores 6–7 × 5–6 μm, basidiocarp usually applanate with blunt margin, always on *Tamarix* .... *Inocutis tamaricis*
3. Basidiospores 4.5–6.5 × 3–5 μm, basidiocarp usually dimidiate with margin turning down, usually on *Populus* ..... *Inocutis rheades*
4. Basidiocarp resupinate to nodulosa 5
4. Basidiocarp pileate 7
5. Basidiocarp resupinate, basidiospores IKI– and CB– or only weakly CB+, anamorph known 6
5. Basidiocarp nodulose, basidiospores faintly dextrinoid and distinctly CB+, anamorph not known .... *Mensularia nodulosa*
6. Basidiocarp in cavities of living trees, tramal hyphoid setae abundant ..... *Inonotus nidus-pici*
6. Basidiocarp under bark, hyphoid setae absent .... *Inonotus obliquus*
7. Branched hyphoid setae on pileus present .... *Inonotus cuticularis*
7. Branched hyphoid setae absent 8
8. Hymenial setae abundant, hooked, basidiospores subglobose, dextrinoid and strongly CB+ ... *Inonotus dryadeus*
8. Hymenial setae rare or absent, with straight apex, basidiospores ellipsoid, IKI– and CB– 9
9. Upper surface hispid, hymenial setae present but rare, widespread species in temperate zone .... *Inonotus hispidus*
9. Upper surface tomentose, hymenial setae absent, rare species known only in North Africa and Iran .... *Inonotus plorans*

Key to species of *Inocutis* in the world

1. Neotropical species, only known from southern North America or South America 2
1. Species from other parts of the world than southern North America and South America 4
2. Basidiocarps in large clusters or rosettes, surface zonate, context without a granular core ..... *I. ludoviciana*
2. Basidiocarps not in clusters or rosettes, surface azonate, context with a granular core 3
3. Basidiocarps ungulate to applanate, surface rimose, pores 1–3 per mm, spores 8–10 × 5–7 μm ..... *I. texana*
3. Basidiocarps pileate to effused-reflexed, surface blackish with a thin wrinkled crust, pores 3–5 per mm, spores 5–7 × 4–5 μm ..... *I. jamaicensis*
4. Basidiospores large, 6–8.5(–10) × 4.5–6.5 μm 5
4. Basidiospores 4.5–7 × 3-5 7
5. Basidiospores 7–8.5(–10) × 5–6.5 μm, spore wall distinctly CB+, mainly known from Central Asia .... *I. levis*
5. Basidiospores 6–8 × 4.5–6 μm, CB– or CB+ only when young 6
6. Species mostly on *Tamarix*, gloeoplerous hyphae absent ..... *I. tamaricis*
6. Species mostly on *Quercus*, gloeoplerous hyphae present in trama ..... *I. dryophila*
7. Basidiocarps applanate, surface zonate and tomentose, core hard, tubes brittle, hyphae thin- to thick-walled, known from the northern hemisphere ..... *I. rheades*

Table 1. Spore dimensions in selected species of *Inonotus s. lato*. Values in parentheses represent *n* (*see* Material and methods). Mean values in boldface.

Species (*n**)	*L* × *W* (µm)	*L* mean (µm)	*W* mean (µm)	*Q*	*Q* mean
***Inocutis levis* (60/2)**	**6.8–8.1(–8.6) × 5.0–6.5**	**7.46**	**5.55**	**1.19–1.53(–1.68)**	**1.35**
Inocutis levis MGH 59	6.8 × 8.0(–8.6) × 5.0–6.5	7.33	5.56	1.19–1.46(–1.57)	1.32
Inocutis levis MGH 47	6.8–8.5 × 5.0–6.4	7.59	5.54	1.21–1.53(–1.68)	1.37
***Inocutis rheades* (90/3)**	**(4.4–)5.0–6.3(–7.0) × 3.0–5.2**	**5.47**	**4.12**	**1.14–1.50(–1.68)**	**1.34**
Inocutis rheades IRAN 2152	(5.4–)5.8–6.6(–7.0)	6.06	4.74	1.14–1.40(–1.57)	1.28
Inocutis rheades Lehesvirta c.n.	(4.4–)4.9–5.7 × 3.1–4.0	5.06	3.69	1.22–1.52(–1.68)	1.38
Inocutis rheades Czekoslovakia 1905	(4.7–)5.0–6.0 × (3.0–)3.5–4.5	5.28	3.92	1.19–1.50(–1.67)	1.35
***Inocutis tamaricis* (60/2)**	**6.0–7.2(–7.8) × 5.0–6.1**	**6.84**	**5.42**	**(1.09–)1.14–1.40**	**1.26**
Inocutis tamaricis MGH 37	6.0–7.4 × 5.0–6.0	6.70	5.32	(1.09–)1.14–1.40	1.26
Inocutis tamaricis Niemelä 545a	6.3–7.2(–7.8) × 5.0–6.1	6.97	5.52	1.15–1.38	1.27
Inocutis sp. MGH 56	5.1–6.5(–6.9) × 4.0–4.5(–5.0)	5.92	4.28	1.24–1.50	1.39
***Inonotus cuticularis* (62/2)**	**5.1–6.9 × 4.0–5.5**	**5.94**	**4.55**	**1.11–1.50(–1.63)**	**1.31**
Inonotus cuticularis NH 1362 (32/1)	5.1–6.2 × 4.0–5.0	5.59	4.32	(1.12–)1.19–1.38(–1.55)	1.30
Inonotus cuticularis Tortic (*s.n.*) Yugoslavia	5.9–6.9 × 4.0–5.5	6.31	4.79	1.11–1.50(–1.63)	1.32
***Inonotus hispidus* (92/3)**	**(7.0–)8.0–10.1(–11.5) × (6.0–)6.9–8.5(–9.0)**	**9.20**	**7.68**	**(1.08–)1.12–1.32**	**1.20**
Inonotus hispidus Saber 156	(8.4–) 9.0–10.1 × (6.9–)7.5–8.2(–8.9)	9.46	7.89	1.12–1.25(–1.35)	1.20
Inonotus hispidus Saber 284	(8.0–)8.5–9.6(–10.0)	9.06	7.60	1.10–1.30	1.19
Inonotus hispidus Korhonen 1150 (32/1)	(7.0–)7.9–9.5(–11.5) × (6.0–) 7.0–9.0	9.09	7.55	(1.08–)1.12–1.27(–1.30)	1.20
***Inonotus plorans* MGH 361 (90/1)**	**9.0–11.0 × 7.0–9.2**	**10.10**	**8.32**	**(1.06–)1.11–1.29(–1.43)**	**1.19**
***Mensularia nodulosa* (65/2)**	**3.5–4.5 × 2.0–3.6**	**4.05**	**2.98**	**1.11–1.20**	**1.37**
Mensularia nodulosa IRAN 11103	3.5–4.5 × 2.0–3.5	3.96	2.86	1.11–1.52(–1.80)	1.40
Mensularia nodulosa Niemelä 1353 (35/1)	3.7–4.5 × 2.5–3.6	4.13	3.07	1.11–1.50(–1.61)	1.35

* if not given, *n* = 30/1.

Table 2. Seta dimensions of selected species of *Inonotus s. lato*. Mean values in boldface.

Species (n*)	$L \times W$ (µm)	L mean (µm)	W mean (µm)	Q	Q mean
***Inonotus cuticularis* (62/2)**	**15–25(–30) × 5–10**	**19.33**	**7.22**	**(1.70–)2.11–4.00(–4.40)**	**2.75**
Inonotus cuticularis NH 1362 (32/1)	15–22(–25) × 5–10	18.97	6.90	2.11–3.67(–4.40)	2.83
Inonotus cuticularis Tortic (s.n.) Yugoslavia	16–23(–30)	19.70	7.53	1.70–3.40(–4.00)	2.68
***Inonotus hispidus* Korhonen 1150 (10/1)**	**10–30 × 7–12**	**21.60**	**9.40**	**1.43–3.75**	**2.31**
***Mensularia nodulosa* (60/2)**	**10–28 × 4–11**	**15.72**	**6.40**	**1.22–3.40(–4.60)**	**2.51**
Mensularia nodulosa IRAN 11103	11–20(-28) × 4–9	15.70	6.47	(1.22–)1.65–3.30(–4.00)	2.46
Mensularia nodulosa Niemelä 1353	10–26 × 4–8(–11)	15.73	6.33	1.57–3.40(–4.60)	2.56

* if not given, n = 30/1.

7. Basidiocarp pileate, surface azonate and velutinate, core and tubes corky, hyphae always thinwalled, known only from China .... *I. subdryophila*

Key to species of *Mensularia* in the world

1. Pores 7–9 per mm, known only from the Caribbean .... *M. crocitincta*
1. Pores less than 7 per mm, known from other parts of the world than the Caribbean 2
2. Basidiocarps mostly resupinate, hyphoid setae in dissepiment present .... *M. hastifera*
2. Basidiocarps pileate with numerous pilei, hyphoid setae absent 3
3. Basidiocarps mostly nodulous, mainly on *Fagus* .... *M. nodulosa*
3. Basidiocarps imbricate in large clusters, mainly on *Alnus* .... *M. radiata*

Notes on Iranian species

Inocutis levis (P. Karst.) Y.C. Dai (Figs. 1 and 2)

BASIONYM: *Inonotus levis* P. Karst.
SYNONYM: *Inonotus pseudohispidus* Kravtzev

KEY CHARACTERS: This is the only *Inocutis* species having rather large and thick-walled cyanophilous spores. In other species of the genus, only young spores may be slightly CB+. No sklerified hyphae was seen in the core (Fig. 2).

ECOLOGY AND DISTRIBUTION: *Inocutis levis* is known from *Acer*, *Fraxinus*, *Populus* and *Salix* in Central Asia (Kazakhstan, Turkmenistan, Uzbekistan) and China. Salem and Michail (1980) found it on *Populus nigra* in Egypt. In Iran it has been reported from several parts of the country as *Inonotus pseudohispidus* (Soleimani 1974, 1976, Saber 2000, Saber & Esmaili-Taheri 2004) from *Platanus orientalis*, *Populus alba*, *Populus euphratica*, *Populus* sp., *Salix*, and *Ulmus*.

SPECIMENS EXAMINED. — **Iran**. Tehran, University of Tehran, *Platanus orientalis*, IV.2003 *Ghobad-Nejhad 59* (MGH ref. herb.); University of Shahid-Beheshti, *Populus alba*, XI.2003 *Ghobad-Nejhad 47* (MGH ref. herb.).

Inocutis rheades (Pers.) Fiasson & Niemelä (Fig. 3)

BASIONYM: *Inonotus rheades* (Pers.) Bondartsev & Singer.

Fig. 1. *Inocutis levis* on *Platanus orientalis* (*Ghobad-Nejhad 47*, MGH ref. herb.).

KEY CHARACTERS: The margin is usually thin and inflexed. The spores are fairly small in relation to those of other species of *Inocutis* (*see* also notes on *I. tamaricis* below).

The context of the single collection from Iran (Pegler & Saber 1998) is zonate with dark and light zones; this was not seen in other specimens. The second report from Iran (Saber 2000) appears to be a misidentification (Ghobad-Nejhad & Dai 2007).

ECOLOGY AND DISTRIBUTION: *Inocutis rheades* is mostly associated with *Populus* in the northern hemisphere. According to Bondartseva and Parmasto (1986) it also occurs in North Africa, and occasionally can be found on *Alnus*, *Betula*, *Fagus*, *Salix* and *Quercus*. Apparently the southernmost occurrences in Asia are in northern India (Sharma 1995 also on *Castanea*) and southern Iran.

SPECIMENS EXAMINED. — **Iran**. Khuzestan: Ahvaz, *Eucalyptus camaldulensis*, 16.XII.1990 *Abai* (2152/10254, IRAN). **Finland**. Etelä-Häme, *Juniperus communis*, 20.VIII.1997 *Lehesvirta s.n.* (H). **Czech Republic**. Svrčov, on bark, October 1936, without collector name and number (H).

Inocutis tamaricis (Pat.) Fiasson & Niemelä (Fig. 4)

BASIONYM: *Inonotus tamaricis* (Pat.) Maire

KEY CHARACTERS: This is the only *Inocutis*

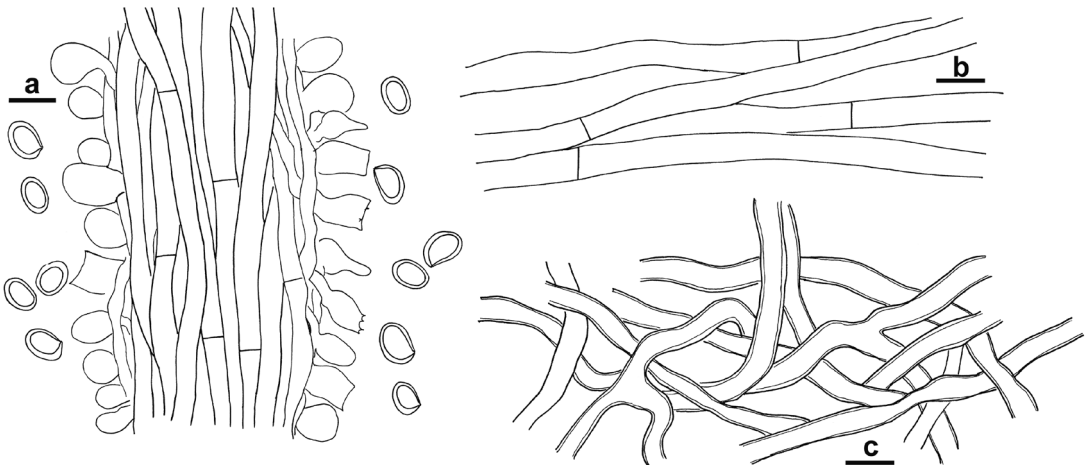

Fig. 2. *Inocutis levis* (*Ghobad-Nejhad 47*, MGH ref. herb.). — **a**: Section through trama. — **b**: Contextual hyphae. — **c**: Core hyphae. Scale bar = 10 µm.

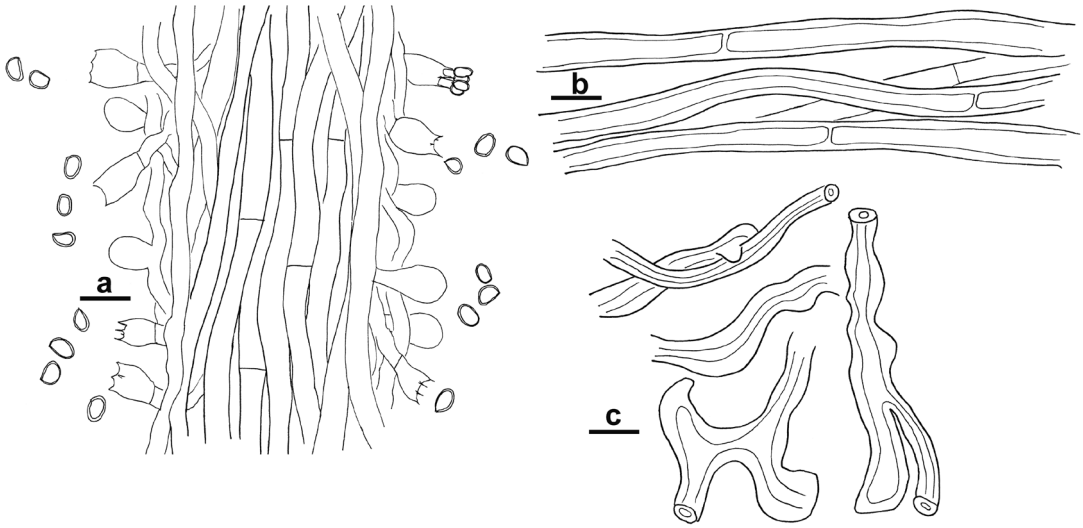

Fig. 3. *Inocutis rheades* (No. *1905 Graz* , H). — **a**: Section through trama. — **b**: Contextual hyphae. — **c**: Skelerified hyphae from the core. Scale bar = 10 µm.

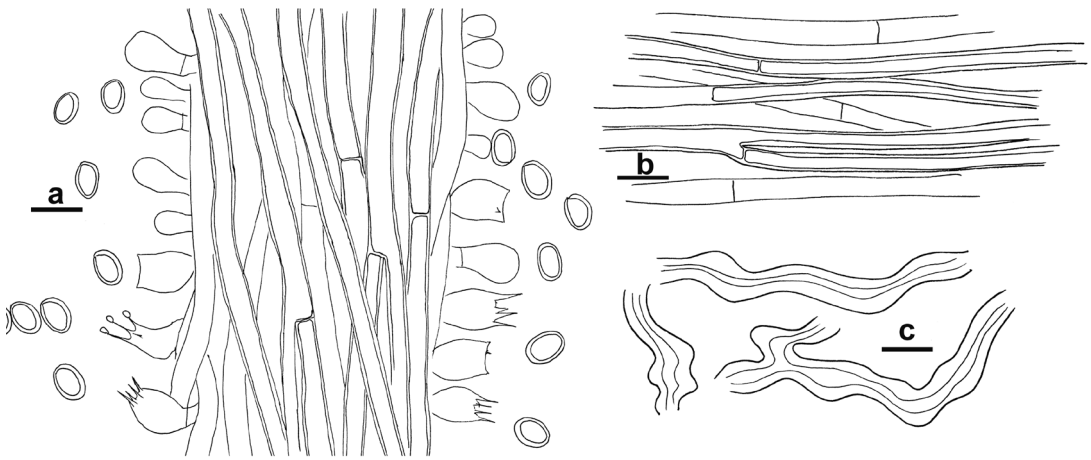

Fig. 4. *Inocutis tamaricis* (*Ghobad-Nejhad 37,* MGH ref. herb.). — **a**: Section through trama. — **b**: Contextual hyphae. — **c**: Skelerified hyphae from the core. Scale bar = 10 µm.

species which grows exclusively on *Tamarix*. The presence of the core and the host are indicative for it. *Inocutis tamaricis* is similar to *I. rheades*, but the latter has smaller spores (*see* Table 1) and is mostly associated with *Populus*. The core and spores in *I. tamaricis* are similar to *I. dryophilus* (not known in Iran), but the latter usually grows on *Quercus*.

ECOLOGY AND DISTRIBUTION: Grows on both dead and living *Tamarix* species and is known from southern Europe, northern Africa, southern Asia, and China (Ryvarden 2005). Many occurrences have been reported on *T. gallica* and *T. ramosissima*. Bondartseva and Parmasto (1986) mention *I. tamaricis* from Georgia, Uzbekistan, Kazakhstan, and the European part of Russia. The first occurrence in Iran was reported by Saber (2000) on *Tamarix* in SW Iran, and it was re-collected by MGH.

SPECIMENS EXAMINED. **Iran**. Khouzestan: 6 km from Ahvaz to Shoushtar, *Tamarix*, III.1999 *Minasian* (IRAN 10656); Masjed-Soleiman, Tembi, *Tamarix*, III.2002 *Ghobad-Nejhad 37* (MGH ref. herb.). **Greece**. Crete: Nomós Lasithíou, Agios Nikólaos 2.5 km S, on *Tamarix*, 18.VIII.1977 *Niemelä 545a* (H).

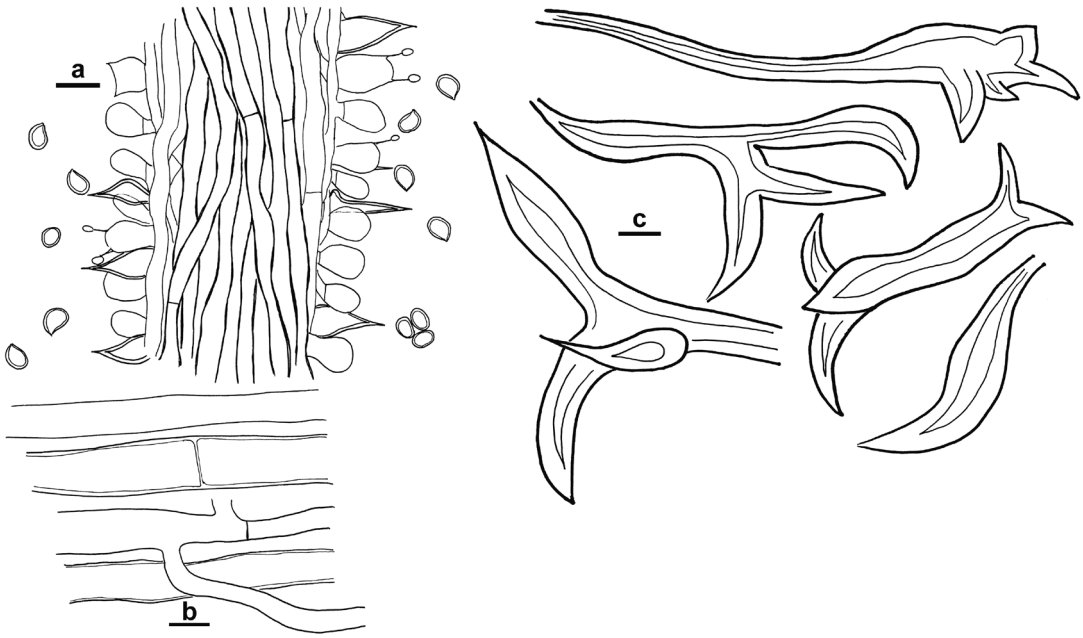

Fig. 5. *Inonotus cuticularis* (*Hallenberg 1362,* GB**)**. — **a**: Section through trama. — **b**: Contextual hyphae. — **c**: Branched setae on pileus surface. Scale bar = 10 µm.

Inonotus cuticularis (Fr.) P. Karst. (Fig. 5)

KEY CHARACTERS: Branched setae on pileus and relatively pale, thin-walled hymenial setae. In Iranian material, the spores are obviously smaller than figures given by Niemelä (2005), Ryvarden (2005), and Dai and Niemelä (2006), and hymenial setae are infrequent and never hooked.

ECOLOGY AND DISTRIBUTION: *Inonotus cuticularis* grows on dead or living wood of different angiosperm trees in the temperate zone. In Iran it has been collected several times especially in northern parts of the country on *Populus* and *Salix* (Soleimani 1974), on a stump of *Quercus castaneifolia* (Hallenberg 1979, 1981), and on *Fagus orientalis* (Saber 2000).

SPECIMENS EXAMINED. — **Iran**. Golestan: Gorgan, Jangal-e Ghorogh, on a stump of *Quercus*, 2.VII.1976 *Hallenberg 1362* (GB). **Croatia**. Zagreb, on living *Aesculus hippocastanum*, alt. 160–170 m, 30.VII.1979 *Göttl 92-79* (H).

Inonotus dryadeus (Pers.) Murrill

KEY CHARACTERS: Large basidiocarps, which emerge mostly at the base of trees. The species has bent hymenial setae and subglobose, hyaline, dextrinoid, CB+ basidiospores.

The only report from Iran was by Buhse (1860: 245, "*Polyporus dryadeus* Fr."). Buhse collected it in 1848 from Asterabad in Golestan Province, and denoted it "*specimen vetustum depravatum*, *1 pedem diametro*".

ECOLOGY AND DISTRIBUTION: *Inonotus dryadeus* grows on angiosperms in Eurasia, usually on *Quercus*, but in North America also on gymnosperms (Dai 1999). Its ecology in Europe, especially Germany, was studied by Dörfelt and Bresinsky (2003) and Krug *et al*. (2004) studied its ecology and host range. They concluded that *I. dryadeus* apparently favours very old trees, and that its distribution in boreal forests is limited by colder climate and the lack of suitable hosts. We found no specimens from Iran for examination and the substrate of the specimen collected by Buhse is unknown.

Inonotus hispidus (Bull.) P. Karst. (Fig. 6)

KEY CHARACTERS: Hispid surface and relatively large thick-walled spores (7.0–)8.0–10.1(–11.5)

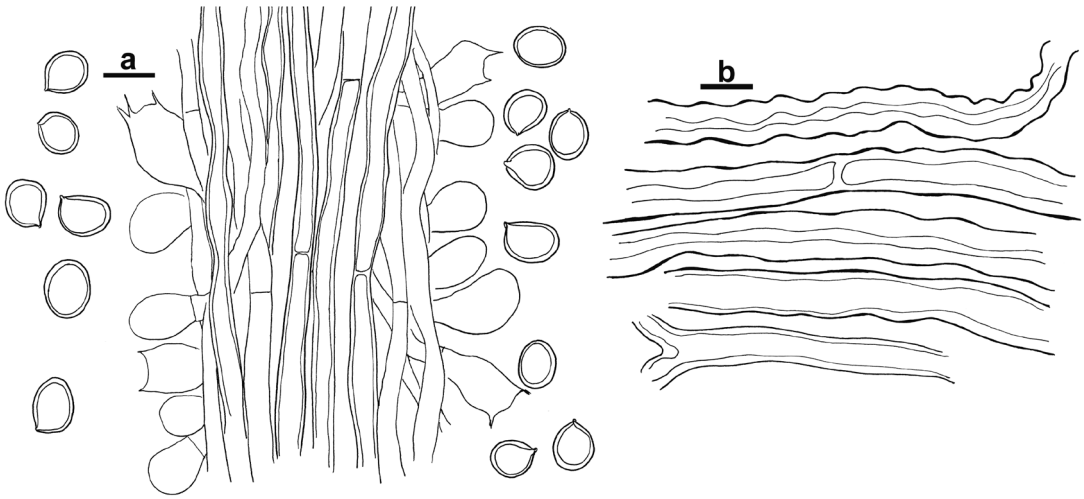

Fig. 6. *Inonotus hispidus* (*Izadyar 156*, GB). — **a**: Section through trama. — **b**: Contextual hyphae. — Scale bar = 10 µm.

× (6.0–)6.9–8.5(–9.0) µm. The presence of hymenial setae is not a constant character: they exist in some European collections, but not in Chinese material (Dai & Niemelä 2006). In some Iranian specimens, premature setae are occasionally seen.

ECOLOGY AND DISTRIBUTION: On different living angiosperms, particularly on *Quercus*, in the temperate zone of the northern hemisphere. Schwarzman (1964) denotes different hardwoods, including *Tamarix*, in Kazakhstan. In Iran the species has been collected in different parts of the country on living *Ulmus* and *Malus* trees (Saber 1974), and *Platanus orientalis* (Soleimani 1974); also reported on *Juglans regia* (Saber 2000), *Tamarix* (Saber 2002) and *Morus* (Asef & Tavanaii 2004).

SPECIMENS EXAMINED. — **Iran**. E Azerbaijan: Jolfa, Daran, on living *Morus alba*, 20.X.2007, *Ghobad-Nejhad 603 & 605* (MGH ref. herb.). Tabriz, Osku, *Malus communis*, 26.IX.1972 *Izadyar 156* (GB). Qazvin: Qazvin to Zanjan road, on standing trunk of *Juglans regia*, 24.VIII.1985 *Amani & Bonapoor no. 278* (GB). Tehran: Tehran, on standing *Fraxinus excelsior*, 12.IX.1985 *Saber 284* (GB). **Turkey**. Izmir, Sapancagölü Lake, alt. 40 m, 1.IX.1972 *Korhonen 1150* (H).

Inonotus nidus-pici Pilát

KEY CHARACTERS: In cavities of living hardwoods. *Inonotus nidus-pici* has both hymenial setae and abundant hyphoid tramal setae. It is somehow similar to *I. obliquus*, which, however, lacks long hyphoid setae in trama.

The Iranian specimen is immature; its hymenium is very young with few, hyaline and faintly cyanophilous spores. However, the spore size, hymenial setae, hyphoid setae and ecology are similiar to *I. nidus-pici*. No chlamydospores were seen in this collection.

ECOLOGY AND DISTRIBUTION: Fruits in holes of living angiosperms, especially *Quercus*, and is considered to be mostly a central–eastern European species, reported only once from Spain (Melo *et al*. 2007). The single collection from NE Iran (Hallenberg 1979) was found in a hole of a living *Quercus* tree. This is most probably the easternmost known locality.

SPECIMENS EXAMINED. — **Iran**. Golestan: Gorgan, Jangale Ghorogh, in a hole of a live standing *Quercus*, 2.VII.1976 *Hallenberg 1350* (GB).

Inonotus obliquus (Pers.) Pilát

KEY CHARACTERS: Resupinate basidiocarps develop under the bark. Before the fruitbodies emerge, black conks often emerge on the trunks.

ECOLOGY AND DISTRIBUTION: *Inonotus obliquus* grows in the northern hemisphere, mostly on *Betula*. In Kazakhstan it has also been recorded on *Malus sieversii* and *Ulmus laevis* (Schwarzman 1964). Its ecology was studied extensively by Niemelä and Kotiranta (1983) in Finland. In

Iran, it has been collected by Khabiri (1968) on *Ulmus* and by Soleimani (1976) on dead wood of different angiosperms in N Iran. It is possible that the collections from *Ulmus* in Kazakhstan and Iran will turn out to be *I. ulmicola* Corfixen.

Inonotus plorans (Pat.) Bondartsev & Singer (Figs. 7 and 8)

Pileus large, single, light in weight when dry, upper surface finely tomentose, pores 1–3 per mm, and when vividly growing with guttation droplets on pore surface. Hyphal system monomitic, hyphae clampless, tramal hyphae yellow, thin- to thick-walled, subparallel, 2–7 μm wide, contextual hyphae golden yellow to brown, parallel to subparallel, thick-walled, 4–9 μm wide. Setae absent. Basidia large, about 15–18 × 9–11 μm. Basidiospores ellipsoid, yellow to pale brown, thickwalled, CB–, IKI–. A stalk-like part joins the basidiocarp to the substrate (Fig. 3b).

KEY CHARACTERS: The large basidiocarp and large thick-walled spores are similar to those of *I. hispidus*. However, the latter is hispid and has occasional setae.

ECOLOGY AND DISTRIBUTION: *Inonotus plorans* is a rare species, for the present only known from Algeria on *Salix* and *Populus* (Ryvarden 2005) and from Morocco (Wagner & Fischer 2002). The specimen from NW Iran was collected from bark of a cultivated *Juglans regia* in a private orchard, and was identified by Prof. Leif Ryvarden. We could not gain access to the type specimen, nor any additional material.

SPECIMENS EXAMINED. — **Iran**. E Azerbaijan: Jolfa, Daran village, on bark of *Juglans regia* in 2 m height, 30.IX.2006 *Ghobad-Nejhad 361* (MGH ref. herb., O/Ryvarden).

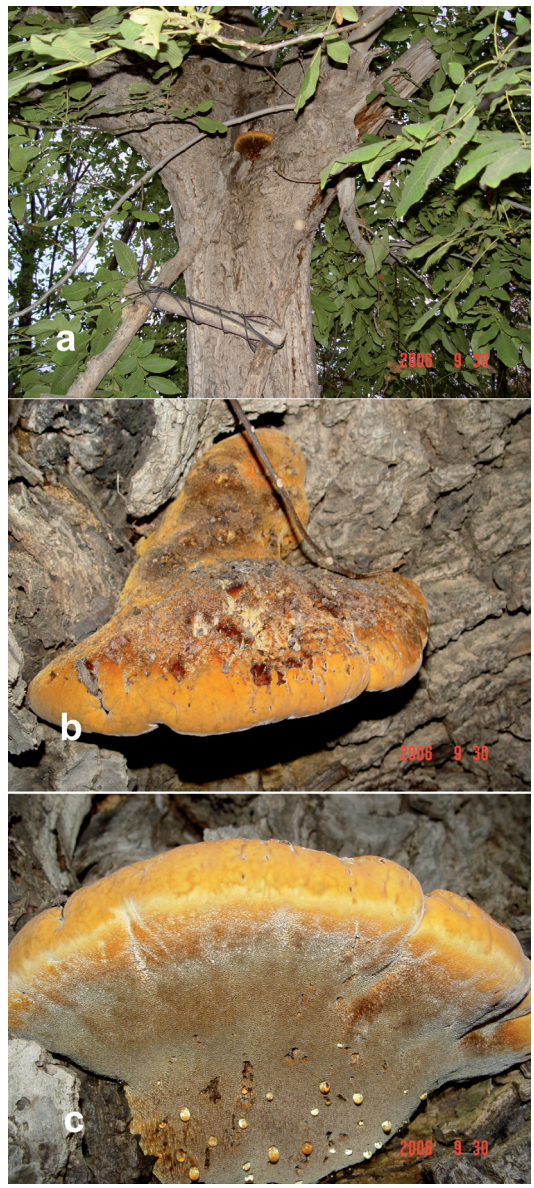

Fig. 7. *Inonotus plorans* on *Juglans regia* in NW Iran (*Ghobad-Nejhad 361*, MGH ref. herb.). — **a**: basidiocarp on the tree. — **b**: upper surface of the basidiocarp. — **c**: lower surface of the basidiocarp. Photos by M. Sohrabi.

Mensularia nodulosa (Fr.) T. Wagner & M. Fisch. (Fig. 9)

BASIONYM: *Inonotus nodulosus* (Fr.) P. Karst.

KEY CHARACTERS: Basidiocarps small, resupinate to nodulose, with hymenial and tramal setae straight. Basidiospores small, 3.5–4.5 × 2.0–3.6 μm, ellipsoid to subglobose, glued together, strongly CB+ and faintly dextrinoid.

ECOLOGY AND DISTRIBUTION: Inhabits mostly *Fagus sylvatica* within its range in the northern hemisphere, though Pieri and Rivoire (1999) mention that it sometimes colonises other angiosperms as well, and Bernicchia (2005) cites *Carpinus* and *Betula* as hosts. In addition Bondartseva and Parmasto (1986) note that it rarely grows on *Carpinus betulus* and *Betula*. The Ira-

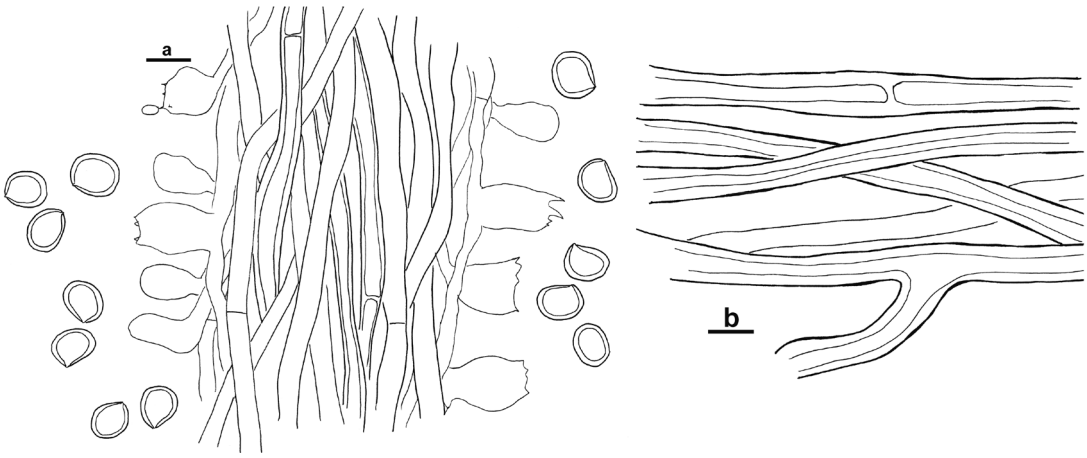

Fig. 8. *Inonotus plorans* (*Ghobad-Nejhad 361*, MGH). — **a**: Section through trama. — **b**: Contextual hyphae. Scale bar = 10 µm.

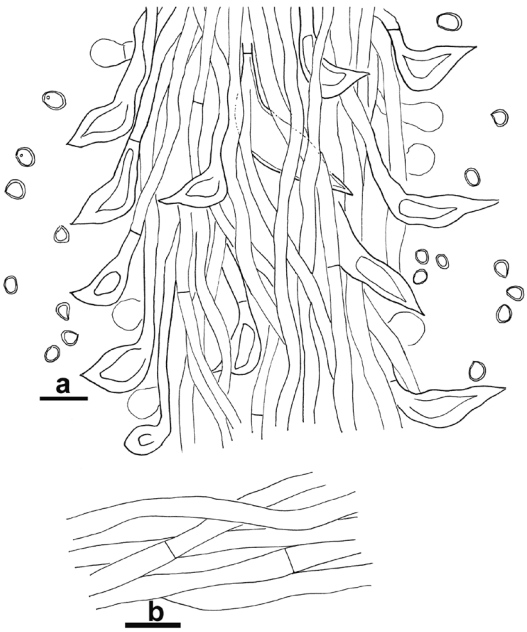

Fig. 9. *Mensularia nodulosa* (*Niemelä 1353*, H). — **a**: Section through trama. — **b**: Contextual hyphae. Scale bar = 10 µm.

nian material was collected from an unidentified tree in N Iran.

SPECIMENS EXAMINED. — **Iran**. Mazandaran: Namakabrood, unknown tree, 30.VI.2000 *Saber & Alavi* (IRAN11103). *Mensularia* cf. *nodulosa*. Gilan: Kelardasht, Mekaroud, on rotten twig, 19.VII.1983 *Karavar*, *Terme & Zargani* (IRAN 11112). **Poland**. Woj. krakowskie, Ojcowski Park Narodowy, fallen trunk of *Fagus sylvatica*, 19.IX.1978 *Niemelä 1353* (H).

Doubtful or excluded names

Inonotus rickii (Pat.) D.A. Reid

The specimens reported by Saber and Minassian (1998) and Saber (2002) are only anamorphs, consisting of hyphae and very abundant chlamydospores. Specimens were collected in southern Iran, Khuzestan province, on *Albizia lebbeck* and *Ziziphus spina-christii*. Chlamydospores are brown, thick-walled, 11–25 × 6–11 μm, hyphae yellow-brownish, 2.7–5.5 μm.

The following two species are excluded and are not yet found from Iran.

Inonotus radiatus (Sowerby) P. Karst.

The material published by Saber (2002) represents *Mensularia nodulosa* and *Phellinus* cf. *baumii* (Ghobad-Nejhad & Dai 2007).

Mensularia hastifera Pouzar

The report from Iran (Saber 2002) is based on a poor specimen collected from an unidentified angiosperm, and it bears no hyphoid setae in dissepiments.

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