

AUTUMN IN HOKKAIDO

PLANTS OF HOROKA TOMAMU MONTANE FOREST



Ben Averis

2019

Photographs taken during a vegetation survey for
Horoka Tomamu Montane Forest biodiversity conservation project
www.horoka.org

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These photographs were taken at Horoka Tomamu Montane Forest, Hokkaido, Japan, in September 2016 and October 2018, during vegetation survey work commissioned by the Horoka Tomamu Montane Forest biodiversity conservation project (www.horoka.org). They are presented here to show what the commonest plant species at Horoka Tomamu look like (at least, in autumn) in the hope that the names of species in my survey report (downloadable from www.horoka.org) can be 'brought to life'. I hope these photos and short notes will also encourage people to look at the plants in forests anywhere in Hokkaido. These photos also include some other species that are not very common here. In total they show almost all of the tree and shrub species that I have found here (photos missing for two cherry species only), as well as all three climbers/vines, all three clubmosses, 75% of the ferns, about 50% of the grasses, sedges, herbs and liverworts, over 70% of the mosses, and a few lichens (lichens not yet surveyed here). As my visits to Horoka Tomamu were in the months of September and October, the flowering of vascular plant species was mostly over and flowers are not seen in most of these photos. However, the photos do show other identification features such as growth form, leaf shape and leaf colour: these can be just as beautiful as the flowers. The mosses and liverworts look much the same all year round and of course are always beautiful, although those on the ground, logs and tree bases are hidden beneath snow all winter.

The photographs are presented in the following order:

- Trees (broadleaved species first, followed by conifers)
- Shrubs
- Woody climbers
- Grasses
- Sedges
- Clubmosses
- Ferns
- Other vascular plants
- Mosses
- Liverworts
- Lichens

Within each of the above groups the photos are ordered alphabetically by the Latin names of the species. The scale bars in the photos are only approximate, just to give some idea of the sizes of plants. Almost all of these photos were taken at Horoka Tomamu, but I have also added a very few taken elsewhere in Hokkaido to show certain species that I have found at Horoka Tomamu but not photographed there, and, for various reasons, a few photos of species found commonly on Hokkaido but not seen at Horoka Tomamu.

TREES

Acer caudatum オガラバナ Ukurundu maple

A shrub/small tree found at Horoka Tomamu in small quantity. The leaves have a wrinkled texture and their 5-7 lobes are cut to less than half way down to the leaf base. Although rather understated in appearance compared with trees that are taller or with bigger or more bizarrely-shaped leaves, its red autumn leaf colour rivals that of the acclaimed *A. japonicum* and *A. palmatum*: just as strong, but in a more subtle way.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Acer japonicum* メイゲツカエデ downy Japanese maple; fullmoon maple**

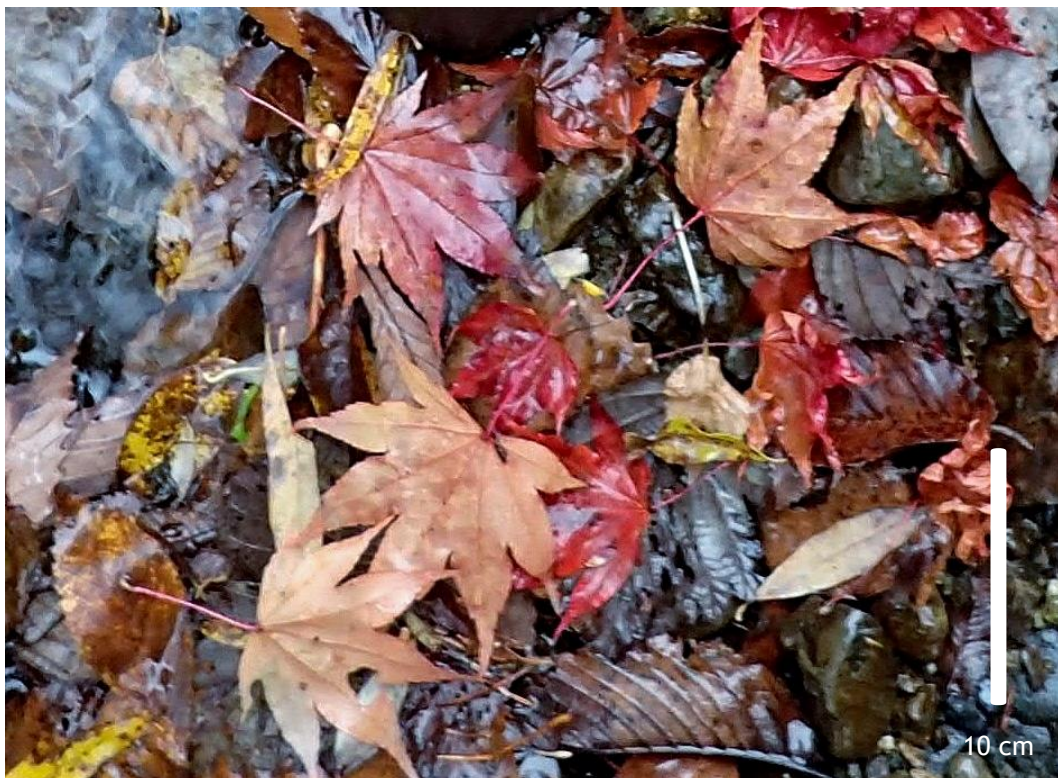
This small tree is common here, especially on the higher ground. It has the most leaf lobes of any maple in this forest: 9 per leaf. The leaves turn bright red in autumn. Most of the brightest red trees dotted among the autumn forests in this part of Hokkaido are of this species, but some *A. japonicum* leaves turn pale orange instead. The fruits, as in all maples, are winged 'keys' (technical name = samara) borne in pairs: see inset photo.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Acer palmatum* イロハモミジ Japanese maple**

This small tree resembles *A. japonicum* in its size and red autumn leaf colour, but the leaves have 7 deeply cut lobes (9 shallower lobes in *A. japonicum*) and the little teeth around the edges of the lobes are smaller than in *A. japonicum*. I shouldn't really tell you this, but I actually overlooked this species while I was at Horoka Tomamu. I discovered its presence later when looking through my photos, some of which show the characteristic leaves on a few trees and also (fallen) on the ground. Did I overlook any other 'new' species here, and if so, what? The answer is, obviously, "I don't know".



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Acer pictum* イタヤカエデ painted maple**

This is by far the commonest maple here, and is indeed one of the commonest tree species at this site. It grows into a tall tree and its leaves are distinct in having 5 lobes with smooth (untoothed) edges and sharply pointed tips. In autumn the leaves turn yellow to yellowish-orange (or, on some trees, a slightly reddish orange, but not as red as in the other three maples at this site). The inset photo shows the winged fruits.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Alnus hirsuta* ケヤマハンノキ Manchurian alder**

This species is common at Horoka Tomamu, especially on damp to wet low ground where it can be dominant or mixed with other trees including willows. It grows quite tall and has smooth greyish bark. Its broad oval leaves have a mix of small teeth and large teeth (or shallow lobes) on their edges. They do not turn bright colours in autumn; just duller/darker green or brownish-green. The flowers are in narrow, hanging 'catkins' and the fruits look like tiny oval green or very dark conifer cones.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

Two other alders not seen at Horoka Tomamu but common in Hokkaido

***Alnus japonica* ハンノキ** Japanese alder grows mainly on wet ground in the lowlands. Its leaves are narrower than those of *A. hirsuta*, with more pointed tips and marginal teeth all small (no hint of shallow lobes).



Near Kushiro, Hokkaido, 09/2016

***Alnus viridis* ミヤマハンノキ** green alder is low and shrubby with broad oval, shiny green leaves with pointed tips and teeth along their edges. It grows on dry or wet ground, mainly in the mountains.



Shiretoko, Hokkaido, 09/2016

Betula ermanii ダケカンバ Erman's birch

This birch is widespread and very common here. On part of the middle/upper eastern slopes it is the dominant canopy species, possibly through having gained a stronger competitive edge during forest re-colonisation after a fire many years ago. It is recognisable by its rather smooth bark being buff-white and peeling off prominently, though the lower trunks of older trees can be darker and rough. The leaves are like those of *B. platyphylla* but the veins more numerous (7+ pairs; <7 in *B. platyphylla*), more prominent and closer together. They turn golden in autumn. *B. ermanii* can be the dominant tree toward the climatic/upper altitudinal limits of forest in Hokkaido. In such places the effect of snow and wind makes the birches shorter and more scrubby and twisted than here at Horoka Tomamu (see inset photo taken at Shiretoko).



Shorter *Betula ermanii* (growth limited by snow/cold/wind around upper altitudinal limit of forest) at Shiretoko, Hokkaido, in September 2016

Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Betula maximowicziana* ウダイカンバ monarch birch**

This tall birch is common here and differs from the other two birches in having larger leaves with heart-shaped bases. The leaves, which turn golden in autumn, can look like those of lime *Tilia* but the lowest 2-3 pairs of veins are spaced out along the main central vein (the all arise together at the extreme leaf base in lime). Lime leaves can also be asymmetrical at their bases (some are, but others are not), while the leaf bases of *B. maximowicziana* are all symmetrical. The trunk of this birch lacks the buff tinge of *B. ermanii* and has more dark horizontal markings than in *B. platyphylla* (so it looks altogether more grey than white).



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Betula platyphylla* シラカンバ Japanese white birch**

Typical trunks of this birch are distinctive in their very white colour: whiter than that of any other tree species here; a clean, cold white lacking the buff tinge seen in *B. ermanii*. The smooth bark has darker (greyish) horizontal lines so small and thin that from about 10 metres away they are barely visible. Large dark markings are more prominent but are much more widely spaced on the otherwise white trunks. The leaves differ from those of *B. ermanii* in having fewer (<7) pairs of veins. As with the other birches here the leaves turn golden in autumn. *B. platyphylla* is common at this site. It is the dominant tree on some of the low ground in the south-east where the massed trunks can look like lots of white sculptures (and in my view actually better than a crowd of white sculptures would be - and I say that even though I am an artist myself!).



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Chengiopanax sciadophylloides* コシアブラ koshiabura**

A few small to medium-sized trees of this species were found in my survey, on the south-western slopes where they stood out from neighbouring trees by the pale yellow autumn colour of their rather large leaves. The tree is distinctive in having leaves divided into leaflets in a star-like (palmate) manner (see lower photo), and small black berries in large, roundish, multi-stemmed clusters (visible against sky in upper photo).



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

Euonymus hamiltonianus ニシキギ Hamilton's spindle tree

Euonymus macropterus ヒロハノツリバナ spindle tree

Both of these species have oval leaves in opposite pairs. *E. hamiltonianus* was found here as a tall tree on the eastern slopes, and *E. macropterus* as smaller trees on the higher ground.



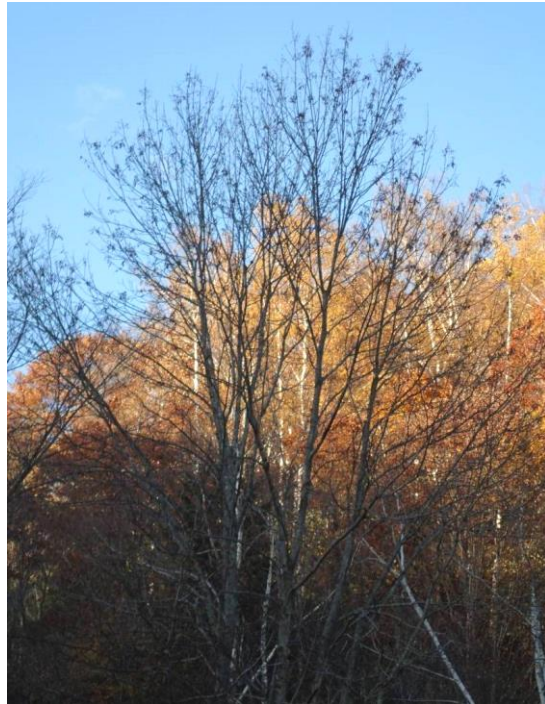
Horoka Tomamu Montane Forest, Hokkaido, 10/2018



Horoka Tomamu Montane Forest, Hokkaido, 10/2018 (fruit = 09/2016)

***Fraxinus mandshurica* ヤチダモ Manchurian ash**

This species, which is common here, grows into a tall tree whose thick, greyish twigs have short, thick, black buds in opposite pairs and large leaves with 3 or more pairs of oval leaflets (with toothed edges) arranged in two rows along the leaf stalk. There is also a single leaflet at the very end of the leaf stalk. The leaves turn yellowish in autumn and fall earlier than those of most other broadleaved tree species here. The dark 'blobs' in the upper photo are hanging bunches of narrow, winged fruits ('keys') whose colour is green at first, becoming brown later. In spring, before the leaves are out, there are small, dense, compact clusters of tiny purplish flowers. *Phellodendron amurense* is a similar-looking tree with its leaves in opposite pairs and with leaflets in two rows, but the leaflets are not toothed and its fruits are berries in branched clusters.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018



Another ash - *Fraxinus lanuginosa* アラゲアオダモ Japanese ash - is also common in Hokkaido but has not been found at Horoka Tomamu. It is typically a smaller tree whose leaves have fewer leaflets (1-3 pairs). Its small white flowers are in open clusters and its fruits are 'keys' as in *F. mandshurica* but smaller; the fruits can be green or purplish-brown or a mix of both colours. This photo (left) of leaves and fruits was taken near Obihiro in October 2016.

***Juglans ailantifolia* オニグルミ Japanese walnut**

This tree is common in Hokkaido, and although it has not been found at Horoka Tomamu the possibility that it could occur here should not be discounted. It is easily recognised by its leaves having two rows of leaflets (and a single terminal leaflet) as in *Fraxinus* and *Phellodendron* but much bigger (whole leaf up to 90 cm long) and not in opposite pairs along the twigs. The leaflets are oblong in shape with shortly pointed tips and small teeth around their edges. They turn yellow in autumn; indeed, their 'normal' (summer) green is quite a yellowish green anyway.



Young growth of *Juglans ailantifolia* near Obihiro, Hokkaido, 10/2018

***Kalopanax septemlobus* ハリギリ prickly castor oil tree**

Coming from Britain, where our native tree species are all quite sober in appearance, the idea of a full-size tree with prickles on its stems, big star-shaped leaves and large, branched clusters of berries sounds like an impossibility. Throw in such a name as 'prickly castor oil tree' and it's obvious this whole thing is made up. Fun to imagine though! But... the prickly castor oil tree really does exist! It grows here at Horoka Tomamu; many of them are scattered through the forest. In the light of this, our criteria for the separation of probable from improbable need to be revised...



Horoka Tomamu Montane Forest, Hokkaido, 10/2018



Near Obihiro, Hokkaido, 10/2018

***Magnolia obovata* ホオノキ Japanese bigleaf magnolia**

Another ‘impossible’ tree, this one is common here and easily identified by its very big, oval, smooth-edged leaves (which can be more than 30 cm long) growing in groups (whorls) of 5 to 8 at the ends of the twigs. In autumn they turn brown. In summer some leaf whorls have a spectacular big white flower in their centres; this later becomes a pink, cone-shaped fruit with many red berries inside. The bark is grey and quite smooth.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Phellodendron amurense* ヒロハノキハダ Sakhalin cork tree**

This tree resembles the Manchurian ash *Fraxinus mandshurica* in having leaves with leaflets in two rows either side of a long central leaf stalk (and a single leaflet at the very end) and the leaves in opposite pairs along the twigs, but its leaflets have smooth edges (no teeth) and its fruits are clusters of berries. The bark is pale grey, rather finely and shallowly fissured and with a slightly spongy texture (hence the name 'cork tree'). *P. amurense* is quite common at Horoka Tomamu.



Photographed near Obihiro; upper photo (which also has *Acer palmatum* at lower left and lower right) includes many bare leaf stalks whose leaflets have fallen off; 10/2018

***Populus suaveolens* ドロノキ Japanese poplar or Maximowicz's poplar**

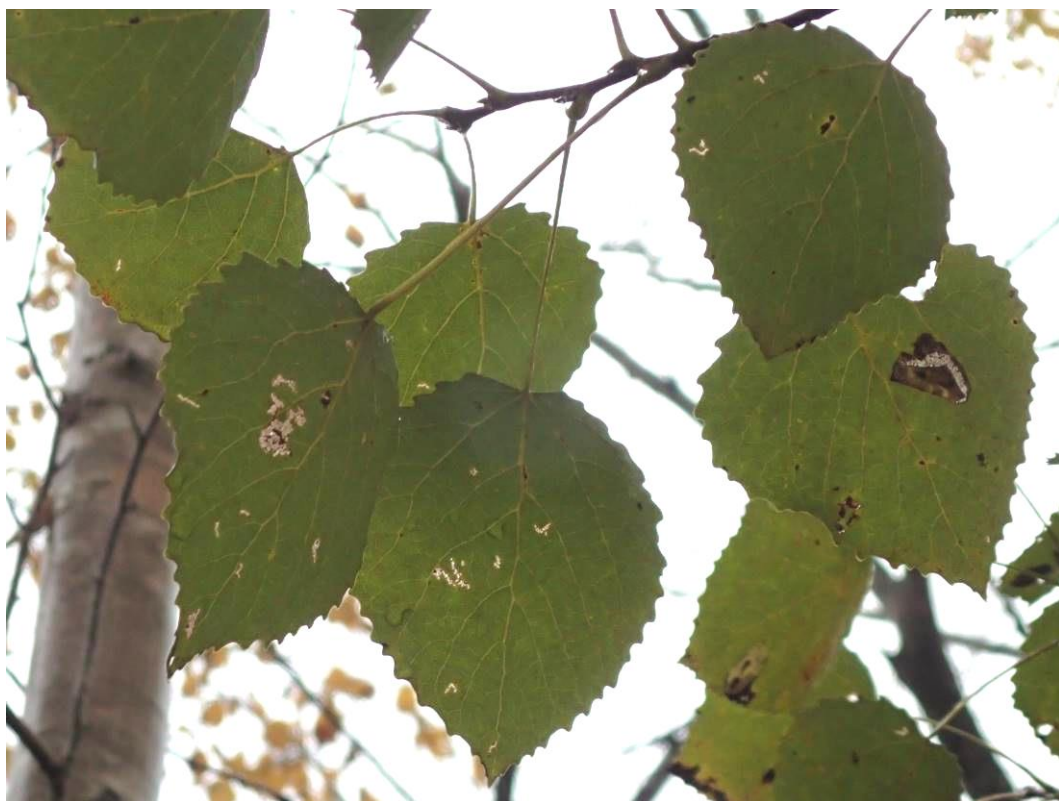
Most poplars have leaves about as wide as long, held on stalks so long and thin (about as long as the leaves themselves and looking almost too long and thin for their purpose) that they wobble around in the slightest breeze. But this species is an exception. Its leaves are narrower than long and are on stalks much shorter than the leaves. These oval leaves have a neat appearance (whatever that means - there's just something about *P. suaveolens* leaves that I really like) and many tiny teeth along their edges. They turn yellow and brown in autumn. The tree grows tall, with upward-spreading branches typical of poplars in general. The bark is fissured. Japanese poplar grows here and there on the lowest ground at Horoka Tomamu, mostly by the river and the road.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Populus tremula* ヤマナラシ / ゾヤマナラシ/チョウセンヤマナラシ aspen**

This species has unmistakable round or round-triangular, wavy-edged leaves that flutter on long stalks in the wind. The leaves turn yellow in autumn. The tree grows tall and straight, with upward-pointing branches. Underground roots spread out and send up suckers, so it is usual to find many aspens growing together. Groups of aspens are scattered widely at Horoka Tomamu on ground varying from low to high and from level to steep. Aspen is one of just two tree species found here that are also native to Britain (the other is goat willow *Salix caprea*). Its leaves are mostly more triangular and pointed than on British aspens, but some (inset photo) look just like those in Britain.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Quercus mongolica* ミズナラ Mongolian oak**

This is very common at Horoka Tomamu and can grow into a big tree with a thick trunk, deeply fissured bark and widely-spreading branches. It is easily recognisable by its leaves, which are large (typically 10-20 cm long) and oval-shaped, with big, pointed teeth along their edges (like a fish with lots of fins all the way around). In autumn the leaves turn a warm orange-brown (or even orange-red) colour.

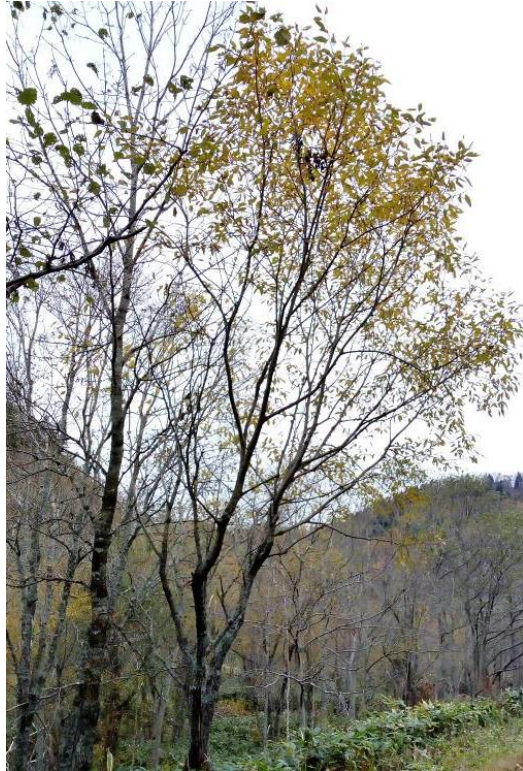


Horoka Tomamu Montane Forest, Hokkaido, 10/2018

Also in Hokkaido, especially in the lowlands (and not seen at Horoka Tomamu), is *Q. dentata* **コナラ** Japanese emperor oak, which has bigger leaves (which can be well over 25 cm long) whose teeth/lobes have blunt, rounded ends.

***Salix caprea* バッコヤナギ goat willow**

Of the four willow species I have seen at Horoka Tomamu, this one has the largest and widest leaves. It is common here and is less restricted to wet places than are the other three willows. It grows as a small tree whose trunk can, with age, become quite wide, with deeply fissured bark. The leaves are oval with untoothed edges, pointed tips and a greyish felty covering on the undersurface. In autumn the leaves turn yellow. In spring the flowers are prominent: pale fluffy-looking catkins. This species and aspen are the only tree species found here that are also native in Britain. The leaves of goat willows here in Hokkaido are mostly longer than those on this same species in Britain, but a minority are shorter like British ones. On returning to Britain I was so eager to re-examine our goat willow leaves that when I walked up to one such tree, on a riverbank in a town park, I was too focused on those leaves and not looking at the ground... and I stepped into something that a dog had done. Grrr!



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Salix integra* イヌコリヤナギ Japanese variegated willow**

This shrubby willow has not been found within Horoka Tomamu Montane Forest but I have seen it just a short distance away, on damp ground in the valley floor. It is possible that it grows within the site, so far unseen: if so the most likely place seems to be damp ground near the river in the west. *S. integra* is easy to distinguish from the other willows in this area by its leaves being arranged in opposite pairs along the twigs. The leaves are also rather blunt-tipped and have very pale greyish-green undersides.



Just outside Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Salix rorida* エゾヤナギ**

A small tree with narrow oval leaves whose edges have many tiny pointed teeth. At the base of the leaf stalk there is something looking like a small leaf but actually called a stipule (see lower photo). Some other willow have stipules too, but in this species the stipules are quite large and taper to pointed tips (stipules of other willows are shorter and blunter). The leaves turn yellow in autumn. I found this species only twice in this survey, both locations being on damp, level ground at the bottom of the hill.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Salix schwerinii* エゾノキヌヤナギ**

This beautiful NE Asian willow looks very similar to the closely related European and west/central Asian *S. viminalis* (osier) in having very long, very narrow leaves without any teeth along their edges. The silvery-white undersides of the leaves (lower photo) contrasts with the dark green uppersides (upper photo), which turn yellow in autumn. I found this species only once at Horoka Tomamu: on damp, level ground near the river at the western edge of the site, with *S. caprea* and *S. udensis* growing nearby.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Salix udensis* オノエヤナギ dragon willow; Japanese fantail willow**

This and *S. caprea* are the commonest willows at Horoka Tomamu. *S. udensis* is common on damp, low ground around the edges of the site. It is a small tree whose long, fine twigs bear narrow leaves with rounded teeth along their edges. As in the other willows here, the leaves turn yellow in autumn; they have a beautiful and delicate look at this time of year, hanging downwards in a yellow and green patterning against the backdrop of slender dark twigs.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Sorbus alnifolia* アズキナシ alder-leaved whitebeam/Korean mountain ash**

This is a medium-sized tree whose oval, short-stalked leaves look rather nondescript but have many straight and closely-spaced side veins and small, sharply-pointed teeth all the way around their edges. The leaves turn golden-brown in autumn. In summer there are clusters of small white flowers, becoming red berries in autumn. The trunk can get quite thick, with smooth or finely fissured grey bark. The branching can be dense and starting not far above ground level. *S. alnifolia* appears is scarce at Horoka Tomamu; I have seen it here only twice, on low ground at the bottom of the mountain.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Sorbus commixta* ナナカマド Japanese rowan**

This small to medium-sized tree is quite common at Horoka Tomamu. Its leaves have many narrow leaflets arranged in pairs along both sides of a central leaf stalk, as in *Fraxinus* and *Phellodendron* (and with a single leaflet at the very end of the leaf stalk), but with the leaves not in opposite pairs along the twigs. The leaflets taper to long, fine points and have toothed edges. They turn red in autumn, rivalling the red of the maples *Acer japonicum* and *A. palmatum*. Earlier in the year there are (or, rather, were) clusters of small white flowers which become red berries in autumn (some visible silhouetted in upper photo).



Kanayamako, Hokkaido 10/2018



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Tilia japonica* シナノキ Japanese lime**

One of the commoner and taller trees at Horoka Tomamu, this species can be identified by its heart-shaped leaves whose first 2-3 pairs of side veins all start from the same point at the base of the leaf. The leaves have many small teeth along their edges and turn yellowish to brownish in autumn. The leaf stalks are quite long; they can be as long as the leaves themselves. In spring/summer the small whitish-green flowers and small green berry-like fruits can be seen in small branched clusters of about 2-6, each cluster attached by a stalk to a narrow oval pale green bract about as long as the leaf. I don't have a photo, but they look just like those of the European lime *T. x europaea*, of which I have inserted a small photo below (I know it's cheating, but...).



Young unopened flowers of
Tilia x europaea in Britain.
Flowers and fruit of *T.*
japonica look much the same
as those of *T. x europaea*.

Horoka Tomamu Montane Forest, Hokkaido, 10/2018

Tilia maximowicziana オオバボダイジュ is also common in Hokkaido but less so than *T. japonica* and mainly in the lowlands (not seen at Horoka Tomamu). It has larger leaves up to 15 cm long (5-10 cm in *T. japonica*) with markedly asymmetrical bases (lower on one side than on the other side), silvery-grey undersides and longer leaf stalks up to 7.5 cm long (up to 5 cm in *T. japonica*).

***Ulmus davidiana* オヒヨウ Japanese elm**

This species is very common here at Horoka Tomamu, where it can often be seen as a tall tree with a thick trunk and furrowed bark. The leaves of this and the next species (i.e. the two elms) are oval with small sharp teeth all around their edges; they grow on very short leaf stalks arising alternately on the left and right sides of the twigs. The leaf base is asymmetrical: it joins the leaf stalk slightly lower on one side than on the other. The leaves turn yellow in autumn. *U. davidiana* lacks the sharply pointed lobes that are found toward the tip of the leaf of *U. laciniata*.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Ulmus laciniata* オヒヨウ Manchurian elm**

This looks similar to *U. davidiana* but its leaves are on average a little larger and many (or most) of them have two or more narrow, pointed lobes (like horns) near the leaf tip. The tree generally grows a little smaller than *U. davidiana*. At Horoka Tomamu it is widespread but not as common as *U. davidiana*: it shows some preference for damp ground and north-facing slopes.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Abies sachalinensis* トドマツ Sakhalin fir**

This conifer is common at Horoka Tomamu, especially in the north. It is easily told from the other three conifer species there by its blunt, notched leaf tips (pointed in the other species). It also has smoother, greyer bark with horizontal line markings (brownier and rougher in *Picea* species), rather like that of *Betula maximowicziana*.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Picea glehnii* アカエゾマツ Sakhalin spruce or Glehn's spruce**

This conifer is rare within the native forest here, but is more common as a planted tree nearby to the east. It is a rather small spruce and has pointed leaf tips typical of spruces in general. It is easily told from *P. jezoensis* (which is very common here) by its shorter leaves: they are about 8-12 mm long (15-25 mm in *P. jezoensis*). This makes the shoots narrow, giving the tree a distinct appearance. The bark is brownish and divided into plates, as in *P. jezoensis*.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Picea jezoensis* エゾマツ Jezo spruce or Yezo spruce**

This tall conifer is common here and looks generally similar to *Abies sachalinensis* but has pointed leaf tips and rougher, browner bark divided into a patterning of 'plates'. It is widespread here but most common on the north-facing slopes in the north.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Taxus cuspidata* イチイ Japanese yew**

This conifer was seen in small quantity in the north of the site. It is easy to tell from other conifers in Hokkaido because (1) its trunk has some vertical grooves and reddish-brown bark that peels off in vertical strips, (2) the leaves are a little broader and less needle-like than those of *Abies* and *Picea* species, and are dark green above, paler below and with shortly-pointed tips, and (3) its fruits look like red berries. Its branches can spread out as widely as those of *Abies sachalinensis* or *Picea jezoensis*, but the tree does not grow as tall as those two species.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

SHRUBS

Aralia elata タラノキ Japanese angelica tree

A distinctive shrub with upright woody stems bearing very large leaves divided into separate parts along left and right sides of a main leaf stalk, with each of those parts divided itself into oval leaflets (with pointed tips and toothed edges) in two rows along its own central stalk, or even subdivided (as above) one stage further. The woody stems have many sharp spines on them, and there are also many spines along the main and secondary leaf stalks. At Horoka Tomamu *A. elata* grows mainly in forest edges with a good amount of light.



Near Horoka Tomamu, 10/2018



Young plant at Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Hydrangea paniculata* ノリウツギ paniced hydrangea**

This shrub grows up to 4-5 m tall and is common at Horoka Tomamu. It has rather large oval leaves in opposite pairs; they are up to 15 cm long and have small teeth along their edges. In summer there are cone-shaped clusters of whitish flowers; these flowers, all gone over by the time of my visits, are mostly small (looking dark in the upper left photo) but some, especially around the lower edge of the cluster, appear much larger but are actually not proper flowers (these are paler brown in the same photo).



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Rhododendron pentandrum* コヨウラクツツジ**

This small shrub grows up to 2 m tall and has slender woody stems and small oval leaves which are distinctly hairy on their upper surfaces and turn yellowish in autumn. It was found in small quantity at Horoka Tomamu. In summer there are small, roundish, reddish flowers on long stalks (not seen on my visits).



Horoka Tomamu Montane Forest, Hokkaido, 09/2016 (above) and 10/2018 (below)

***Sambucus racemosa* ニワトコ red-berried elder**

This shrub, growing up to about 4-5 m tall, was found in just a few places at Horoka Tomamu, on low ground near the forest edge. It has thick twigs bearing leaves in opposite pairs. The leaves are large and have pairs of leaflets (mostly 2 pairs) in two rows along a central leaf stalk, and a final leaflet at the end. Earlier in the year there can be clusters of small creamy flowers developing into red berries (not seen, but see inset photo taken in Britain).



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Viburnum furcatum* オオカメノキ forked/scarlet-leaved viburnum**

This shrub, growing up to about 4 m tall, is distinctive on account of its large, broadly oval leaves with toothed edges, growing in opposite pairs. Wide, flattened clusters (umbels) of white flowers in summer (small flowers in centre of cluster; larger ones around the edge) develop into red berries in autumn when the leaves turn reddish or purplish. *V. furcatum* is common at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016 (upper photo) and 10/2018 (lower photo)

***Pinus pumila* ハイマツ dwarf pine**

This scrubby conifer, growing up to about 3 m tall, does not grow at Horoka Tomamu but is included here because *P. pumila* scrub is such a conspicuous feature of the uppermost forest zone in Hokkaido. This zone, which can also include scrubby stands of *Betula ermanii* <10 m tall and with twisted trunks and branches, is over 1000 metres above sea level in central Hokkaido (i.e. at least 400 m higher than the highest part of Horoka Tomamu) but descends in the east to about 600-800 m at Shiretoko. The low and twisted or slanting growth forms of the pines and birches in these places is largely an effect of winter snow cover, but also, to some extent, wind and possibly also the generally low temperatures through much of the year. *P. pumila* has leaves up to 6 cm long, in bundles of 5; other Hokkaido evergreen conifers have shorter, single leaves.



Shiretoko (lower photo also including *Betula ermanii*) 09/2016

WOODY CLIMBERS

Actinidea arguta サルナシ, コクワ monkey pear, hardy kiwi

A common climber at Horoka Tomamu, its oval leaves are quite ordinary-looking (though turning yellow in autumn) but whose fruits are like miniature kiwi fruits in appearance and taste. Looking close at the teeth around the edges of the leaves one can see that many of them are distinctively narrow and hair-like (lower photo).



Horoka Tomamu Montane Forest, Hokkaido, 09/2016 (upper photo) and 10/2018 (lower photos)

***Hydrangea petiolaris* ツルアジサイ climbing hydrangea**

These three photos look like three different species but they are all *H. petiolaris*, one of the commonest plants at Horoka Tomamu. It is a tree-climber with large, broad oval to heart-shaped leaves (upper photo), and also creeps low on the ground, with much smaller leaves of varied shapes (lower photos). The leaves turn pale yellow in autumn.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016 (upper photo) and 10/2018 (lower photos)

***Vitis coignetiae* ヤマブドウ crimson glory vine**

This species, which is quite common at Horoka Tomamu climbing up trees and also scrambling among other vegetation such as dwarf bamboo *Sasa*, has the largest leaves of all the climbing species here. The leaves can be over 25 cm across and are broadly heart-shaped with big teeth along their edges and a distinct network of veins cut into shallow grooves on their upper surfaces. They turn bright red in autumn. Elongated clusters of small flowers in summer develop into back berries in autumn.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

GRASSES

Brachypodium sylvaticum ヤマカモジグサ false brome

An attractive grass with tufts of softly hairy leaves and narrow, unbranched flower heads. At Horoka Tomamu it is found mainly on the banks of the river in the west.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

Brylkinia caudata ホガエリガヤ

A grass whose flower head is very distinctive because of its long, backward-pointing spikelets (visible in centre of photo). Found at Horoka Tomamu near the river in the west.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Calamagrostis hakonensis* ヒメノガリヤス**

A grass whose beautiful flower heads have many small delicate spikelets on very fine, spreading branches. At Horoka Tomamu mainly on steep banks in the north and west.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Muhlenbergia huegelii* オオネズミガヤ**

The long flowering heads of this grass are curved or drooping and their branches also curved or held close to the main stem. The leaves turn yellowish or pink-tinged in autumn. At Horoka Tomamu *M. huegelii* grows mainly on riverside banks and by paths.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Phragmites australis* ヨシ common reed**

An unmistakable grass with many tall (1.5-2.0 m), rattling stems growing from underground shoots (rhizomes) so that they form extensive and dense patches (not forming separated tufts or tussocks). The wide leaves are spaced evenly all the way up the stems (mostly at base and lower parts of stems in many other grasses). The flower heads are large and divided up with many branches bearing small, brown or purplish spikelets. *Phragmites* is dominant in one area on wet, level ground at the south-eastern edge of the Horoka Tomamu site, close to the road running along the bottom of the hill at its southern edge.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Sasa senanensis* クマイザサ dwarf bamboo**

By far the most abundant species at Horoka Tomamu, and probably in forests in Hokkaido generally, *S. senanensis* is impossible to ignore if only because of the physical challenge it presents to us when we want to explore the forest environment. The dense masses of tall (1.5-2.0 m), thick, tough stems, arising from underground rhizomes, bear large hairless leaves that are up to about 20 cm long and 6 cm wide and, at the shoot tips, spread out in a fan shape. The branched flowering heads (lower right photo) are relatively inconspicuous. In autumn many of the leaves are 'variegated' green and buff.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018 (top + lower left) and 09/2016 (lower right)

SEDGES

Carex dispalata カサスゲ

A large sedge with long, mid to dark green leaves and long, narrow, catkin-like flower/fruit spikes, three of which are visible in this photo. This species grows on damp ground on the lower slopes and riverside in the north-western part of Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

Carex mollicula ヒメシラスゲ

A rather large sedge with yellow-green leaves and typically with three female (fruiting) spikes close together at the stem tip, held out at about 45° and with their fruits sticking out at about 90°. It is scattered on damp ground at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Carex pisiformis* サハリンイトスゲ**

A sedge with tufts of narrow yellowish-green leaves the show the same curved and arching form as seen in *C. dispalata* and *C. mollicula* (but leaves narrower than in those species). Common at Horoka Tomamu on well drained sloping ground where dwarf bamboo is sparse: i.e. mainly on riverside banks, other steep banks in the north, and by paths. Flowers/fruits were seen only rarely during this survey.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Scirpus wichurae*
アブラガヤ**

A tall and easily recognisable sedge with multiple stalked clusters of many small brown flowers/fruits at the top of a tall upright stem, and with broad yellowish-green leaves lower down. There are also leaf-like bracts (like shorter leaves) growing with the flower heads at the stem tips. *S. wichurae* grows on damp to wet ground, and was found only rarely within the Horoka Tomamu reserve but is more common in open places just outside the site.

Photo taken just outside Horoka Tomamu Montane Forest, Hokkaido, 09/2016



CLUBMOSES

Clubmosses are primitive plants that look rather like big mosses and are related to ferns.

Huperzia serrata トウゲシバ toothed clubmoss

This unmistakable clubmoss is quite common at Horoka Tomamu, growing as small groups of upright, unbranched or sparingly branched stems with small narrow pointed leaves sticking out in all directions. The leaves have tiny teeth on their edges, hence the name *serrata*.

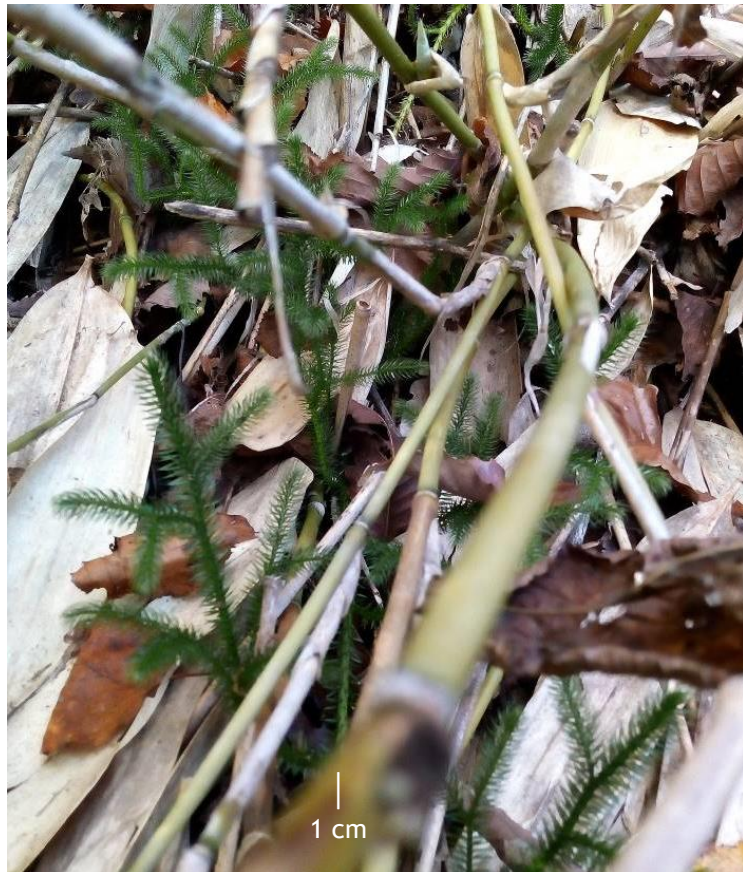


Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Lycopodium
clavatum***
ヒカゲノカズラ
stag's-horn
clubmoss

This species was seen only once in my surveys here at Horoka Tomamu: beneath *Sasa senanensis* (what else?) on a steep slope in the south-west of the site. Its long, branched, tough and slightly woody-textured shoots grow low over the ground and bear many small, narrow, needle-like leaves. Each leaf ends in a very thin white hair-point.

Photo taken at Horoka Tomamu Montane Forest, Hokkaido, 10/2018



Lycopodium dendroideum マンネンスギ tree groundpine

This clubmoss is quite common on the forest floor at Horoka Tomamu, especially in the northern part of the site. It is unmistakable with its branched growth form, like a miniature tree with many short, narrow, evergreen leaves.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

FERNS

Adiantum myriosorum クジャクシダ northern maidenhair

This fern, with its unmistakable multi-branched form and delicate appearance, grows on steep, shady banks above the river at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

Athyrium vidalii ヤマイヌワラビ Japanese lady fern

A fern whose triangular fronds have purple-tinged stems and delicately toothed edges to their leaflets (pinnules). Found in some of the sheltered gullies at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Coniogramme intermedia* イワガネゼンマイ intermediate bamboo fern**

The fronds of this fern are divided much less intricately than those of the other ferns at Horoka Tomamu. It grows here on steep slopes by the river and in gullies.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Deparia pycnosora* ミヤマシケシダ tapering glade fern**

A smallish fern whose fronds tend to hang downwards on the steep, shaded banks where it grows. The main stem is hairy and the small veins within the many small leaflets (pinnules) are conspicuous as a series of ridges and grooves on the frond' upper surface.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Dryopteris crassirhizoma* オシダ wood fern**

This large ‘shuttlecock’ fern has small shallow teeth along the edges of the small sub-leaflets (pinnules) and is common at Horoka Tomamu, especially on north-facing slopes.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Hymenophyllum wrightii* コケシノブ Wright’s filmy fern**

This tiny, rather liverwort-like fern has translucent dark green fronds divided into lobes (pinnae) whose central veins are very thin but dark and distinct. It was found at Horoka Tomamu in two places, both of them on steep, shaded banks in the north of the site.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Leptorumohra miqueliana* ホソバナライシダ Miquel's Arachniodes**

This looks rather like *Athyrium vidalii* but has the lowest parts of the frond more intricately divided (3-pinnate). The final divisions (pinnules) have very toothed edges. It is quite common on shaded north-facing slopes at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Matteuccia orientalis* イヌガンソク Oriental ostrich fern**

This looks nothing like the related ostrich fern *M. struthiopteris*, as it is lower grown with shorter fronds spreading outwards instead of tall and upright. The lowest pinnae point backwards and those toward the tip of the frond are all joined together at their bases. The final divisions (pinnules) have smooth, untoothed edges.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Matteuccia struthiopteris* クサソテツ ostrich fern**

The tall, upright fronds grouped together in ‘shuttlecock’ tussocks give this fern a distinctive look. The side pinnae are widest in the middle of the frond and become gradually shorter toward the base and the tip with very short pinnae right down to the base of the main stem). Their subdivisions (pinnules) have smooth, untoothed edges. The tips of the fronds tend to droop slightly. Ostrich fern was found on damp ground by the river at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Osmundastrum cinnamomeum* ヤマドリゼンマイ cinnamon fern**

Another fern whose smallest subdivisions (pinnules) have smooth, untoothed edges, this species has fronds that spread out widely. It can resemble *Matteucia orientalis* but has tiny tufts of orange hairs at the bases of the side pinnae on the underside of the frond. At Horoka Tomamu it was found on damp ground and north-facing slopes.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

Phegopteris connectilis

ミヤマウラビ

beech fern

A non-tufted fern with small to medium-sized fronds growing singly and commonly hanging downwards. The side pinnae point out at 90° or, toward the frond tip, slightly forwards, but the lowest pair are very different in that they point backwards. The upper surface of the frond is hairy. The smallest divisions (pinnules) have smooth, untoothed edges. Beech fern is a common species on steep slopes in the north-western part of the Horoka Tomamu site, especially near the river and in gullies.

Photo taken at Horoka Tomamu Montane Forest, Hokkaido, 09/2016



***Polypodium fauriei* オシヤグジデンド**

This small fern, with its side pinnae numerous but undivided, grows on the trunks of trees in sheltered places in the north-western part of Horoka Tomamu. It is not tufted: fronds arise singly from lateral creeping shoots.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Polystichum braunii* ホソイノデ Japanese tassel fern; Braun's holly fern**

A rather large tufted fern with sharp, bristle-pointed teeth on the small pinnules (see inset). Found on north-facing banks and in gullies at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Polystichum retroso-paleaceum* サカゲイノデ**

Another large, tufted fern with bristly teeth on the pinnules, but compared with *P. braunii* the frond surface is smoother (lacking hairs across the surface) and of a less leathery texture. It can look like *Osmundaceum cinnamomeum* but with toothed pinnules. Found in a gully in the western part of Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Polystichum tripterum* ジュウモンジシダ trifold holly fern**

This cannot be confused with any other fern species at Horoka Tomamu, because the two lowest side pinnae are in the form of 'miniature fronds' with their own subdivisions as in the main frond. The pinnules also have the sharp bristly teeth characteristic of the *Polystichum* genus. At Horoka Tomamu it is common on sheltered slopes in the north and in gullies.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

OTHER VASCULAR PLANTS

Achlys japonica ナンブソウ Japanese vanilla leaf

An abundant herb at Horoka Tomamu, and easily identified by its medium-sized leaves, each one on an upright stalk and with three leaflets. In summer there is a small, thin spike of tiny whitish flowers on a long stalk arising from ground level.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

Actea asiatica ルイヨウショウマ baneberry

This plant, seen rarely at Horoka Tomamu, has leaves divided in a rather fern-like manner but with fewer leaflets (these leaflets with sharply toothed edges). Small white flowers in summer, arranged in a spike, become poisonous black berries in autumn.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Aconitum sachalinense* エゾトリカブト Ezo aconite**

The leaves are deeply cut into 3-5 lobes which themselves have toothed or lobed edges. There are clusters of blue-mauve flowers (seen here in photo taken in September). *A. sachalinense* is very common at Horoka Tomamu. The plant is poisonous. Also in this photo is *Athyrium multidentatum* エゾメシダ glandular lady fern.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Amphicarpaea edgeworthii* ヤブマメ hogpeanut**

I have not seen the trefoil leaves (with three diamond-shaped leaflets) and blue/white flowers of this clambering plant at Horoka Tomamu, but I did find these old stems and fruits in one place at the forest edge.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Angelica sachalinensis* エゾノヨロイグサ**

All I have seen of this species at Horoka Tomamu are the lower leaves, which I have found on damp to wet ground in a few places. These leaves are divided into leaflets with toothed edges.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Artemisia montana* オオヨモキ mountain mugwort**

An easily identified plant whose tall stems bear scented leaves which, on the lower parts of the plant are deeply cut into lobes. The small dull-coloured flowers are in long, narrow spikes at the top of the main stem and upper branches. *A. montana* was found among other tall species in a few places during the survey Horoka Tomamu, especially near the forest edges.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Astilbe odontophylla* トリアシショウマ false goat's-beard**

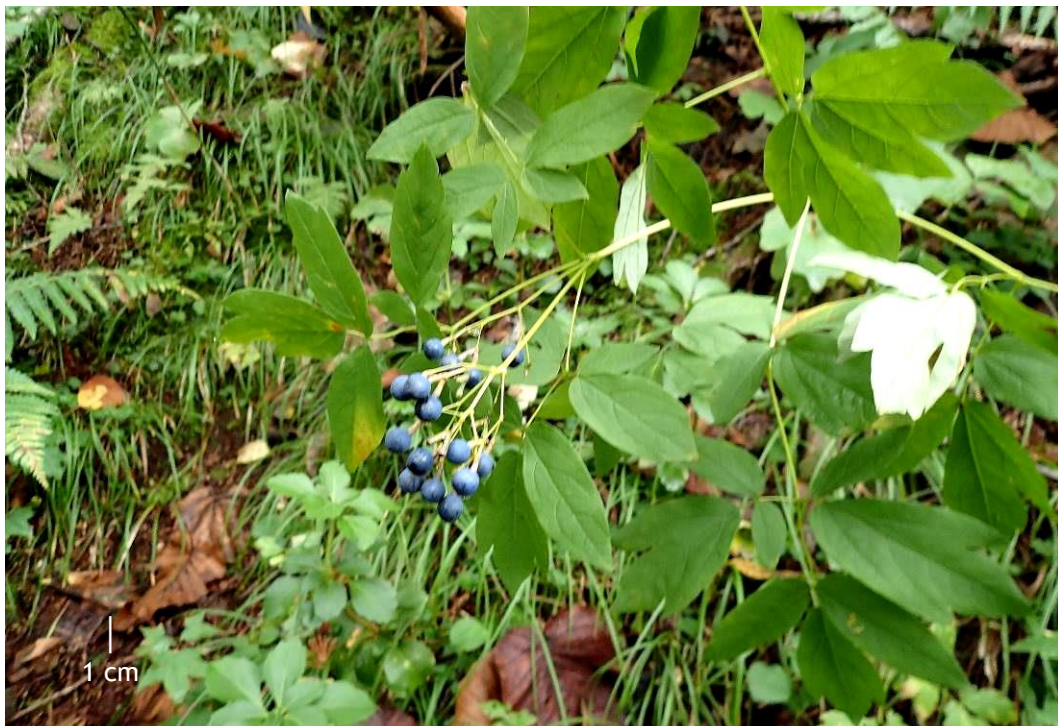
A tall herb with leaves divided into stalked, toothed leaflets, and with long narrow spikes of small white flowers. Thinly scattered in the forest at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Caulophyllum robustum* ルイヨウボタン Asian blue cohosh**

Another tall herb, this one has leaflets lobed but lacking smaller marginal teeth, and has branched clusters of yellow-green flowers developing into blue berries by early autumn. Found in small quantity at Horoka Tomamu. This plant is poisonous.



Slightly out-of-focus photo taken at Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Cardiocrinum cordatum* オオウバユリ heartleaf lily**

Very big and unmistakable. The tall, stout stem has large, long-stalked heart-shaped leaves and, at its top, a big upright spike of very large, horizontally-spreading creamy flowers in summer, becoming green fruits (main photo taken in September) later turning brown (inset photo; October). Thinly scattered through Horoka Tomamu forest.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016 (main photo) and 10/2018 (inset photo)

***Chloranthus japonicus* ヒトリシズカ wild chloranthus**

Easy to tell by its whorl of four leaves with toothed edges and a distinct network of veins. In summer there is a spike of white flowers arising from the middle of the leaf whorl. Found on steep banks in the NW of the Horoka Tomamu site.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Chrysosplenium flagelliferum* ツルネコノメソウ stolon golden saxifrage**

The leaves of this herb are roundish with shallow rounded teeth. They are hairy and on relatively long stalks arising from ground level. Found among mosses on damp ground.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Chrysosplenium kamtschaticum* チシマネコノメソウ golden saxifrage**

This has roundish leaves in opposite pairs with each pair immediately on top of the one below because the main stem (and whole plant) is so short. This species is quite common on damp ground in the north and west of the Horoka Tomamu site.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Circaea alpina* ミヤマタニタデ alpine enchanter's nightshade**

The stalked, heart-shaped leaves are in opposite pairs on a rather short stem, and have well-spaced teeth along their edges. The tiny flowers are in open spikes but are not conspicuous. Scattered in small quantity on the Horoka Tomamu forest floor.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Cirsium kamtschaticum* チシマアザミ Kamchatka thistle**

This thistle is common at Horoka Tomamu. It can grow tall, but many plants are just rosettes of basal leaves. The leaves can be broad oval or cut deeply into lobes; they have prickly teeth on their edges. I was too late for the pink flower heads, so here is an old brown one - but that has its own beauty. Doesn't it? Or am I just saying that, to sound like someone so much more clever and more perceptive than people like you that I can see beauty in anything and even in a boring old dull brown miserably drooping...?



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Clinopodium micranthum* var. *sachalinense* ミヤマトウバナ**

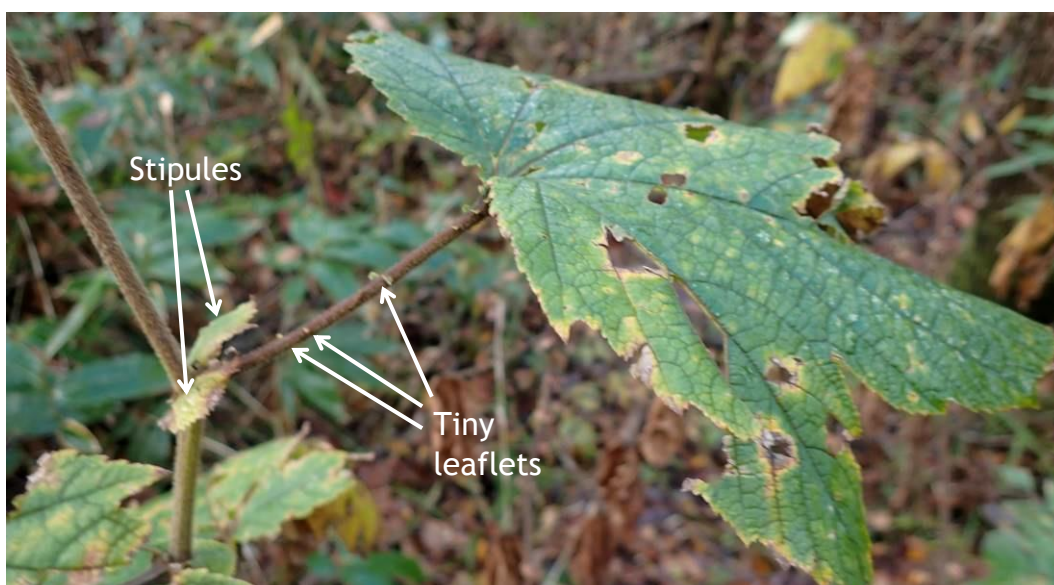
A delicate herb with oval, toothed leaves on long stalks and in opposite pairs on the slender upright stems. At the time of my surveys the small, pale pinkish flowers at the shoot tips and in leaf axils were over, but the green fruits were present and quite. *C. micranthum* is quite common at Horoka Tomamu, growing here mainly on damp ground in the north and west and in gullies.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Filipendula camschatica* オニシモツケ Kamchatka meadowsweet**

The leaves of this tall herb were falling apart and the big clusters of small white flowers well over by the time I took these photos, but you can still see that the leaves are lobed in a rather maple-like way and that there are very tiny 'leaflets' along the reddish-coloured leaf stalks and larger leaf-like stipules where those leaf stalks leave the main plant stem. This species grows on damp, low ground at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Galium kamtschaticum* エゾノヨツバムグラ boreal bedstraw**

This low grown creeping herb is easily identified by its broad oval (almost round) leaves in whorls of four. It grows on moist and sheltered banks in the northern and western parts of Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Galium trifloriforme* オククルマムグラ three-flower bedstraw**

Another low, creeping herb of shaded, sheltered forest habitats, this species has 6 leaves per whorl and its flowers (all over at the time of my survey) are tiny, white and in stalked clusters. *G. odoratum* (クルマバソウ woodruff) is similar and grows in similarly sheltered places here but has leaves mostly in whorls of 8 or more.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Ilex rugosa* ツルツゲ Tsuru holly**

A low grown sub shrub whose woody stems have narrow oval, toothed evergreen leaves of a leathery texture. It is quite common in the northern half of Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Impatiens noli-tangere* キツリフネ touch-me-not balsam**

This species can grow quite tall but was seen at Horoka Tomamu as just a few short plants. It has oval, bluntly toothed leaves (lower ones on long stalks) and large yellow flowers (with a forward-projecting upper 'hood' petal, a larger, lobed, downward hanging lower petal and a backward-projecting tubular, curved 'beak') which later develop into narrow seed pods which, in the ripe state, burst open when touched.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Jacobaea cannabifolia* ハンゴンソウ Aleutian ragwort**

A tall plant whose leaves are cut deeply into 3 or 5 pointed lobes. At the top of the stem are large clusters of small yellow flowers in summer, these later becoming whitish fluffy seeds. A very common species at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Laportea bulbifera* ムカゴイラクサ bulbiferous woodnettle**

This looks like a nettle but some of its leaves are not in opposite pairs and have small brownish bulbils at the bases of their long leaf stalks. Common at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Lycopus uniflorus* エゾシロネ northern bugleweed**

This herb, found at Horoka Tomamu in small quantity on damp ground, has upright stems, toothed leaves in opposite pairs, and small dense clusters of white flowers at the bases of the leaf stalks.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Maianthemum dilatatum* マイヅルソウ false lily of the valley**

This herb is very common as Horoka Tomamu, growing mostly as low shoots, each bearing between 1 and 3 hairless, shiny, heart-shaped leaves. The flowers and fruits were over by the time of my visits here, but the remains of some of their old spikes were still present in September 2016. You want to know what the flowers and fruits would have looked like? How would I know? I wasn't there. I was in Britain, on the other side of the world. And aren't these leaves good enough? And... OK, white flowers and red berries. And the moss in the photo of the next species is *Rhytidiadelphus triquetrus*. Yes, I know you didn't ask that. What kind of world would it be if we knew only the answers to questions we had asked? Pretty obviously a world in which most people would not recognize *Rhytidiadelphus triquetrus*. What a strange world that would be!



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Oxalis acetosella* コミヤマカタバミ wood sorrel**

The leaves look like those of clover (*Trifolium*) species, each with 3 leaflets, but their veins are curved (straight in clovers) and the forest habitat is not typical of clovers. It is common at Horoka Tomamu. It grows in Britain too, which is how I am able to provide the inset photo of its flowers, which appear in spring, much earlier in the year than my autumn visits.



Main photo: Horoka Tomamu Montane Forest, Hokkaido, 09/2016. Inset photo: flowers in spring in Britain.

***Pachysandra terminalis* フッキソウ Japanese spurge**

This is one of the commonest ground layer species at Horoka Tomamu. It is easy to recognize because its short upright shoots have widely spreading evergreen leaves of a thick and smooth-surfaced texture. The leaf margins have a few shallow, blunt teeth. There is a short spike of small white flowers at the top of the stem. It is common to see many upright shoots of this species growing together to form carpets varying from open to quite dense. *P. terminalis* grows here on ground varying from steep and well drained to level and damp, and is evidently shade-tolerant as it can grow sparsely among quite dense *Sasa senanensis*.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Parasenecio hastatus* ヨブスマソウ**

A distinctive herb because it is tall and has large triangular leaves whose outer corners project to either side as lobes. The leaf also continues very narrowly (as a pair of 'wings') down either side of the long leaf stalk. The flowers are small and whitish and grow in branched heads at the stem tips.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Paris tetraphylla* ツクバネソウ four-leaf paris**

The short upright shoots each have a single whorl of 4 oval leaves at their top. In summer the flower, on a stalk arising from the middle of the leaf whorl, is large and green. This species was found only rarely at Horoka Tomamu, on shady banks in the NW. The related *P. verticillata* was also recorded at this site before my visits, but I have not seen it here. It has leaves in whorls of 5 to 8.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Peracarpa carnosa* タニギキョウ fleshy peracarp**

A small, delicate herb of damp ground at Horoka Tomamu, its stalked, round-triangular leaves have sparse hairs on their upper surface and in summer the flowers are small, white, 5-petalled and borne singly on relatively long stalks at the shoot tips.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Petasites japonicus* アキタブキ giant butterbur**

No other plant species at Horoka Tomamu has such huge heart-shaped leaves as this one. The leaves are on long, thick, rhubarb-like stalks. *P. japonicus* grows here mainly on damp, more or less level ground along the western edge of the site.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016 (upper photo) and 10/2018 (lower photo)

***Rubus idaeus* エゾイチゴ raspberry**

This undershrub, found sparsely at Horoka Tomamu, has woody stems with straight prickles and leaves with 3 or 5 leaflets with very pale whitish-green undersides. Inconspicuous whitish-green flowers in spring become edible red raspberries in summer.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Rubus pseudojaponicus* ヒメゴヨウイチゴ**

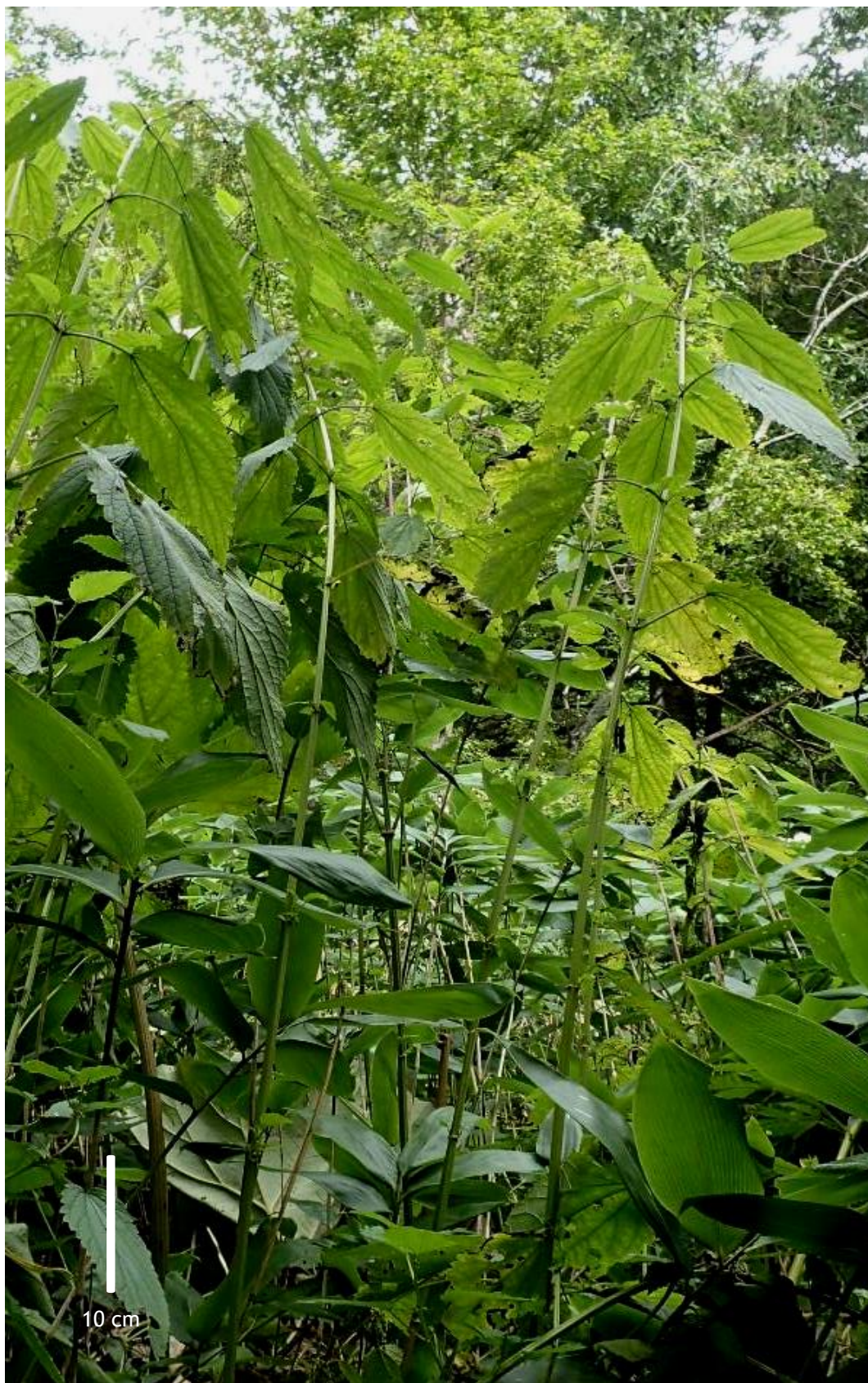
The low, creeping stems of this species have leaves with 5 leaflets arranged in a star-like manner. In summer there are white flowers which develop into red, raspberry-like fruits. *R. pseudojaponicus* was found on sheltered banks in the NW of Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Urtica platyphylla* エゾイラクサ Ezo nettle**

A tall plant to be wary of because of the stinging hairs on its oval, toothed, long-stalked opposite leaves. The tiny greenish flowers grow in small, rather inconspicuous spikes (like catkins) at the points where leaf stalks leave the stem (i.e. in the leaf axils). This nettle grows quite commonly on damp, low ground along parts of the western edge of the sit at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Viola selkirkii* ミヤマスミレ Selkirk's violet or great-spur violet**

A small plant easily recognized by the variegated dark green and light green patterning on its heart-shaped leaves. The flowers are typical of violet flowers in general (purple with 5 petals) but they were gone at the time of my surveys at Horoka Tomamu. *V. selkirkii* is widespread and common here.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016 (above) and 10/2018 (below)

Why have I shown two photos so similar to each other? 1. Well, it must be OK because other people do it. For example, popular newspapers and magazines freely and happily present us with sequences of several near-identical photos of this or that celebrity out shopping or partying. So I'm told. How else would I know? 2. The lower photo is actually different because there is moss in it too, and we should not ignore mosses - which leads us on to the next page and the next section of this document...

MOSSES

Anoetangium aestivum ネジレラッキョウゴケ

This moss forms dense, compact, bright yellow-green cushions on some steep rock faces on the lower slopes in the NW of Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

Anomodon giraldii オオギボウシゴケモドキ

When I found this moss, on a willow trunk by the river, I thought it might be a species of *Isoetecium*. Do you know about *Isoetecium*? Maybe not. More than likely you'd never heard of *Isoetecium* until now. So why am I telling you this? Especially as I was wrong anyway. It wasn't *Isoetecium*. It was (and still is, of course) *Anomodon giraldii*. OK - basically, *Isoetecium* mosses have a tufted, bushy growth form and that's what this moss has and that's what fooled me. I'm sorry. It won't happen again.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Anomodon minor* ギボウシュゴケモドキ**

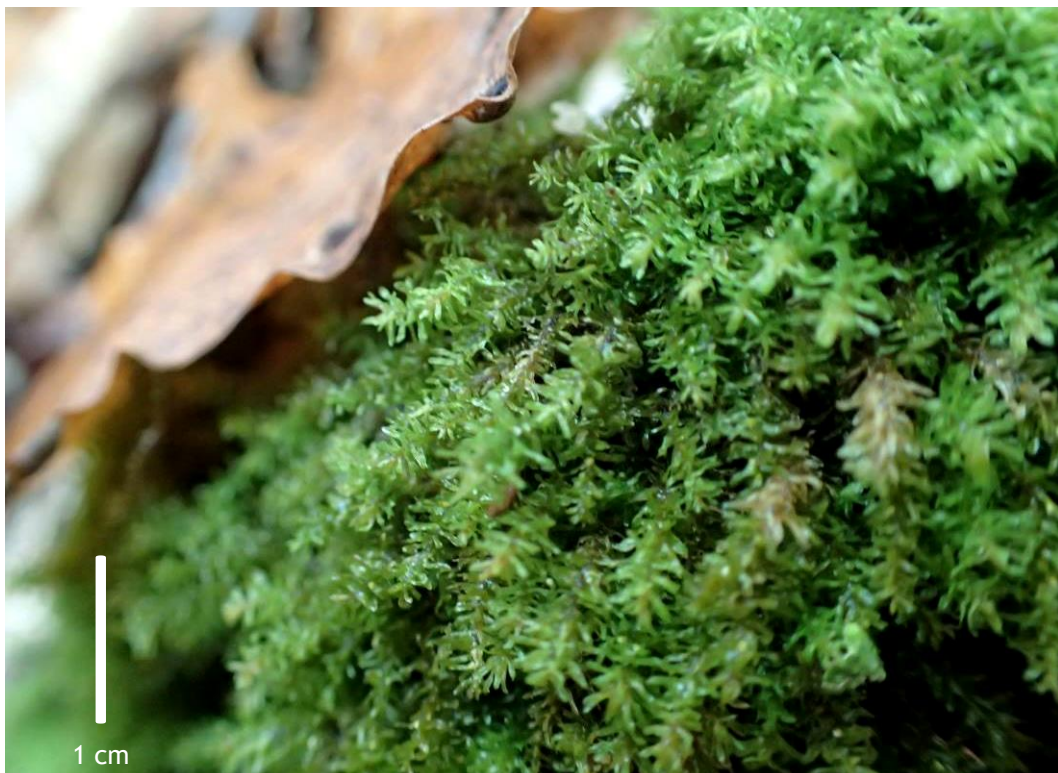
A little moss that grows on trees and has a creeping main stem from which lots of very short branches grow out sideways. That's fine, but you could say the same about some other mosses that grow on trees here... except that those other ones don't have leaves as blunt as this one. Unfortunately the leaves are so small that you can't see their blunt tips in this photo. Well, don't be surprised. It's called *minor*, which means small.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Anomodon rugelii* エゾイトゴケ**

See that oak leaf at the top left? That shows how small this moss is. But compared with some other mosses it's not *that* small. It's bigger than *A. minor* (see above). It grows on trees at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Atrichum undulatum* ナミガタタチゴケ**

A large moss, and easy to identify. See those long leaves sticking out in all directions? Even in this photo you can make out an alternating light and dark pattern along some of them. That's because the leaf surface is wavy on a very small scale - hence the name *undulatum*. This species is common on the ground at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Aulacomnium heterostichum* ナガミチョウチンゴケ**

Another large and easy moss. Like the last one it has little folds and undulations on the leaves, giving a light/dark patterning. But the leaves are blunt and they spread out in a way that looks like each shoot has been flattened a bit (top and bottom surfaces pressed together). A common moss here on steep, rocky and soily banks.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Bartramia pomiformis* タマゴケ**

See how round this big cushion of moss is? And how round its little capsules are? Each capsule held like a tiny ball on a long, thin stalk, well clear of the big green ball of leaves. Like a planet with lots of satellite moons. Welcome to the World of *Bartramia pomiformis*! Where is this World of *Bartramia pomiformis*? On steep, rocky banks above the river at Horoka Tomamu. And, even better, there's probably another World of *Bartramia pomiformis* somewhere near you too!



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Boulaya mittenii* チャボスズゴケ**

The creeping main stems go all over the place in long, curvy lines on tree trunks and have masses of ridiculously short side branches whose leaves stick out when wet and fold in when dry. It is common on trees at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Brachythecium brotheri* アラハヒツジゴケ**

The widely spreading leaves give this large, irregularly branched, yellowish green moss a distinctive spiky or fuzzy appearance. It grows on the ground at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Bryhnia novae-angliae* ヤノネゴケ**

A fairly large, well branched moss that is common on shaded, sheltered banks at Horoka Tomamu. It grows in many other parts of the world (including New England, hence '*novae-angliae*').



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Bryonoguchia molkenboeri* ホンシノブゴケ**

If branches are what you're into, you'll love this moss (growing here on banks, tree bases and dead wood) because not only does it have a great many side branches sticking out in all directions from its long, stiff main stem, but those side branches also have lots and lots of much smaller branchlets of their own. Each stem, branch and branchlet has many tiny leaves growing all the way along it. See how small those little branchlets are... and then just think how incredibly tiny its leaves must be. What? You're not into branches? Ah - you mean you *weren't*, but you are *now*. (You probably already were anyway, but just didn't want to admit it.)



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Bryum pseudotriquetrum* オオハリガネゴケ**

Have you ever found yourself trying to think of something to say about something and just not getting anywhere? That is the situation I'm in right now, and the 'something' subject in question is this little moss. I could say "it's got relatively large oval leaves spreading out in all directions, each leaf with a central narrow line running from its base to its tip, like a vein, but not a vein, because mosses don't have real veins like those seen in flowering plants" but you can see that just by looking at the photo. Or I could say "its stems are unbranched, and it grows on wet banks by the river at Horoka Tomamu", but that wouldn't be a very gripping or inspiring sentence.

What would you say?...

See! Difficult, isn't it!

Photo taken at Horoka Tomamu Montane Forest, Hokkaido, 10/2018



***Calliergonella lindbergii* エゾハイゴケ**

This large, yellowish-green moss has reddish stems (with a few side branches) and leaves curved over to one side. It likes damp or wet places. In Britain we see it growing mainly as upright shoots on level, damp ground. At Horoka Tomamu I have found on sloping rocky banks by the river. Its shoots here looked very different from those I've seen in Britain, because they were growing out sideways or even slightly downwards. So - that difference in orientation might be something to do with Japan and Britain being on different sides of the world?



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Climacium dendroides* フロウソウ**

This moss has a tree-like growth form with many branches growing out from near the top of an upright main stem. It look especially like a miniature palm tree. The inset photo shows a side view (main stem longer than it looks because its lower part is hidden). This species grows on low, level, damp ground at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Climacium japonicum* コウヤノマンネングサ**

This is similar to *C. dendroides* (see above) but the main stem curves to one side at the top and the branches are curved and taper gradually to thinner, more pointed ends because the leaves get smaller toward the branch tips. I found it only once at Horoka Tomamu, on low, damp ground in the west.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Cratoneuron filicinum* ミズシダゴケ**

A medium-sized moss whose shoots have many side branches closely spaced along left and right sides of the main stem and becoming shorter toward the stem tip - hence the triangular shape to the shoot as a whole. The leaves taper to fine, narrow points and have a tendency to curl in a downward-pointing direction. At Horoka Tomamu *C. filicinum* grows on steep, wet banks above the river in the west of the site.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Dichodontium pellucidum* シメリイワゴケ**

There are patches of this small moss on many damp or wet rocks in and by the river at Horoka Tomamu. The patches are made up of many short, unbranched shoots bearing narrow leaves that spread out widely or curl slightly to one side. The leaf tips are rather blunt, with a few tiny teeth (visible through a hand lens).



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Dicranum flagellare* ヒメカモジゴケ**

The dense patches and cushions of this moss have rather long, very narrow leaves, and at the tips of the main stems there are little groups of much smaller, very straight shoots with tiny leaves on them. These smaller shoots break off the plant easily (so they can grow into new plants where they land). *D. flagellare* grows on trees at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Dicranum scoparium* カモジゴケ**

This moss is conspicuous as cushions with long, very narrow bright yellow-green leaves. Most leaves are curved to one side of the shoot. *D. scoparium* is common on trees, logs and the ground at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Dicranum viride* var. *hakkodense* タカネカモジゴケ**

I found this species only once at Horoka Tomamu - on the trunk of a tree (*Ulmus davidiana*) by the river. It forms dense patches and cushions. Its leaves are very narrow, with tips that are pointed but fragile, so they break off easily to leave the leaf a bit shorter and with an abruptly square-cut end.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Fissidens dubius* トサカホウオウゴケ**

Leafy liverworts differ from mosses in having their leaves in two rows, to the left and right of the stem, except for the genus *Fissidens* whose leaves are in two rows too. Each shoot of *Fissidens* looks like a tiny leaf from a tree such as *Fraxinus*, *Juglans* or *Phellodendron*. *F. dubius* is common on rock and soil at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Forsstroemia trichomitra* スズゴケ**

This dull green moss, found on a tree trunk at Horoka Tomamu, has shoots that stick out noticeably from the trunk in the manner of *Neckera* species (see below) but with the shoots narrower and not flattened. The projecting stems have shorter side branches, and the leaves on both stems and branches are narrow oval and pointed.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Helodium sachalinense* カラフトシノブゴケ**

The main stems and the many closely-spaced side branches of this moss have narrowly pointed leaves, and the side branches become shorter toward the stem tip (as in many other branched mosses). This species grows on the ground at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Homalia trichomanoides* ヤマトヒラゴケ**

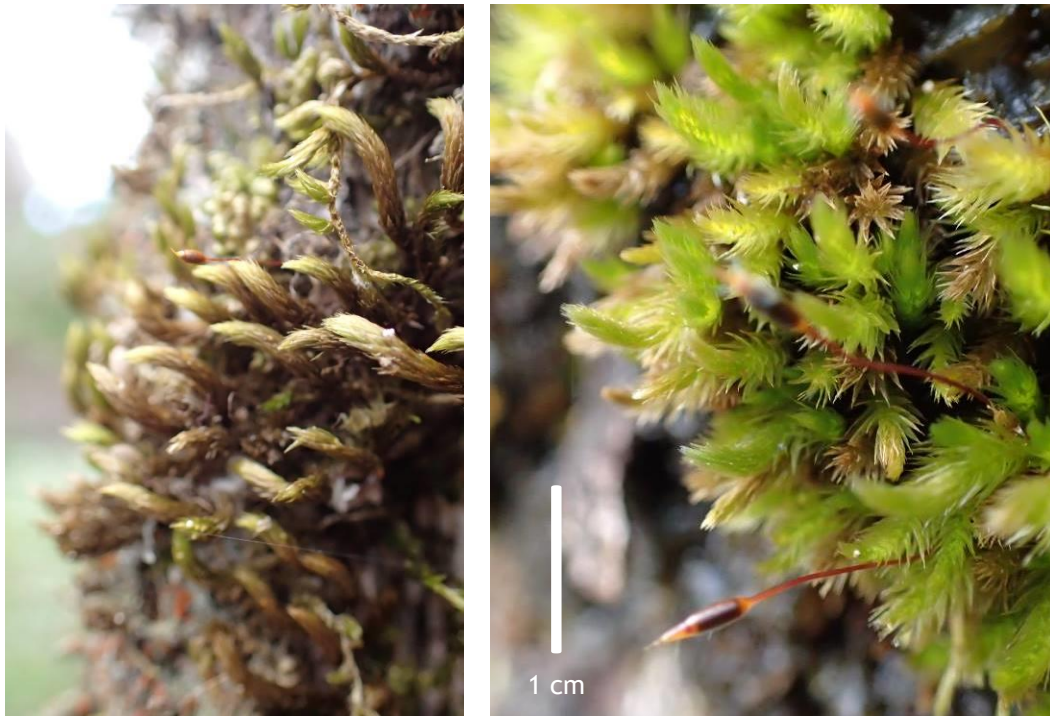
The shoots of this moss are so flattened, and the leaves so wide and blunt, that we could easily mistake it for a leafy liverwort. However, when looking close we can see that it is actually a moss because its leaves are not arranged in two strict (left and right) rows. *H. trichomanoides* is common on rocks, trees and soil at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Homalothecium laevisetum* アツブサゴケ**

This moss has creeping main stems from which shorter branches stick outwards. It forms large patches on some trees at Horoka Tomamu. When dry, the branches curve upwards and their narrow, pointed leaves are folded inwards (left photo), but when wet the branches are straighter and their leaves stick out (right photo).



Horoka Tomamu Montane Forest, Hokkaido, 10/2018 (left = dry; right = wet)

***Hygrohypnum eugyrium* タカネシメリゴケ**

A medium-sized, dull to brownish green moss whose irregularly branched shoots have oval, pointed leaves that are mostly curled in one direction. At Horoka Tomamu this species grows on wet rocks by the river.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Hylocomium splendens* イワダレゴケ**

This species, which grows on some tree bases, logs and banks at Horoka Tomamu, is unmistakable because of its intricate branching (the branches have their own branchlets, some of which have their own tiny sub-branchlets) combined with the red colour of the stems and branches. *Thuidium* species can look similar but their stems and branches are green or brown or blackish, and not red.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Loeskeobryum cavifolium* フトリユウビゴケ**

A big moss whose stems and branches are red and whose branching pattern is irregular. It can resemble *Pleurozium schreberi* but its leaves are pointed (blunt in *Pleurozium*). It is common on the ground at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Mnium lycopodiodes* ナメリチョウチンゴケ**

The small, unbranched shoots of this moss have a delicate look with their rather well spaced, narrow oval leaves with pointed tips and toothed edges. At Horoka Tomamu this species does not form large patches; it grows as small tufts and scattered shoots among other mosses on steep, moist, shaded banks.

Photo taken at Horoka Tomamu Montane Forest, Hokkaido, 10/2018



***Myuroclada maximowiczii* ネズミノオゴケ**

Found here in small quantity and mainly on tree bases, this moss is unmistakable because its blunt, concave leaves are overlapping and do not stick out; this gives the shoots a strange tubular or worm-like look.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Neckera pennata* ハネヒラゴケ**

Most mosses of the genus *Neckera* have their shoots flattened, so that their width is much greater than their depth from upper surface to lower surface. Hence they can look like flattish plates sticking out from the bark or rock surface on which they grow. *N. pennata* also has lots of tiny undulations on its leaves (see light/dark patterning in inset photo). It grows on trees at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Neckera yezoana* エゾヒラゴケ**

This species looks a bit like *N. pennata* but its shoots are less strongly flattened and its leaves do not have such obvious undulations along them. Like *N. pennata* it grows on trees at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Orthotrichum sordicum* タチバヒダゴケ**

This moss and *Uloa* species grow as little tufts or cushions on tree trunks at Horoka Tomamu. *O. sordicum* has its capsules held low and half-hidden among the leaves, while *Uloa* capsules are on longer stalks so that they are held clear of the leaves.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Plagiomnium cuspidatum* ツボゴケ**

The stems of this moss have very few side branches but the leaves are quite large: broad oval with pointed tips and lots of tiny teeth along their edges. The leaves are also quite translucent. These leafy stems are also quite long and grow in a creeping manner, forming loose patches on damp ground and banks at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Plagiomnium rostratum* オオバチヨウチンゴケ**

Like *P. cuspidatum* (see above) this is a large moss with long, trailing stems bearing large oval translucent leaves. The leaves are larger and blunter-tipped than those of *P. cuspidatum*. *P. rostratum* is common on damp to wet ground at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Plagiothecium nemorale* エゾサナダゴケ**

Plagiothecium species have flattened shoots with leaves spreading out widely to the left and right of the stem, as in *Neckera* but with the shoots tending to point downwards or close to the substrate (instead of sticking out as in *Neckera*). The shoots have very few side branches. *P. nemorale* is quite common on sheltered banks at Horoka Tomamu. Its leaves are oval and slightly glossy, tapering to pointed tips.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Plagiothecium neckeroideum* オオサナダゴケ**

This species has the flattened, little-branched shoots typical of the genus and is separable from other *Plagiothecium* species by its downward-pointing shoots being drawn out into very long, finely-tapering ends (because the oval, pointed leaves become smaller and smaller toward the shoot tips). This growth form of long, drawn-out shoot tips is more typical of mosses in warmer subtropical forests in southern Japan where it is shown by many other species as well as this one, so its occurrence here in *P. neckeroideum* might be an expression of some aspect of warmth (summer temperatures?) in the otherwise colder environment of the Hokkaido forests.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Pleuroziopsis ruthenica* フジノマンネングサ**

As with *Climacium*, this moss has a tree-like growth form with an upright main stem dividing near its top into many branches. The branches have their own smaller branchlets, giving an even more tree-like look. *P. ruthenica* grows on some tree bases and large old logs at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Pleurozium schreberi* タチハイゴケ**

Compared with the last species, this is more of an 'ordinary' moss with simpler branching. Its stems and branches are red and its leaves are blunt. It is a large moss whose shoots form patches on banks, logs and tree bases at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Pogonatum contortum* アオスギゴケ**

This moss has medium-sized unbranched shoots with long, narrow, pointed, opaque, mid green leaves with a thick, stiff texture (like miniature conifer leaves) and toothed edges. Some shoots are rather flattened, with their leaves spread out mostly to the left and right sides. *P. contortum* grows on shaded banks at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Pogonatum inflexum* コスギゴケ**

This resembles *P. contortum* (see above) but with greyer and more widely spreading leaves, and with capsules with white, hairy outer coverings. This species grows on steep banks above the river at the northern edge of Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Pohlia wahlenbergii* チョウチンハリガネゴケ**

The slender shoots of this moss have small, narrow, pointed leaves of a distinctive pale bluish-green colour. This species was found only once in this survey at Horoka Tomamu: on a wet, shaded, overhanging bank in a gully.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Polytrichastrum formosum* オオスギゴケ**

A large moss whose unbranched shoots have long, narrow, pointed leaves with toothed edges and a stiff, thick texture rather like that of conifer leaves. *P. formosum* was found in small quantity with other big mosses on a large old log at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Pylaisiella subcircinata* マキハキヌゴケ**

The long, creeping shoots of this moss have branches whose narrow, pointed leaves are curled to one side, so a part of each little branch reflects the light so that the whole plant has a ‘bobbly’ look. This species is quite common on trees at Horoka Tomamu. Capsules are common and conspicuous.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Raiiella fujisana* パンダイゴケ**

This species is common at Horoka Tomamu. Its shoots creep on tree trunks and have many side branches bearing tiny, short, pointed leaves (too small to see without a hand lens). The shoots can be well spaced out, as in this photo, or they can grow more densely as thin mats.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

Rhizomnium punctatum セイタカウチワチョウチンゴケ

The most distinctive feature of this moss is the large size and broad oval to roundish shape of the leaves. The leaf tapers out from a narrow base to a wide middle and a very blunt tip. There is a pale line along the whole length of the leaf margin. The capsules are large and hang downwards at the top of their long, thin stalks. *R. punctatum* grows at Horoka Tomamu on moist to wet ground and banks near the river and in gullies. In this photo it is seen growing with *Thuidium tamariscinum*.

Photo taken at Horoka Tomamu Montane Forest, Hokkaido, 10/2018



Rhizomnium striatulum スジチョウチンゴケ

This looks like a small version of *R. punctatum* (see above) though the capsule stalk can be longer than in that species. There is a tiny point at the otherwise very blunt leaf tip. It was found at Horoka Tomamu on soil and on dead wood.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Rhynchostegium pallidifolium* コカヤゴケ**

This large, irregularly branched moss would be quite nondescript if it were not for the way in which its shoots are flattened with the oval, pointed leaves sticking out mostly to the left and right sides (forming the wider shoots in this photo; the narrower shoots growing with are of *Bryhnia novae-angliae*). It is common at Horoka Tomamu, on the ground, on rocks, on tree bases and on dead wood.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Rhytidiadelphus triquetrus* オオフサゴケ**

A large, irregularly branched moss whose shoots are very thick and dense-looking because leaves are large (wide triangular) and closely spaced. The main stem is a reddish colour. *R. triquetrus* is quite common on the ground in parts of Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Saelania glaucescens* アオゴケ**

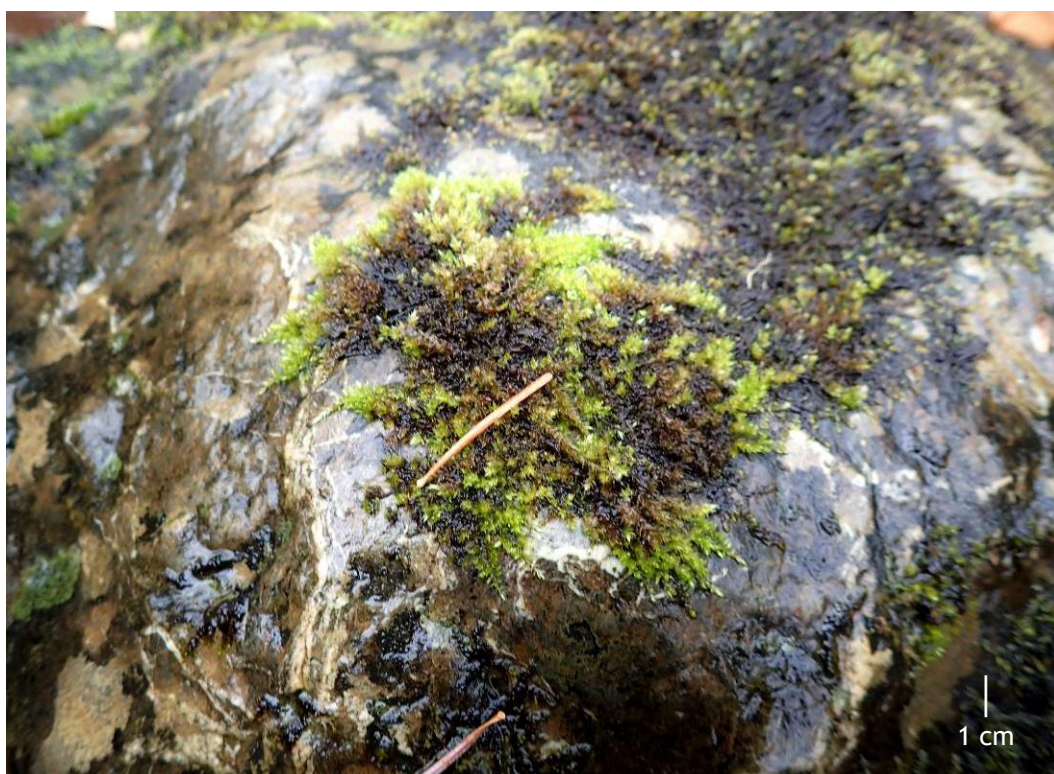
This moss forms dense patches and cushions and catches the eye because of the pale bluish-green colour of the small, narrow, pointed leaves that grow on its massed unbranched shoots. Capsules (long and narrow cylindrical) are common. This species was found in a few places at Horoka Tomamu, growing on rock, soil and dead wood.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Sciuro-hypnum plumosum* オオハネヒツジゴケ**

A large and irregularly branched golden-coloured moss (with older parts of shoots going very dark) on rocks in and by the river along the western edge of Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Taxiphyllum aomoriense* アオモリサナダゴケ**

A medium-sized moss with branched shoots that were found at Horoka Tomamu creeping low on the surface of some dead wood. The shoots are quite wide, flattened, and have overlapping leaves that are glossy and have their tips curled downwards. This combination - flattened; glossy; curled downwards - makes the species easy to identify.

Horoka Tomamu Montane Forest, Hokkaido, 10/2018



***Thuidium delicatulum* コバノエゾシノブゴケ**

This and the next species are large and very distinctive mosses because their shoots are divided multiple times into very fine, delicate pattern and their colour is typically yellowish-green. The leaves on the little branches and branchlets are so tiny that they cannot be seen properly without a hand lens. *T. delicatulum* is common at Horoka Tomamu, on moist ground, on banks and among rocks.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Thuidium tamariscinum* オオシノブゴケ**

This is similar to, but slightly larger than, *T. delicatulum* (see above) but is best separated from that species by checking details of the leaf tips through a microscope. *T. tamariscinum* is common at Horoka Tomamu, on the ground, among rocks and on some old logs.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Trachycystis flagellaris* エゾチョウチンゴケ**

The unbranched shoots of this moss grow massed together to form patches, that can be large, on tree trunks. The leaves are broad oval and spread out in all directions, but as mosses go, this one looks pretty crazy because of the tufts of tiny, very thin shoots (bearing almost invisible miniature leaves) arising from the tips of the main shoots.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Ulota crispa* カラフトキンモウゴケ**

Small, cushion-like tufts of moss looking more or less like the one shown in this photo are common on tree trunks at Horoka Tomamu, and most of them belong to this species. The narrow, pointed leaves of *U. crispa* are straight when wet but curly when dry, and the little capsules are held (on stalks of course - they can't hold themselves up on their own) just above the tips of the leaves. *Orthotrichum sordicum* looks similar but its capsules are lower down among the leaves, which don't go curly when dry.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Ulota drummondii* ナガサヤキンモウゴケ**

This looks similar to *U. crispa* (see above) but instead of having all shoots sticking out there are some sticking out and many others creeping (and branching) outwards around the edges of the patch. Also, the leaves don't go curly when they're dry.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

LIVERWORTS

Bazzania denudata タマゴバムチゴケ

The name *denudatum* refers to the way that many of the leaves of this leafy liverwort fall off to leave parts of the stems bare and denuded of leafy growth. The leaves are rectangular with 3 shallow teeth along the otherwise straight, wide tip. *B. denudata* grows on rotting logs in the northern and western parts of Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

Blepharostoma trichophyllum マツバウロコゴケ

The minutely slender pale green shoots of this leafy liverwort can be seen growing among larger liverworts and mosses in this photo. Its leaves are deeply divided into 3 or 4 very thin lobes. This species grows on moist, sheltered mossy banks in the NW part of Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Chiloscyphus polyanthos* フジウロコゴケ**

This leafy liverwort has creeping shoots whose leaves, in two rows on the left and right (some of them in almost opposite pairs), are a simple, roundish-oval shape and of a dull pale green colour. *C. polyanthos* grows on moist to wet rocks in the north and west of Horoka Tomamu, especially along the course of the river.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

Cololejeunea macounii

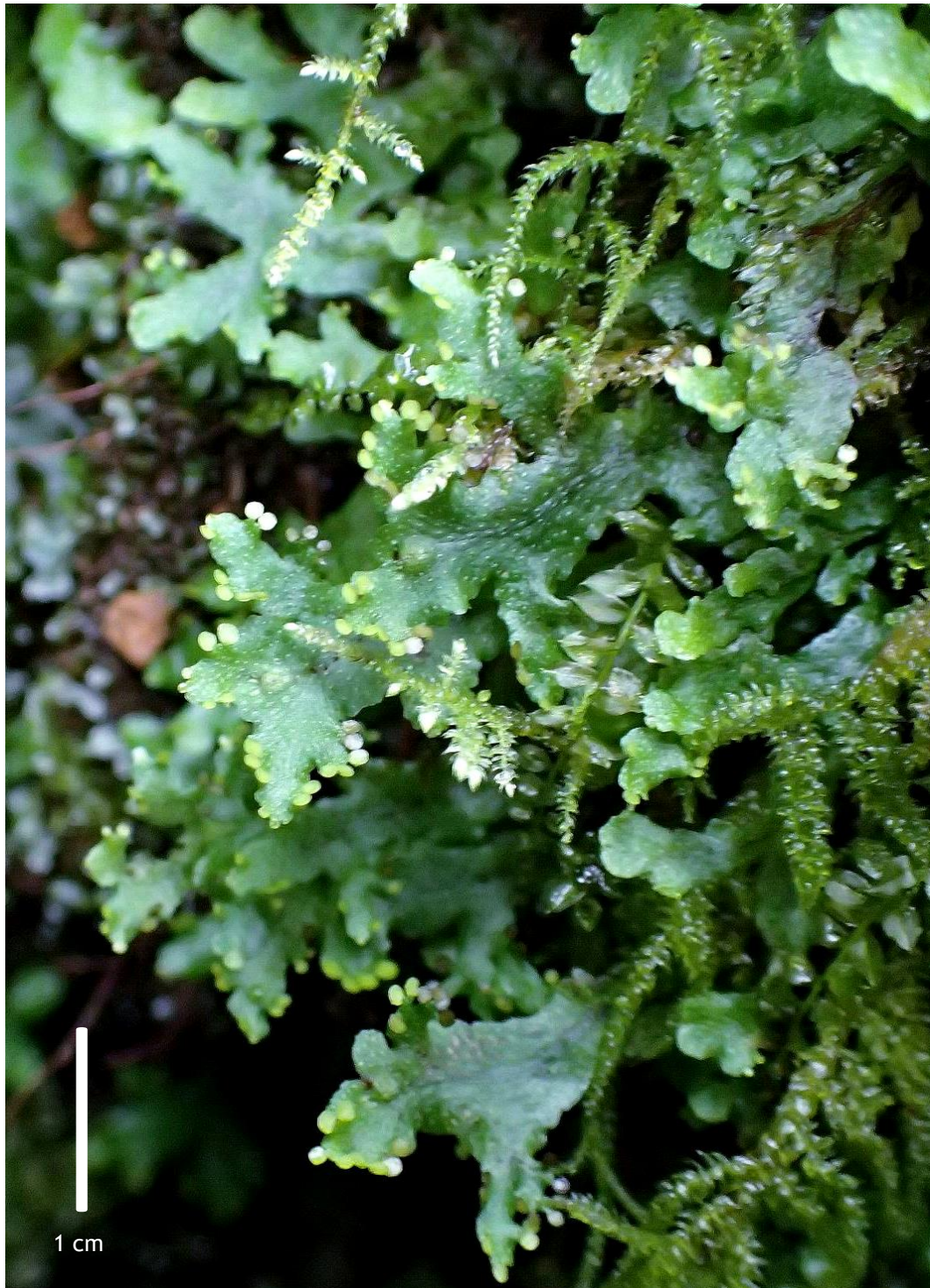
Small patches of this leafy liverwort grow on some tree trunks in humid, sheltered situations in the northern part of Horoka Tomamu. The shoots are narrow and branched, and bear tiny oval overlapping pale green leaves.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Conocephalum japonicum* ヒメジャゴケ**

This rather large liverwort is a thalloid species. Thalloid means that instead of having a stem with leaves, as in mosses and leafy liverworts, there is just a single flattened thallus whose branching is in the form of broad lobes. (Now you know what I meant by 'leafy liverwort' in the text for each of the last four species. I could have said earlier, but this is a better place because you can see what the 'non-leafy' alternative is and understand it all better. That's my excuse, anyway.) This growth form is shared by other thalloid liverworts, with some variation between species in terms of the width, thickness, surface texture and degree of opacity of the thallus. In *Conocephalum* the thallus is quite thick and opaque. *C. japonicum* has tiny pale dots on the upper surface and is especially distinct with the roundish, pale yellowish dots (gemmae) that adorn the outer thallus margins. At Horoka Tomamu this species grows on steep, moist, shaded, sheltered banks, especially above the river in the north and west.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Conocephalum salebrosum* タカオジャゴ**

This is a very distinctive thalloid liverwort because it is so big and has a 'snakeskin' type of patterning over its leathery-textured upper surface. As with *C. japonicum* (see above) it grows at Horoka Tomamu on steep, moist, shaded, sheltered banks, mainly above the river in the north and west.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Frullania muscicola* カラヤスデゴケ**

This is one of four species of *Frullania* that I have found on trees at Horoka Tomamu. They are leafy liverworts and all look similar until examined very closely with a hand lens or a microscope. They all have branched shoots with dark brownish to purplish, overlapping, scale-like leaves, so as a group of species they are very distinctive indeed.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Lepidozia reptans* ハイスギバゴケ**

The green patches or mats of this leafy liverwort, found on dead wood at Horoka Tomamu, are made up of a dense growth of many shoots with narrow branches bearing overlapping leaves that are divided deeply into 3 or 4 narrow lobes. Each leaf looks a bit like a miniature hand. *Blepharostoma trichophyllum* (see above) has a rather similar growth form but with its leaf lobes much narrower.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

Lophocolea bidentata トガリバトサカゴケ

The leaves of this leafy liverwort grow in two rows (left and right) along the stem and are a pale, translucent green colour. They are rectangular and end with two big lobes. Each lobe tapers to a long, fine point. The flattened shoots creep over the surfaces of dead wood at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

Lophocolea heterophylla

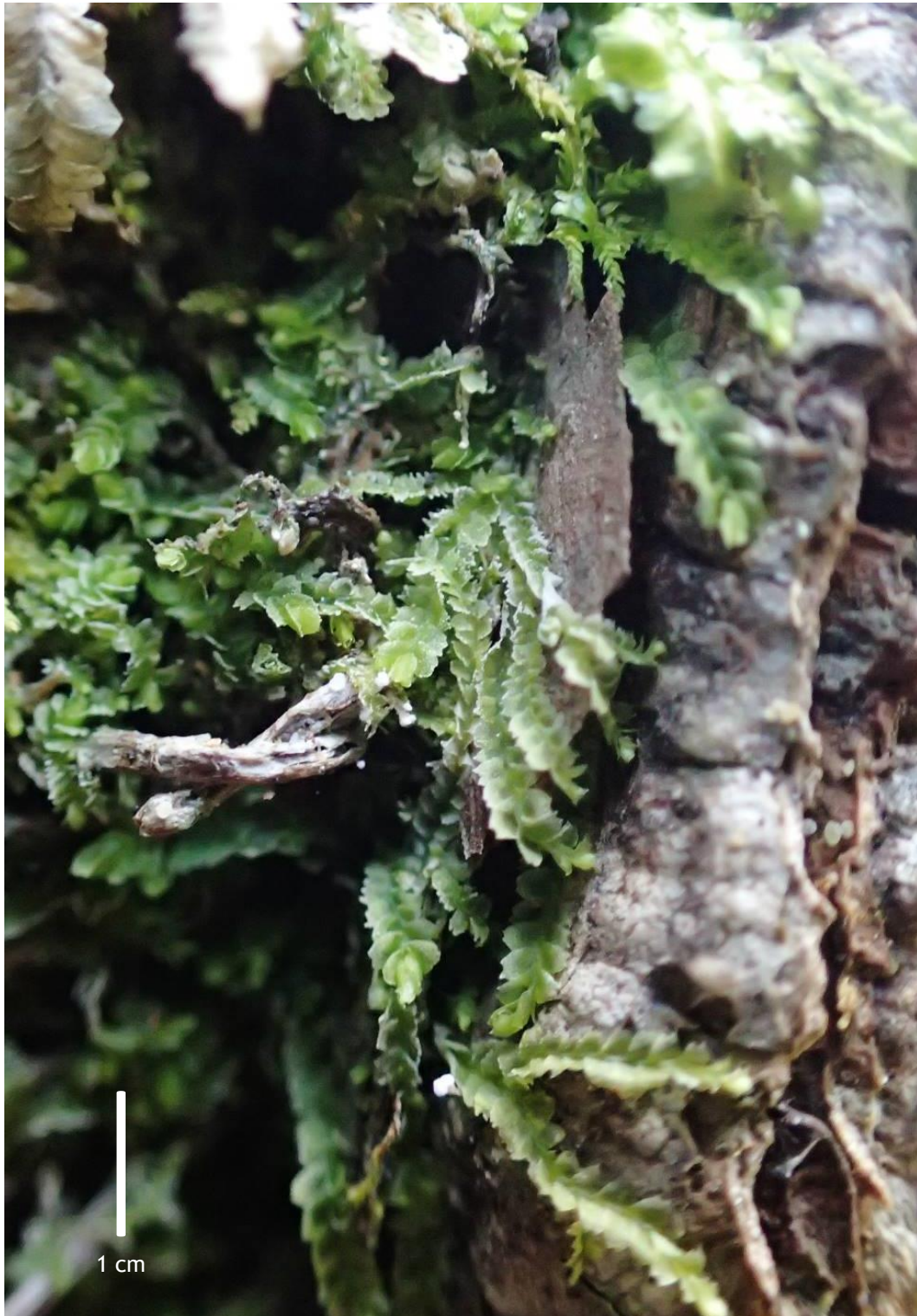
This leafy liverwort species looks a lot like *L. bidentata* (see above) and grows in the same type of dead wood habitat at Horoka Tomamu. It differs from *L. bidentata* in that its leaves are more varied in shape. Toward the ends of the shoots they have two lobes as in *L. bidentata* (but with the lobe tips a bit shorter and not drawn out into such long, fine points), but lower down (or, you could say, further back) they become a more simple rectangular-oval shape without lobes.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

Lophocolea minor

This small leafy liverwort, found on some trees and rocks at Horoka Tomamu, is a bit like *L. bidentata* in having each leaf ending in two pointed lobes, but is smaller, its leaf lobes are not drawn out into such long fine points, and many of the leaves have roughened, pale, powdery-looking edges made up of lots of tiny pale dots. These dots and powdery bits are called gemmae. They have the potential, if they break off and are so lucky as to land in the right sort of place at the right time, to grow into new plants. Many liverworts and mosses have gemmae as a means of reproduction. I suppose I should have told you that earlier when we saw the pale yellow gemmae on *Conocephalum japonicum*, but... Oh well, at least you know now.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

Moerckia erimona

This thalloid liverwort is much more translucent than the *Conocephalum* species described above. Its thallus is wavy and strap-shaped, with parallel edges and a definite thickened line running all along the middle. It was found in this survey at Horoka Tomamu on steep moist banks in a gully on the western slope.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

Plagiochila ovalifolia

This medium-sized leafy liverwort has shoots that stick out from the rock or bank surface on which it grows (unlike the creeping shoots of *Lophocolea* and *Chiloscyphus*). The wide oval to roundish leaves have very tiny teeth on their edges. At Horoka Tomamu *P. ovalifolia* grows on steep, sheltered banks above the river and in gullies.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Porella fauriei* ケクラマゴケモドキ**

The branched shoots of this leafy liverwort have lots of small, scale-like, glossy brownish-green leaves that are so closely overlapping as to give a slightly tubular look to each shoot. On the underside there are also additional leaf lobes and underleaves that form a dense and complicated pattern when seen from below. *P. fauriei* grows on trees and rocks at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Porella grandiloba* オオクラマゴケモドキ**

This looks like a bigger version of *P. fauriei*, with wider, looser and less tubular-looking shoots and leaves that spread out widely to each side. It grows on trees at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Radula complanata* ヒラケビラゴケ**

This leafy liverwort has shoots that creep closely over the surfaces of bark on tree trunks. The shoots are wide, with roundish, overlapping, scale-like, pale green leaves, so it can look like a large, pale green version of *Frullania* (see above). In this photo, *R. complanata* is seen growing with the moss *Pylaisiella subcircinata*: *R. complanata* is dominant in the centre of the photo and *P. subcircinata* dominant to the left.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

Riccardia multifida

This thalloid liverwort species shows how divided up a thallus can be - with lots of small, narrow, parallel-sided branches but still no differentiation into separate stems and leaves. On very close inspection the edges of each branch of this species are seen to be paler than its other parts. At Horoka Tomamu *R. multifida* was found on steep, wet banks in one of the gullies. In this photo it is accompanied by a few shoots of the moss *Mnium lycopodioides* (visible in the lower-right quarter).



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

LICHENS

Lichens are abundant on trees at Horoka Tomamu but have not yet been surveyed here. I am not a real lichenologist and cannot identify the majority of species, especially the smaller 'crustose' ones that can look as though a thin layer of paint has been applied to a tree trunk or a rock. Here are photos of the lichens that I have been able to name to the level of either an individual species or a small group of closely related and very similar-looking species.

Lichens are not 'proper' plants. (Sorry - I shouldn't have said 'proper' just then, because it is quite unfair to those innocent and perfectly respectable lichens!) Each lichen is actually a mixture of a fungus and an alga growing together. This makes them extraordinary and fascinating organisms, and makes us have to think a bit differently about the concept of a species. Lichens are typically named after the fungus element, which forms the major part of the organism.

Caloplaca flavorubescens カフトゴケ

This species is common on trees at Horoka Tomamu, and can be recognized by its 2-coloured patches appearing like a patch of thinly applied dull yellowish paint over which are scattered many orange circles.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

Cetrelia chicitae コフキトコブシゴケ

The leafy-looking lobes of this lichen are pale greenish grey on their uppersides and mid brown beneath. There is a dusting of a powdery substance (soredia - tiny reproductive structures) along the edges of many of the older lobes. *C. chicitae* grows on trees at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

Cladonia coniocraea ヤリノホゴケ

This is one of many pale greyish-green lichens with upright columnar structures (podetia) arising from a base of small scales (squamules). *C. coniocraea* was found on dead wood and tree bases at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

Cladonia squamosa ウロコハナゴケ

This looks rather like *C. coniocraea* (see above) but with the upright columnar podetia covered in projecting scales. It was found on a mossy tree trunk at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

Heterodermia isidiophora コウヤクゴケ

This is one of many pale greenish-grey lichens that have branched lobes radiating out from the middle, to form plate-like structures on tree trunks. This particular species has rows of very tiny upward-projecting cylindrical structures (called isidia) along the edges of the lobes. These isidia can break off and, with luck, grow into new lichens.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

Heterodermia obscurata/japonica/tremulans

This looks like *H. isidiophora* (see above) but without the upward-projecting isidia along the lobe margins. Instead, it has clusters of a powdery texture at many of the lobe tips; these are clusters of soredia which, like isidia, have reproductive potential. Details of the specimens I photographed are such that I cannot pin the lichens down to an individual species, so I have named them down to a group of three species.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

Leptogium* species: possibly *L. saturninum

I had thought that this blackish lichen, found on trees at Horoka Tomamu, was *Collema subflaccidum*, but then Dr Brian Coppins said it might be a species of *Leptogium*, possibly *L. saturninum*. Heck! What should I do? Answer: agree with him. Not because he'd throw a fit if challenged. (He wouldn't.) It's because he's about as top as you can get among lichen experts. "Mr Lichen International". Sorry - "**DR** Lichen International"! Of course, this is all hugely inconvenient because I've now had to move this picture and text onto a different page in order to maintain the alphabetical ordering of species. Such a fuss over a bit of black stuff! Maybe I shouldn't have bothered in the first place. Could have just left it out. I mean, it's not even like it's a proper moss or anything. Maybe it just doesn't really belong here anyway...



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Lobaria fuscotomentosa* ウラグロエビラゴケ**

This lichen has a thick texture and its large lobes are closely appressed to the tree trunk. The thallus surface is smooth but with patches of small parallel wrinkles, like groups of miniature waves. The photographed specimen is dry; when wet it is brighter green.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Lobaria pulmonaria* カブトゴケ**

This large lichen has a distinct pattern of ridges and depressions on its upper surface. That pattern combined with the dull olive green colour - brighter when moist (as in photo) and duller and greyer when dry - and its large size make it quite unmistakable. It grows on many trees at Horoka Tomamu. This species is sensitive to atmospheric pollution, so it is always a positive thing to see it because it means the air is clean.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Lobaria quercizans* カラフトエビラゴケ**

Another large lichen, this one has a smoother thallus that grows more flattened against the tree trunk. The colour varies from green (when moist or wet - see upper photo) to whitish-grey (when dry - see lower photo). As with *L. pumoharia* it is an indicator of clean air. I have seen it on several trees in the northern and western parts of Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016 (upper photo) and 10/2018 (lower photo)

Menegazzia subsimilis

This and the next species are pale grey lichens closely attached to tree trunks. They have many little holes in the thallus. *M. subsimilis* also has short tubes sticking up from the thallus surface, with each tube topped by a very pale powdery topping of soredia (visible in upper left part of photo; the soredia are tiny structures capable of falling off and growing into new lichens). These *Menegazzia* species are indicators of clean air. I found them on many trees at Horoka Tomamu.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Menegazzia terebrata* センシゴケ**

This resembles *M. subsimilis* (see above) but without the upright tubular structures.



Horoka Tomamu Montane Forest, Hokkaido, 09/2016

***Nephroma* species: possibly *N. bellum* ナメラウラミゴケ**

Some of these *Nephroma* species can be hard to tell apart, but they are all indicators of clean air, so this one (found on a riverside tree at Horoka Tomamu) is a good find, whichever species it is. The upper surfaces of its lobes are a brown and of a rather felty texture; some lobes are bent out and up to reveal an orange-brown underside.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Parmelia praesquarrosa* ナメラカラクサゴケ**

This lichen is common on trees at Horoka Tomamu. Its silvery-grey thallus, deeply cut into many narrowly branched lobes, is closely appressed to the bark. More distinctive are the numerous brown circles, each one edged finely in white. These are apothecia: reproductive structures that contain spores.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Peltigera collina* ヘルトリツメゴケ**

This large, deeply lobed, dark brown lichen found on trees at Horoka Tomamu has an abundant greyish powdery coating along the edges of the upper surfaces of its lobes. The undersides are brown and have many small projecting structures that resemble very short roots but are called rhizines.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Pseudocyphellaria crocata* ニセキンブチゴケ**

Yet another indicator of clean air, I found this lichen growing on a riverside tree at Horoka Tomamu. It is dark brown with yellow around the edges and some yellow dots on the upper surface. The taxonomy of *P. crocata* in the broad sense is now seen to be more complex than was known in the past, at least in North America where a recent (2017) study found that lichens previously named as *P. crocata* encompass a total of 13 species, none of which is actually true *P. crocata*! Among them, *P. holarctica* looks very like this specimen and has been found not only in N America but also in far eastern Russia (180 km E of Vladivostok; 680 km W of Horoka Tomamu), so it seems possible that '*P. crocata*' in Hokkaido might actually be (or at least include) *P. holarctica*. I haven't given the full reference for the American study here, mainly because I don't have enough room for its unusually long list of 29 authors!



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Sticta fuliginosa* コウヤクゴケ**

The rounded lobes of this lichen have upper surfaces that are dark, dull brown, partly smooth and partly with a dusted, powdery texture, and undersides that are paler brown with tiny white dots. *S. fuliginosa* grows on trees at Horoka Tomamu. *Sticta* species in general are pollution-sensitive and good indicators of clean air.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018

***Sticta nylanderiana* テリハヨロイゴケ or *S. wrightii* アツバヨロイゴケ**

These two species can look very alike, so in the absence of details about such things as the presence or absence of gyrophoric acid (for the analysis of which I'm afraid I lack the necessary equipment and skills) I am calling the examples I found on riverside trees at Horoka Tomamu *S. nylanderiana*/*wrightii*. This large lichen has leafy lobes with deeply cut edges and brown undersides with small white dots.



Horoka Tomamu Montane Forest, Hokkaido, 10/2018