

***Pytho depressus* (Linnaeus, 1767): A rare and sporadically distributed beetle in Belgium**

(Coleoptera: Pythidae)

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Abstract

In this article, we report on the widespread Palearctic species, *Pytho depressus* (Linnaeus, 1767), in Belgium. We present the current distribution data of *P. depressus* in Belgium and unravel and interpret its distribution and habitat. Based on the limited observations, *Pytho depressus* seems to be rare and sporadic.

Keywords: distribution, *Pytho depressus*, Saproxyllic beetle

Samenvatting

In dit artikel melden we de waarnemingen van een wijdverspreide palearctische soort, *Pytho depressus* (Linnaeus, 1767), in België. We tonen de huidige verspreidingsdata van *P. depressus* in België, en ontrafelen en interpreteren de verspreiding en de habitat. Gebaseerd op het beperkt aantal waarnemingen lijkt de soort zeldzaam en sporadisch.

Résumé

Dans cet article, nous rapportons les observations de *Pytho depressus* (Linnaeus, 1767) en Belgique. Nous présentons des cartes de répartition de *P. depressus* en Belgique et tentons de démêler et d'interpréter sa distribution et son habitat. Sur la base d'observations limitées, l'espèce semble être rare et sa présence sporadique.

Introduction

The genus *Pytho* Latreille, 1796 belongs to the Pythidae family. Species from this genus are found in the northern hemisphere, mainly in cold regions. They are saproxylic beetles whose larvae develop in the subcortical region of dead trees (PAINTER *et al.*, 2007; WEBSTER *et al.*, 2012). The larvae of *Pytho* are xylophagous, as they have been reared solely on the cambium of dead trees, but they are probably also occasionally opportunistic (POLLOCK, 1991; WEBSTER *et al.*, 2012). Their development probably takes several years, with the larvae pupating in the substrate under the bark. When fully developed, the adults of the genus *Pytho* are usually not longer than 1.5 cm and can be found under the bark in spring before they emerge. Adults may be predacious, but no direct observations are known (HEJDA *et al.*, 2017). The genus *Pytho* is represented in Europe by *Pytho depressus* (Linnaeus, 1767), *P. abieticola* Sahlberg, 1875, and *P. kolwensis* Sahlberg, 1833. The latter is the most specialized considering habitat requirements and is found in Norway, Finland, Sweden, north-eastern China, and north-western Russia (PAINTER *et al.*, 2007). *Pytho kolwensis* tends to inhabit large diameter trunks, within forest stands with high continuity of old-growth conditions (SIITONEN & SAARISTO, 2000). *Pytho abieticola* is also considered as a rare boreal forest specialist. However, it tolerates drier conditions, and hence its habitat requirements are not as strict as those of *P. kolwensis*. Lastly, *P. depressus* is the most common and widespread of the Palearctic *Pytho* species (POLLOCK, 1991) and the least demanding concerning old-growth conditions.

Adults of *P. depressus* are 7.5 to 13.7 mm long; have a dorsoventrally depressed, orthosomatic body and are well adapted for activity and movements in the cambial layer (Fig. 1; SMITH & SEARS, 1982; POLLOCK, 1991). Individuals can have a blue brown to metallic blue dorsal side and a black to dark shiny blue ventral side. Sometimes specimens are observed with red sternites (KIM *et al.*, 2004). *P. kolwensis* (10.9 to 15.9 mm) has, in comparison to *P. depressus*, a darker coloration. Adults of *P. abieticola* (5.6 to 10.6 mm) have a nonmetallic brown coloration (POLLOCK, 1991). The coloration of the *P. depressus* larvae resembles that of *Cucujus cinnaberinus* (Scopoli, 1763) (Cucujidae) but the orange color is more vivid on *C. cinnaberinus* larvae and the apex of both larvae clearly differs (Fig. 2; BRUSTEL & GOUIX, 2012; THOMAES *et al.*, 2021). Before pupating, the larvae make a pupal chamber from cambium fibers, presumably as protection against other predacious larvae (POLLOCK, 1991).

P. depressus has a relatively wide Palearctic range, from Spain to Korea and from Norway to Hungary but with a preference for the boreal region (POLLOCK, 1991; ABRAHAMSSON *et al.*, 2008; HORAK *et al.*, 2012; WEBSTER *et al.*, 2012; IRURZUN & MORENO, 2016; LAAKSONEN *et al.*, 2020). In Germany, *P. depressus* is widely distributed in the North-East but nearly absent in West-Germany bordering The Netherlands and Belgium (www.colkat.be). In the Netherlands the species has been observed in most provinces (VORST, 2010). In France, the species is rarely observed and mentioned from all mountain pine groves (Pyrenees, Alps and Jura) and furthermore from Alsace-Lorraine, French Ardennes and Seine valley in other resinous stands (TRONQUET, 2014; MOULIN, 2020).

The species prefers pines (*Pinus*) but has furthermore been recorded on other dead conifers (*Picea*, *Abies*, *Larix*) and, occasionally even on deciduous trees (*Betula*, *Salix*, *Populus*), on fallen and standing trees, and in tree stumps. It prefers large host tree trunks but records are known from wood pieces up to 6 cm in diameter (SMITH & SEARS, 1982; POLLOCK, 1991; MIESSEN, 1994; SIITONEN & SAARISTO, 2000). *P. depressus* lives in dead trees, but still fresh with the bark still intact and without fungal activity (POLLOCK, 1991). *P. depressus* is listed on the IUCN Red List as a species of least concern (NIETO & ALEXANDER, 2010). Nevertheless, in Europe, large dead trees have become increasingly rare due to land management (e.g., logging and removal of dead trees for economical, health and safety reasons) and saproxylic species confined to a certain dead wood type (e.g. large fallen logs of a certain tree species) may be

more vulnerable to declining amounts of dead wood than generalists with a wider range of host species (LAAKSONEN *et al.*, 2020). However, data is very poor on the population trends of many saproxylic species, including *P. depressus*. Therefore, increased efforts are needed in monitoring European saproxylic beetle populations (NIETO & ALEXANDER, 2010).

Some recent findings of *P. depressus* in Belgium were the onset for this article with the aim to give an overview of this species in our country. Based on the limited observations, *P. depressus* seems to be rare and exhibits a limited distribution.

Material and methods

The onset of this paper was the discovery of some specimens due to the ‘*Monochamus*’ monitoring project, conducted from 2013 till 2015 throughout Belgium. This project was funded by the Federal Public Service (FPS) Health, food chain safety, and environment. The project was carried out by the Université Libre de Bruxelles (ULB), Institute for Agricultural and Fisheries Research (ILVO), and Département de l’Etude du Milieu Naturel et Agricole (DEMNA). The main objective was to study the presence of *Monochamus* spp. (Cerambycidae) in Belgium. This project deployed 89, 90, and 92 baited traps throughout Belgium in 2013, 2014, and 2015, respectively. The deployed traps were cross vane flight interception traps Crosstrap^R baited with Galloprotect Pack^R lures (SEDQ: *Ips* spp. pheromones: ipsenol and 2-methyl-3-buten-1-ol, and a conifer volatile, α -pinene). Ten traps were set up in pine trees in the vicinity of import risk locations and the remaining traps were established in pine forest stands, evenly distributed according to the distribution of pine forests throughout Belgium (see also THOMAES *et al.*, 2017). After 2015, trapping was continued by FPS with 15 traps set up in the years 2016 and 2017 in Wallonia and in 2018 in Flanders.

The rest fractions of all these traps were checked for the presence of *P. depressus*. Furthermore, Belgian literature was compiled to retrieve data of *P. depressus*. Additionally, the collections of the Royal Belgian Institute of Natural Sciences (RBINS), Gents Universiteitsmuseum (GUM), Université de Liège (ULg which will be moved to Hexapoda, Waremme later this year), Université Catholique de Louvain (UCLouvain) and Cercle des Entomologistes Liégeois (CEL) were checked, revealing results in the first two collections. Besides, data from private collections of 57 amateur beetle researchers were requested. Finally, data from Waarnemingen.be/Observations.be (Natuurpunt, Stichting Natuurinformatie and Natagora) and GBIF.be as well as Likona were checked but no additional matches were found.

As the species is mainly boreal and because the observations seem to be grouped in certain time periods, we wondered whether observations could be linked to colder periods or periods with colder winters. Therefore, we collected temperature data to see if the sightings in Belgium were related to temperature. Hereby, we made use of the monthly mean temperature data collected by the Koninklijk Meteorologisch Instituut (KMI) in Ukkel between 1930 and 2021 (<https://www.meteobelgie.be/klimatologie/grafische-gegevens/ukkel-vanaf-1833>). From this data yearly mean temperature, mean summer (mean of three warmest months: June, July and August) and mean winter temperature (mean of three coldest months: December of the previous year, January and February) was calculated. For this comparison, individuals found under the bark between September and December were allocated to the next year. We compared years with presence (n=20) and absence (n=73) of individuals with the mean temperature of the same and previous year, mean winter temperature of the same and previous year and the mean summer temperature of the previous year by means of single sided t-test (hypothesis: temperature is lower in years with observations).

Stacking pictures were taken with a Canon EOS 700 (Speed: 1/100, ISO: f4,5-5) and a 65 mm macro-lens. Each specimen has been set on a stand with a light grey background. The light was provided by two Pixco flashes (1/8) and was coming from underneath the specimen. The final pictures have been obtained with the "focus-stacking" technique: several pictures have been

taken with different focus distance and have been combined to get an image with a bigger depth of field. This process has been done with the Zerene Stacker software). The distribution map was made with ArcGIS 10.4.1, statistics were performed in R.4.1.1.

ACRONYMS USED FOR THE COLLECTIONS.

| | | |
|---------|---|--|
| GUM | = | Gents Universiteitsmuseum, Ghent Belgium |
| PCAB | = | Private collection André Braeckman |
| PCGM | = | Private collection Geoffrey Miessen |
| PCHR | = | Private collection Hugo Raemdonck |
| PCHC | = | Private collection Hubert Cloth |
| PCJD | = | Private collection Juul De Witte |
| PCJL | = | Private collection Jean-Michel Lempereur |
| PCLC | = | Private collection Luc Crèvecoeur |
| PCMC | = | Private collection Marc Counhaye |
| PCMD | = | Private collection Maurice Delwaide |
| PCMP | = | Private collection Marc Paquay |
| PCMVM | = | Private collection Michel Van Malderen |
| RBINSg | = | Royal Belgian Institute for Natural Sciences, general collection, Brussels Belgium |
| RBINS-D | = | Royal Belgian Institute for Natural Sciences, collection Emile Derenne, Brussels Belgium |
| RBINS-L | = | Royal Belgian Institute for Natural Sciences, collection Jean Leroux, Brussels Belgium |
| RBINS-N | = | Royal Belgian Institute for Natural Sciences, collection Marcel Neuray, Brussels Belgium |
| RBINS-W | = | Royal Belgian Institute for Natural Sciences, collection Jean-Marie Warlet, Brussels Belgium |

Results

BELGIUM

PROVINCE ANTWERP: **Kalmthout**: 1 ex., 7.V.1971, Boosten (1971); 2 ex., 6.IV.1976, coll. PCAB; **Mol**, Postel: 2 ex., III.1935, leg. Mayné, det. G. Fagel, coll. RBINSg; **Mol**, Postel: 5 ex., III.1935, det. et ex-coll. L. Frennet, coll. RBINSg (I.G. 17.208); **Mol**, Postel: 1 ex., III.1938, Derenne (unpublished manuscript); **Mol**, Postel, under bark of *Pinus sylvestris*: 1 ex., 7.I.2022, coll. PCJD; **Ravels**: 1 ex., 13.IV.1947, ex-coll. Hostie, coll. GUM; 3 ex., 12.IX.1975, Lhost (1976).

BRUSSELS-CAPITAL REGION: **Auderghem**: 2 ex., 10.VI.1936, det. E. Derenne, coll. RBINS-D (I.G. 26.920); Woluwel-Saint-Pierre, Parc: 1 ex., IX.[19]38, Derenne (unpublished manuscript).

PROVINCE LIÈGE: **Malmedy** (surrounding), under the bark of standing dead pines (*Pinus sylvestris*): 1 ex., 25.V.1990, coll. PCGM; **Malmedy** (surrounding), under the bark of standing dead pines (*Pinus sylvestris*): 3 ex., 25.X.1992, coll. PCGM; **Malmedy** (surrounding), under the bark of standing dead pines (*Pinus sylvestris*): 1 ex., 30.XII.1992, coll. PCGM; **Malmedy**, Arimont, sous écorce *Pinus sylvestris*: 1 ex., 26.XI.1995, coll. PCGM; **Malmedy**, Arimont, sous écorce *Pinus sylvestris*: 3 ex., 30.XII.2001, coll. PCGM; **Malmedy**, Arimont, pièges à phéromones pour *Monochamus*: 1 ex., 6.I.2002, coll. PCGM; **Malmedy**, Arimont, pièges à phéromones pour *Monochamus*: 1 ex., 15.V-12.VI.2017, coll. PCGM; **Malmedy**, val d'Arimont (50°24.973'N, 6°04.266'E), 524m: 1 ex., 15.V-1.VI.2014, Project Monitoring *Monochamus*, coll. RBINSg

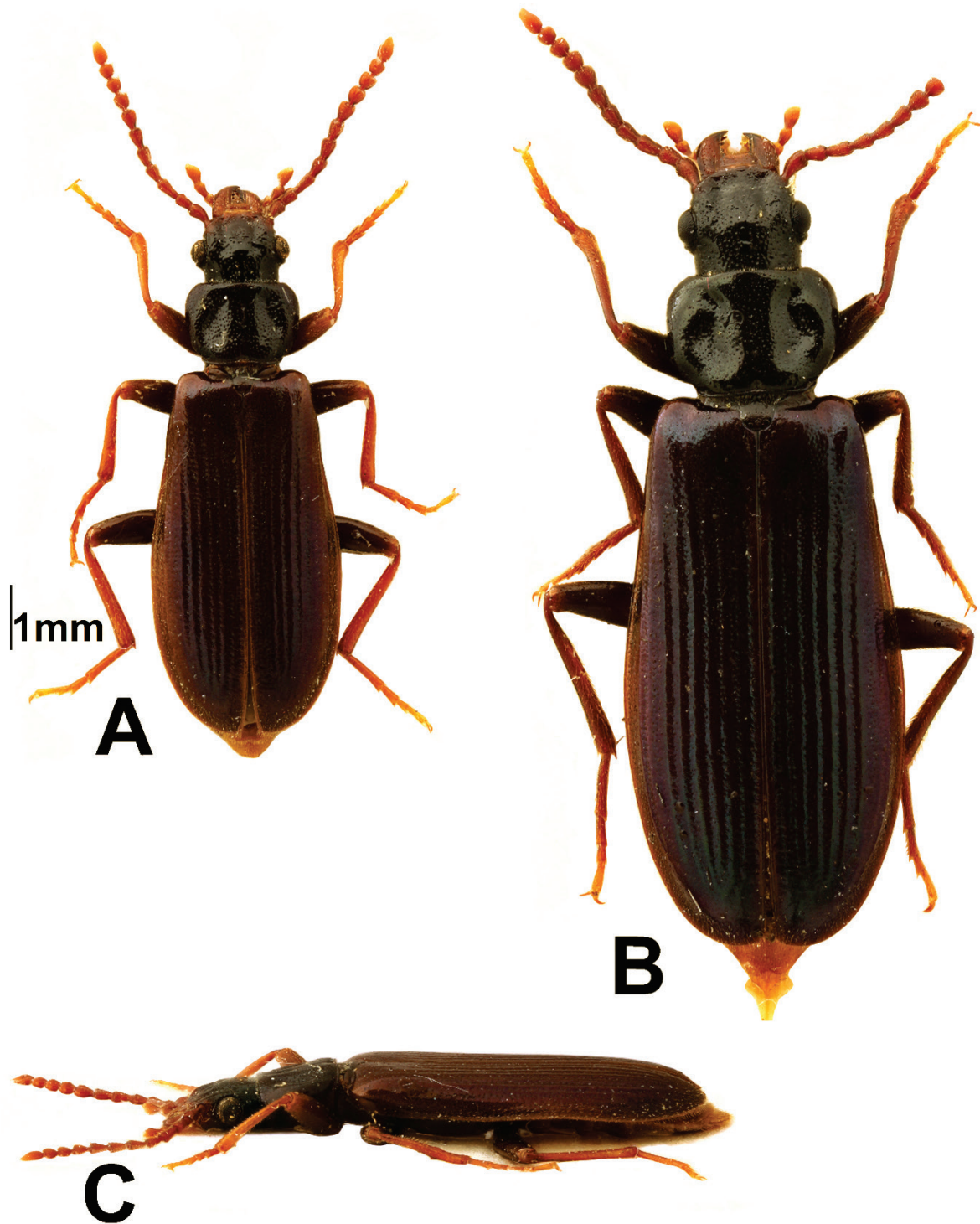


Fig. 1. *Pytho depressus* (Linnaeus, 1767), habitus (A & C: Theux, La Reid: 2.V.1995, coll. RBINS-N (I.G. 34.192); B: Durbuy, gare de Biron: 4.V.1995, coll. RBINS-N (I.G. 34.192)). A, ♂ dorsal view. B, ♀, dorsal view. C, ♂ lateral view.

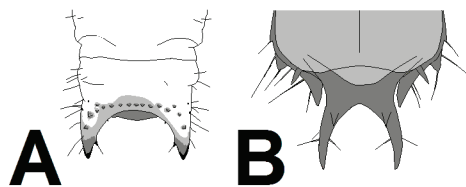


Fig. 2. Apex of the larvae. A, *Pytho depressus* (Linnaeus, 1767). B, *Cucujus cinnaberinus* (Scopoli, 1763).

(I.G. 34.452); **Malmedy**, val d'Arumont (50°24.973'N, 6°04.266'E), 524m: 1 ex., 15.V-1.VI.2014, Project Monitoring *Monochamus*, coll. PCHR; **Spa**, Fagne de Malchamps: 1 ex., 30.IV.1990, coll. RBINS-W (I.G. 31.513); **Spa**, Géronstère: 1 ex., 5.IV.1987, coll. PCGM; **Theux**, La Reid, tronc de pin sylv. abattu: 1 ex., 2.V.1995, coll. RBINS-N (I.G. 34.192); **Theux**, La Reid, Maquisard, sous écorce de pins morts sur pied: multiples ex., 9.IV.1995, coll. PCMD; **Theux**, Polleur, Bois de Staneux: 1 ex., 20.V.1989, leg. M. Counhaye, coll. PCMC; **Theux**, La Borchêne, 22.IV.2009, coll. PCHC.

PROVINCE LIMBURG: **Bilzen**, sous écorce de résineux: 4 ex., 2.IV.1974, det. J.P. Smeekens, coll. RBINS-L (I.G. 30.202); **Genk**, Bokrijk, Lisec, FS7049, under bark Poplar cultivar: 1 ex., 13.X.1988, coll. PCLC; **Neerpelt**: 1 ex., 3.III.1935, Derenne (unpublished manuscript); **Neerpelt**: 10 ex., 31.III.1935, leg. A. Quairière, coll. RBINSg (I.G. 10.646).

PROVINCE LUXEMBOURG: **Durbuy**, Barvaux (50°19.977'N, 5°28.447'E), 220m: 1 ex., 15.V-1.VI.2014, Project Monitoring *Monochamus*, coll. RBINSg (I.G. 34.452); **Durbuy**, Biron: 1 ex., 1.III.1980, (leg.) Thisquen, coll. RBINS-W (I.G. 31.513); **Durbuy**, Biron: 1 ex., 4.V.1995, leg. J. Chapelle, coll. PCMVM; **Durbuy**, Biron: 3 ex., 28.III.1998, coll. RBINS-W (I.G. 31.513); **Durbuy**, Biron, S/*Pinus*: 3 ex., 29.III.1998, coll. RBINS-W (I.G. 31.513); **Durbuy**, gare de Biron, troncs d'épicéas abattus: 2 ex., 4.V.1995, coll. RBINS-N (I.G. 34.192); **Durbuy**, Petit-Han, écorce pin: 1 ex., 8.XI.1980, coll. RBINS-W (I.G. 31.513); **Saint-Hubert** (50°12.785'N, 5°21.886'E), 501m: 1 ex., 1-15.V.2014, Project Monitoring *Monochamus*, coll. RBINSg (I.G. 34.452); **Saint-Léger**, Bois de Saint-Léger, sous écorce de Pin laricio: 2 ex., 5.III.1993, coll. PCJL.

PROVINCE NAMUR: **Houyet**, sous écorce d'un gros chablis de pin weymouth: 3 ex., 1.XI.1989, coll. PCMP.

THE NETHERLANDS

PROVINCE GELDERLAND: **Nunspeet**, *Pinus*: 2 ex., 18.IV.[19]83, ex-coll. J. Roggeman, coll. RBINSg (I.G. 30.600).

The following records were extracted from the literature:

MAYNÉ (1935): "*Pytho depressus* L. Belg. nov. sp., avec la var. *chloropterus* Everts, capturé à Postel par MM. Quairière E et Leleup." (already included in collection material).

DERENNE (handwritten unpublished catalog at RBINS): "Postel (III.1938, N.L.); Neerpelt (3.III.1935, Quairière); Woluwe-St-Pierre (Parc, IX.1938, E.D.)".

BOOSTEN (1971): "*Pytho depressus* L. (Pythidae): Kalmthout, Prov. d'Anvers, 7.V.1971".

LHOST (1976): "*Phyto* (sic) *depressus* (L.) (Pythidae): Ravels (Antwerpen), 12.IX.1975, 3 exemplaires sous écorce de *Pinus silvestris*".

Furthermore, LEROUX (1976) mentions 4 ex. from Bilzen collected by Smeekens, LHOST (1993) mentions 3 ex. from Saint-Léger in coll. PCJL and MIESSEN (1994) gives an overview of the specimen found by him and at RBINS an unpublished manuscript of Warlet mentions his collected specimen (all of these also already included in collection material).

This compiles to 42 sources referring to 38 independent observations (assuming DERENNE (unpubl.) has wrongly copied the date from the material of Neerpelt) of more than 71 individuals of *P. depressus* in Belgium (and one additional observation in the Netherlands). The species was found in five ecoregions: Campine, Loam, Fagne-Famenne-Calestienne, Ardenne and Gaume et Lorraine region (Fig. 3). The species has been repeatedly found in most of the locations e.g. Ravels, Postel, Durbuy, Malmedy, Spa-Theux. Also the findings with *Monochamus* traps confirmed two known locations besides revealing only one unknown population (Saint-Hubert).

The observations come from six distinct time periods: five observations from 1935 till 1938; a single record from 1947; six from 1971 till 1980; 17 from 1987 till 2002, one from 2009, five

from 2014 till 2017 and one from 2022. The main flying and activity period results in a peak in the phenology from March till May with seven to ten observations per month. In June only one record was confirmed. From September till January, individuals were found under bark with two to three observations per month.

Concerning the host tree species, most individuals were associated with pine trees, *Pinus sylvestris* was mentioned nine times and *Pinus* spp. six times. In addition, the five specimens captured in the *Monochamus* project refer to *Pinus* stands. Only one record specifies *Pinus nigra laricio* (the second most common pine tree in Belgium, after *Pinus sylvestris*) and one record refers to *Pinus strobus*. One record refers to *Picea abies* and one to *Populus x canadensis* while a final record only mentions a resinous tree.

There was no significant effect of temperature on years with observations (Table 1). Moreover, the years with observations are in general slightly warmer than those without observations.

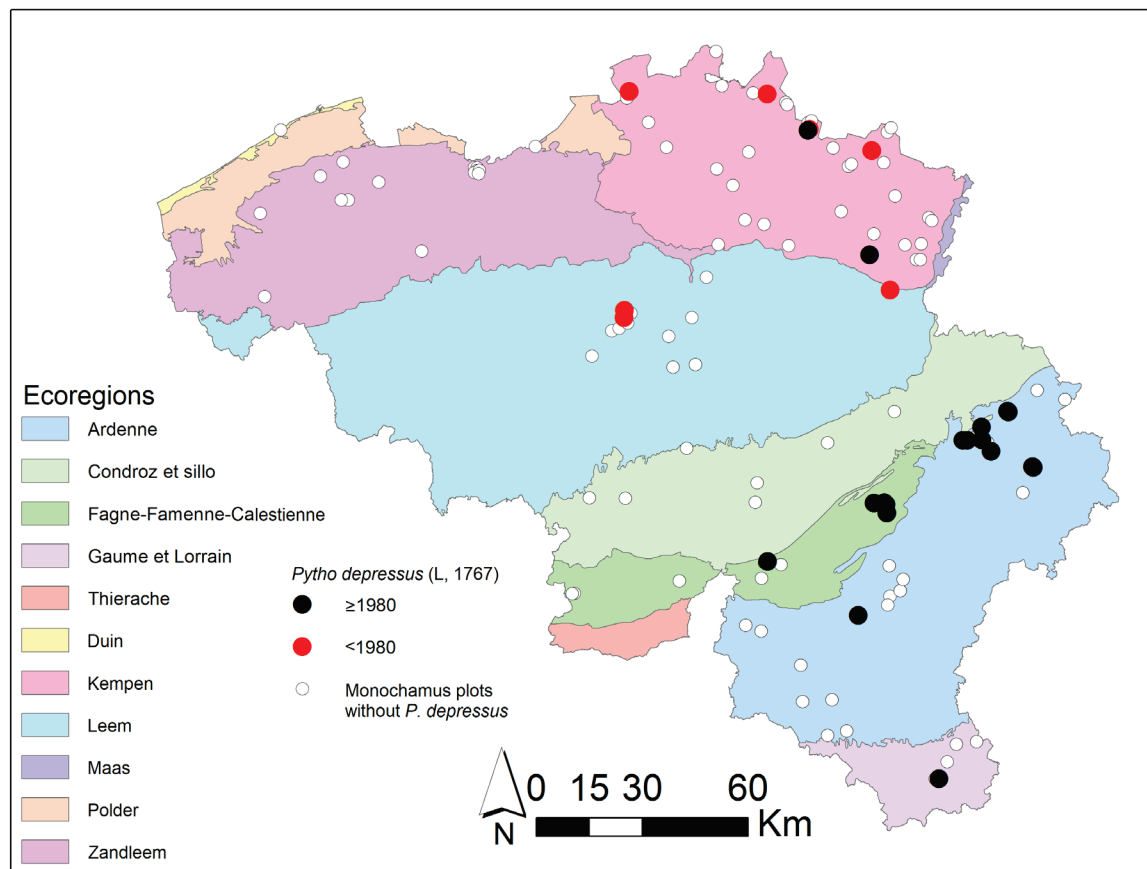


Fig. 3. Distribution of *Pytho depressus* in Belgium.

Table 1. t-test statistics on the effect of mean temperature on the presence and absence of observations of *P. depressus*.

| | Mean temp. (\pm s.d.) in years with presence | Mean temp. (\pm s.d.) in years with absence | t-value | Df | p-value |
|--|---|--|---------|--------|---------|
| Mean year temperature | 10.3 \pm 0.7 | 10.0 \pm 0.8 | 1.5419 | 43.079 | 0.9348 |
| Mean year temperature of previous year | 10.1 \pm 0.6 | 10.1 \pm 0.9 | 0.3711 | 56.023 | 0.6440 |
| Mean winter temperature | 3.8 \pm 1.7 | 3.1 \pm 1.7 | 1.9435 | 37.725 | 0.9703 |
| Mean winter temperature of previous winter | 3.6 \pm 1.6 | 3.1 \pm 1.7 | 1.1190 | 41.939 | 0.8652 |
| Mean summer temperature of previous summer | 17.1 \pm 0.9 | 16.9 \pm 1.1 | 0.9222 | 49.581 | 0.8196 |

Discussion

Pytho depressus thrives in cold boreal regions but has a very wide range (SIITONEN & SAARISTO, 2000; ABRAHAMSSON *et al.*, 2008; HORAK *et al.*, 2012). Outside the cold boreal regions, sightings of the species are more sporadic. Based on our results, we can conclude that *P. depressus* is present but rare in Belgium sporadically established populations.

It seems to be mainly found in a limited number of locations in Belgium and in some of these locations the species has been found repeatedly over large periods of time. Furthermore, the *Monochamus* plots confirmed two known locations and only one unknown population. This makes it likely that these locations harbor permanent populations, but that the species is more or less limited to these locations. Most locations can be found in the Campine and Ardenne region. The Campine region is the warmest region of Belgium but has a reasonable forest cover dominated by pine stands (*Pinus sylvestris* as well as *Pinus nigra laricio*). The Ardenne region is the highest (and coldest) region of Belgium and has a high forest cover dominated by spruce forests (*Picea abies*), but pine stands also occur. Most records of the species in Belgium refer to pine trees (*Pinus sylvestris* and *Pinus* spp.) which is in accordance with the literature (SMITH & SEARS, 1982; POLLOCK, 1991; MIESSEN, 1994; SIITONEN & SAARISTO, 2000).

Before 1980, all observations originate from the Campine and Loam region, while all records from 1980 onwards (except two from Campine region) originate from Ardenne and adjacent Fagne-Famenne-Calestienne and Gaume et Lorraine. It is unclear whether this needs to be interpreted as the species becoming rarer in the Campine area and more abundant in Ardenne and adjacent regions, or if it is more related to the activity of certain entomologists in certain periods. As the species prefers a colder climate (SIITONEN & SAARISTO, 2000; ABRAHAMSSON *et al.*, 2008; HORAK *et al.*, 2012), possibly the species becomes rare in the Campine area as the climate becomes warmer. The records from Ardenne and adjacent regions are from higher altitudes (± 150 -500 m) with a colder climate.

The species was first discovered in 1935 (MAYNÉ, 1935) and a remarkable increase in records is observed after 1970. During the last millennia, the continuity of pine trees (*P. sylvestris*) is uncertain for Belgium. Possibly the tree species remained present at sites with extreme growing conditions where it was not outcompeted by other tree species, but confirmation is not present (DEN OUDEN *et al.*, 2010). Certain is however that the species has been planted from the 16th century onwards. Large scale planting of pine stands started at the end of the 19th century and the area of pines increased strongly shortly after WWII (DEN OUDEN *et al.*, 2010, ADRIAENSSENS & VERHEYEN, 2013). So it is possible that *P. depressus* could have been continuously present in the Campine region or it recolonized that area after pine was reintroduced on a large scale. The large scale planting of pine stands will have led to an increase in mature pine stands and thick dead pine wood from 1970 onwards. Initially, dead wood in pine stands will still have been low and has only increased in the last decades (ADRIAENSSENS & VERHEYEN, 2013). Therefore, the amount of dead wood can not explain the decreasing trend in the Campine region but might explain the potential increase or expansion to the Ardenne and adjacent regions.

Mean year, winter and summer temperatures of the same as well as the previous year had no influence on the presence and absence. Temperatures were in general even slightly higher for presence than absence, possibly explained by the higher number of more recent records.

Based on the results, we can conclude that *P. depressus* is present in Belgium with established populations. Its distribution seems to be limited to certain locations and the species seems to be rare.

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References

- ABRAHAMSSON M., LINDBLADH M. & RÖNNEBERG J., 2008. - Influence of butt rot on beetle diversity in artificially created high-stumps of Norway spruce. *Forest Ecology and Management*, 255(8-9): 3396-3403, <https://doi.org/10.1016/j.foreco.2008.01.010>.
- ADRIAENSSENS S. & VERHEYEN K., 2013. - *Oude bossen van de Antwerpse Kempen*. Davidsfonds Uitgeverij, Leuven, 252 pp.
- BOOSTEN, G., 1971. - Communication de G. Boosten. In: BASILEWSKY, P., 1971. – Assemblée mensuelle du 2 juin 1971. *Bulletin et annales de la S.R.B.E./K.B.V.E.*, 107: 103-104.
- BRUSTEL H. & GOUX N., 2012. - La chasse aux mythes ! Petite contribution cryptoentomologique sur les Coléoptères de la Directive Habitats à rechercher en France. *Le Coléoptériste*, 15(1): 26-37.
- DEN OUDEN J., MUYS B., MOHREN F. & VERHEYEN K., 2010. - *Bosecologie en bosbeheer*. Acco, Leuven, 674 pp.
- HEJDA R., FARAC J. & CHOBOT K., 2017. - Pythidae. *Family Court Review*, 55(4): 491-492, <https://doi.org/10.1111/fcre.12297>.
- HORAK J., CHUMANOVA E.V.A. & HILSZCZAN J. 2012. - Saproxylic beetle thrives on the openness in management: a case study on the ecological requirements of *Cucujus cinnaberinus* from Central Europe. *Insect Conservation and Diversity*, 5(6): 403-413, <https://doi.org/10.1111/j.1752-4598.2011.00173.x>
- IRURZUN J.I.R. & SAN MARTIN MORENO A.F., 2016. - Saproxylic beetles (Coleoptera) of two Pyrenean forests of Navarre. *Heteropterus Revista de Entomología*, 16(1): 53-69.
- KIM J., KANG T.H. & JUNG B.H., 2004. - A Newly Recorded Species of the Family Pythidae (Coleoptera) from Korea. *Entomological Research*, 34(3): 159-161, <https://doi.org/10.1111/j.1748-5967.2004.tb00107.x>.
- LAAKSONEN M., PUNTTILA P., SIITONEN J. & OVASKAINEN O., 2020. - Saproxylic beetle assemblages in recently dead Scots pines: How traits modulate species' response to forest management? *Forest Ecology and Management*, 473: 118300, <https://doi.org/10.1016/j.foreco.2020.118300>.
- LEROUX J., 1976. - Communication de J. Leroux. In: Leleup, N., 1976. – Assemblée mensuelle du 2 juin 1976. *Bulletin et annales S.R.B.E./K.B.V.E.*, 112: 118.
- LHOST G., 1976. - Communication de G. Lhost. In: LELEUP, N., 1976. – Assemblée mensuelle du 11 janvier 1976. *Bulletin et annales S.R.B.E./K.B.V.E.*, 112: 22-23.
- LHOST G., 1993. - Communication de G. Lhost. In: – Assemblée mensuelle du 3 novembre 1993. *Bulletin et annales S.R.B.E./K.B.V.E.*, 129: 311-312.
- MAYNÉ M., 1935. - Communication de M. Mayné. In: Mayné, M., 1935. – Assemblée mensuelle du 4 mai 1935. *Bulletin et annales S.R.B.E./K.B.V.E.*, 75: 170-171.
- MIESSEN G., 1994. - *Pytho depressus* L., insecte curieux. *Cercle culturel Marie-Anne Libert*, 94(1): 32.
- MOULIN N., 2020. - Clown triste, Cardinal triste (Français): *Pytho depressus* Linnaeus, 1767. https://inpn.mnhn.fr/espece/cd_nom/224101.
- NIETO A. & ALEXANDER K., 2010. - *IUCN Red List. In European Red List of Saproxylic Beetles*. Publications Office of the European Union, Luxembourg, 45pp., <https://doi.org/10.2779/84561>.
- PAINTER J.N., SIITONEN J. & HANSKI I., 2007. - Phylogeographical patterns and genetic diversity in three species of Eurasian boreal forest beetles. *Biological Journal of the Linnean Society*, 91(2): 267-279.
- POLLOCK D.A., 1991. - Natural history, classification, reconstructed phylogeny, and geographic history of *Pytho* Latreille (Coleoptera: Heteromera: Pythidae). *Memoirs - Entomological Society of Canada*, 154: 3-104, <https://doi.org/10.4039/entm123154fv>.
- SIITONEN J. & SAARISTO L., 2000. - Habitat requirements and conservation of *Pytho kolwensis*, a beetle species of old-growth boreal forest. *Biological Conservation*, 94(2): 211-220.

- SMITH D.B. & SEARS M.K., 1982. - Mandibular structure and feeding habits of three morphologically similar coleopterous larvae: *Cucujus clavipes* (Cucujidae), *Dendroides canadensis* (Pyrochroidae), and *Pytho depressus* (Salpingidae). *Canadian entomologist*, 114: 173-175.
- THOMAES A., DRUMONT A., WARZÉE N., GRÉGOIRE J.-C., STASSEN E., CRÈVECOEUR L., BERCKVENS N., CASTEELS H., VAN DE VIJVER D. & RAEMDONCK H., 2017. - Ecology and distribution of *Thanasimus formicarius* (Linnaeus, 1758) and the newly discovered *Thanasimus femoralis* (Zetterstedt, 1828) in Belgium (Coleoptera: Cleridae). *Bulletin de la S.R.B.E./K.B.V.E.*, 153: 206-214.
- THOMAES A., CRÈVECOEUR L., DAKA G., DE BLOCK M., FIEVET V., HEYNDRIKX R., KARIUKI K., LAMMERANT R., MARCHAND S., SCHEERS K., SREEKENS V. & VAN DE KERCKHOVE P., 2021. *Cucujus cinnaberinus* (Cucujidae) is rapidly colonising Northern Belgium. *Bulletin de la S.R.B.E./K.B.V.E.*, 156: 162–172.
- TRONQUET M. (ed.), 2014. - *Catalogue des Coléoptères de France*. Association Roussillonnaise d'Entomologie, Perpignan, 1052 pp.
- VORST O., 2010. - *Catalogus van de Nederlandse kevers (Coleoptera)*. Nederlandse Entomologische Vereniging, Amsterdam, 317 pp.
- WEBSTER R.P., SWEENEY J.D. & DEMERCHANT I., 2012. - New Coleoptera records from New Brunswick, Canada: Stenotrachelidae, Oedemeridae, Meloidae, Myceteridae, Boridae, Pythidae, Pyrochroidae, Anthicidae, and Aderidae. *ZooKeys*, 179: 279–307, <https://doi.org/10.3897/zookeys.179.2629>.
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