

A pest control device, a pest control system and a method for attracting pestTechnical field

The present disclosure relates to a pest control device for attracting pest, a pest control system and a method for attracting pest by running the pest control system. More specifically, the disclosure relates to a pest control device for attracting pest, a pest control system and a method for attracting pest by running the pest control system as defined in the introductory parts of the independent claims.

Background art

In most cities in the world the presence of rodents, in particular rats, is a problem. As the cities and the population in the cities grow, the problem becomes larger. Even though pest control has developed immensely during the last decades, severe damages are still today caused by rodents. The damages are not only direct damages, e.g. food or crops being eaten by rodents, but also indirect damages causing sanitary issues for households or business as well as spreading of diseases. Having reliable and efficient pest control is therefore important from a wide range of aspects.

Insects may also cause problems. Problems associated with insects range from being a nuisance to causing tangible damages, for instance, by spreading diseases, ruining food or crops, destroying clothes, furniture, or even building materials. As a result, property, buildings or other living spaces may become uninhabitable. To date, there has especially been a need for developing pest control for mosquitoes, cockroaches, bedbugs and flies, but the increased globalization leads to higher risk of global spreading of other harmful insects.

New and improved methods for pest control are consequently being developed on an ongoing basis, a great deal of which is based on insecticides, pesticides, while other methods use actual traps, containing mechanical and/or electric means for pest control.

During the last few years, digitally connected pest control devices have become increasingly popular. For instance, the SMART solutions developed and marketed by Anticimex™ is one example well-known in the industry of pest control. By having pest control devices and sensors for monitoring that are connected to the Internet, improved monitoring of pest is made possible. This has the advantage that the need for manually checking the pest

control devices is reduced or in some cases completely removed. The workload for an operator monitoring or operating the pest control devices may thereby be reduced.

Although pest control devices and systems of pest control devices are improving, there is still a need for further development. By way of example, there is a need for simpler ways of attracting pest thereby simplifying maintenance needs for the pest control devices. It may, however, be challenging to attract or lure pest to a pest control device as behavioural resistance developed the pest may make them avoiding new objects and/or other changes to the surrounding. To allow for more efficient monitoring and/or trapping of pest there is further a need for improved identification of the type of pest that is present at a given location. There is therefore also a need for improved tracking of the identified pest as this may allow for more accurate analysis and forecasts regarding, for instance, pest population growth, migration and/or behavioural patterns of the pests. Damages associated with the presence of pest may thereby be reduced. The spreading of pest may even be prevented by use of specific and efficient pest control such as monitoring devices and traps having these capabilities.

Summary

It is an object of the present disclosure to mitigate, alleviate or eliminate one or more of the above-identified deficiencies and disadvantages in the prior art and solve at least the above mentioned problem. According to a first aspect there is provided a pest control device for attracting pest comprising: a housing; a processor; a memory; a data communication device configured to communicate with a gateway or another pest control device; and a sound emitting device. The memory comprises recordings of one or more sound patterns corresponding to a pest species or a subgroup thereof; and the sound emitting device is configured to emit a reproduction of the at least one sound pattern for attracting the pest species or a subgroup thereof.

The subgroup may be one or more pest. The subgroup may be males, females, infants, "stages of insect". Configured to select sound pattern to attract a sub-population of the pest species, for instance a female population, a male population infants, young or old members of the pest species.

The emitted sound pattern is emitted to attract pest by submitting a sound that the pest find attractive with the aim of luring the pest towards the pest control device.

According to some embodiments, the pest species is an insect species. The sound is then selected to attract that specific sound. The sound is received by the insect via hearing or by feeling the sound. Not all insect species have hearing, but may still have acute "hearing" capabilities by way of detecting vibrations in solids they are in contact with or by detecting vibrations or pressure changes in the air. It is thus possible to use sound patterns specific for an insect species or a group of insect species for attraction towards a pest control device.

According to some embodiments, the pest species is an animal species. Animals normally have hearing organs and use sounds for communicating or make use of what they hear for intelligent determinations of what to do. Rodents for example are commonly considered a pest in rural areas and generally indoors. They have good hearing and use sounds for communicating. It is thus possible to use sound patterns for attracting them.

According to some embodiments, the pest control device is configured to reproduce a sound pattern selected or received by a remote device. The remote device may have information about the specific type of pest that is present near the pest control device and may also select a sound pattern for the pest control device to emit. If the pest control does not have the selected sound pattern stored on the memory, the remote device may send it to the pest control device.

According to some embodiments, the pest control device further comprises a sound recording device wherein the pest control device is configured to record a further sound pattern from a pest species or a sub-group thereof and save the further sound pattern to the one or more sound patterns of the memory. In that way the pest control device will collect further sound patterns to choose from and may then gain better precision when choosing the best sound pattern for attracting an specific pest.

According to some embodiments, the remote device the pest comprises a camera and/or a sound recording device arranged to determine a pest species or a subgroup thereof, wherein information regarding the determined pest species or subgroup thereof is transmitted to the pest control device.

The remote device may be another pest control device connected in a network to the pest control device. The remote device may also be a detection device, such as a surveillance camera or microphone. The remote device may be a user equipment such as a phone or tablet. When detecting a pest information regarding the determined pest species or subgroup thereof is transmitted from the remote device to the pest control device.

According to some embodiments, the pest comprises: at least one additional sound emitting device and at least one sensor for detecting pest. The processor in combination with the memory is arranged to receive signals from the at least one sensor and link the received signals to detection time points and to process the signals and the detection time points into sensor data sets; wherein the pest control device is configured to guide pest within the pest control device by sequentially emitting a sound pattern from the multiple sound emitting devices. The sensor may be a proximity sensor (PIR, vibrations, heat etc), a camera, etc. The wording "multiple sound emitting devices" is to be understood as the pest control device comprising the "sound emitting device" and "at least one additional sound emitting device".

An advantage being that that the movement of pest within the pest control device may be controlled. A pest may be attracted from one sound emitting device to another within the trap. The pest may then be guided towards a section of the pest control device where it is trapped, recorded or photographed. For small pests like insects it may also be feasible to guide the pest also in a relatively small pest control device. The trap may be a glue board or a liquid container trap for insects. For larger pest, like rodents, the trap may be a mechanical or electrical trap that holds and/or kills the pest. Guiding the pest within the pest control device may also be used to divide up different types of species and guide them in different directions. E.g. in case one species is considered pest and another is not, the species considered pest is guided towards a trap while the species not considered a pest is guided out from the pest control device to go free. This makes it possible to use sound patterns attracting several species while still differentiating between different species within the trap, e.g. in case they require different type of traps.

According to some embodiments, the pest control device is configured to modify the sound pattern such that the sound pattern deviates from other sound patterns of the one or more sound patterns. A unique sound pattern may then be produced to simulate a unique individual of a pest species. This can be done e.g. by modifying intensity, pitch, introducing new part, errors etc. Local variations in sound behaviour for a pest species and/or a subportion thereof may be adjusted for to improve the probability of the sound pattern attracting the pest species.

According to some embodiments, the pest control device is configured to generate artificial sound patterns for attraction. These patterns could be built on or derived from known effective sound patterns, but could also be generated from scratch as a unique sound creation based on known sound pattern parameters for a pest species.

According to some embodiments, the pest control device is a monitoring device and/or a trapping device.

According to a second aspect there is provided a pest control system comprising: multiple pest control devices according to the first aspect configured in a network. Efficient
5 communication between the pest control devices within the network may be provided so as to e.g. let different embodiments of the pest control device share data. An identified pest species where the identification is made by a pest control device comprising a camera (a monitoring device or a trap) can be sent to another pest control device where the

According to some embodiments, the pest control system comprises a gateway and
10 remote or local server with recordings of sound patterns. The sound patterns on the remote server may be accessed by the local pest control device. The remote server may also update sound patterns saved on the memory of pest control devices by pushing the update to one or multiple pest control devices, which then will update their respective memory with updated sound patterns. The gateway may comprise a network connection to the internet or an
15 external network outside of the network of pest control devices. The server may then be placed remotely in the cloud or otherwise connected to the external network or the internet. According to some embodiments, however, a local server is included within the network of pest control devices. This is e.g. an advantage in environments where external networks or internet connections are not available or where such connections are not reliable.

20 According to some embodiments the network is a mesh network. Using a mesh network has the advantage that not all nodes in the network need to be connected to a central router, which will make placement of the pest control devices and/or the router easier and more flexible.

According to some embodiments, a first pest control device is configured to attract a
25 pest species or subgroup thereof by emitting a reproduction of the at least one sound patterns based on a detection of pest made by a second pest control device. The pest may then be guided from one device to another or in a sequence between multiple pest control devices. The pest may e.g. be guided to a trap device. It could also be that the first pest control device is a trap device, but that the trap is full, e.g. if a glue board is full or if a rat is captured. In that
30 case the pest may be guided to another trap. It could also be that a trap intended for insects detects a rodent. The rodent can then be guided from the insect trap towards a rodent trap within the network of pest control devices. In some embodiments the pest may be guided from pest control device to pest control device until it is lead away from the area that is pest

controlled. Rodents may e.g. be guided from an indoor environment to an outdoor environment or pest may be guided away from one pest controlled outdoor area towards another outdoor area where they are deemed to be allowed.

5 According to some embodiments, a first pest control device is configured to attract a pest species by emitting a reproduction of the one or more sound patterns based on a determination of pest species or subgroup thereof made by a second pest control device. The second pest control device may have capabilities to identify the pest, e.g. by recognizing the sound of it or by identifying it using a camera. The first pest control device can then select the correct sound pattern for attracting the pest.

10 According to a third aspect there is provided a method for attracting pest by running the pest control system according to the first aspect to attract a pest, the method comprising: emitting, by the sound emitting device, a reproduction of one or more sound patterns corresponding to a pest species or a subgroup thereof.

15 In line with the features and advantages presented above with respect to the first and the second aspects, a method for attracting pest species or a subgroup thereof is provided. With this third aspect of the invention, similar advantages and preferred features are present when applicable as in the previously discussed first and second aspects of the invention.

20 According to some embodiments, the method further comprises: receiving a sound pattern or information pertaining to a selected sound pattern from a remote device; and emitting, by the sound emitting device, the sound pattern received or selected by a remote device. An advantage is that the pest then may be identified or recognized at the remote device so that the correct sound pattern may be applied for attracting the pest to the pest control device. This can be in the process of guiding the pest between devices or attracting the pest towards a trap or to attract the pest towards a monitoring device for recording of sound and/or images.

25 According to some embodiments, to attract a pest, the method further comprises: recording a further sound pattern from a pest species or a sub-group thereof; and saving the further sound pattern to the one or more sound patterns of the memory.

30 According to some embodiments the method comprises: calibrating the sound intensity emitted from of each pest control device by: for each pest control device, emitting a test sound signal at number of intensities; detecting if a received intensity of the test sound at another pest control device is within a predetermined intensity interval; selecting the

detected test sound determined to be within the predetermined intensity interval having the lowest sound intensity. An advantage is that the sound emission can be calibrated to a sound level that is the lowest needed for one pest control device to be heard at the pest control device furthest away in the system or network. In that way it is ensured that pest control
5 devices placed indoors, which is the normal operating scenario, will not attract pest further away, e.g. from an adjacent forest or other outdoor environments where animals and insects most often are not considered pest. But also when setting up an outdoor pest control system it may be advantageous not to attract pest outside the perimeter of the pest control system.

Effects and features of the second and third aspects are to a large extent analogous to
10 those described above in connection with the first aspect. Embodiments mentioned in relation to the first aspect are largely compatible with the second and third aspects.

The present disclosure will become apparent from the detailed description given below. The detailed description and specific examples disclose preferred embodiments of the disclosure by way of illustration only. Those skilled in the art understand from guidance in the
15 detailed description that changes and modifications may be made within the scope of the disclosure.

Hence, it is to be understood that the herein disclosed disclosure is not limited to the particular component parts of the device described or steps of the methods described since such device and method may vary. It is also to be understood that the terminology used
20 herein is for purpose of describing particular embodiments only, and is not intended to be limiting. It should be noted that, as used in the specification and the appended claim, the articles "a", "an", "the", and "said" are intended to mean that there are one or more of the elements unless the context explicitly dictates otherwise. Thus, for example, reference to "a unit" or "the unit" may include several devices, and the like. Furthermore, the words
25 "comprising", "including", "containing" and similar wordings does not exclude other elements or steps.

Brief descriptions of the drawings

The above objects, as well as additional objects, features and advantages of the
30 present disclosure, will be more fully appreciated by reference to the following illustrative and non-limiting detailed description of example embodiments of the present disclosure, when taken in conjunction with the accompanying drawings.

Figure 1 shows a schematic drawing of a pest control device in the form of a monitoring device for emitting sound according to an embodiment of the present disclosure.

Figure 2a shows a schematic drawing of a pest control device in the form of a monitoring device with a camera according to an embodiment of the present disclosure.

5 Figure 2b shows a schematic drawing of a pest control device in the form of a monitoring device with a proximity sensor according to an embodiment of the present disclosure.

Figure 3 shows a schematic drawing of a gateway device with external and internal communication means.

10 Figure 4a shows a schematic drawing of a pest control device in the form of a trap device comprising a sound emitting device and a pressure sensor surface.

Figure 4b shows a schematic drawing of a pest control device in the form of a trap device comprising a sound emitting device where a pest has been trapped.

15 Figure 5 shows a pest control system according to an embodiment of the present disclosure comprising a network with trap devices and monitoring devices.

Figure 6 shows a pest control device in which a pest is guided by multiple sound emitting devices emitting sound patterns.

Figure 7 shows a flow chart of the method according to the present invention.

20 Detailed description

The present disclosure will now be described with reference to the accompanying drawings, in which preferred example embodiments of the disclosure are shown. The disclosure may, however, be embodied in other forms and should not be construed as limited to the herein disclosed embodiments. The disclosed embodiments are provided to fully
25 convey the scope of the disclosure to the skilled person.

Figure 1 shows schematically a pest control device 10 for attracting pest 11 according to some embodiments of the present disclosure. The pest control device comprising: a housing 12; a processor 14; a memory 16; a data communication device 18 configured to communicate with a gateway 20, as illustrated in figure 3, or another pest control device 10.

The pest control device further comprises a sound emitting device 22. The memory 16 comprises recordings of one or more sound patterns corresponding to a pest species 17a,17b,17c or a subgroup thereof. The sound emitting device 22 of the pest control device 10 is configured to emit a reproduction of the at least one sound pattern for attracting the pest species or a subgroup thereof. The pest species 17a,17b,17c may be an insect species 17a,17b or it may be an animal species 17c.

The wording "pest" may be understood refer to one or more individuals of an insect or animal species considered destructive. The sound pattern may form part of a sound generated by individuals of a pest species, a subgroup or a specific individual of the pest species.

The sound emitting device 22 may be arranged to emit sound in the audio frequency range. The audio frequency range may be from about 20 Hz to 20 000 Hz. The audio frequency range may be understood as the corresponding to the audible sound for humans. The sound emitting device 22 may also or alternatively, be arranged to emit sound in the ultrasonic sound range. The ultrasonic sound range may be understood as comprising sound waves having a frequency above 20 000 Hz. The sound emitting device may be arranged to also or alternatively emit sound waves having a frequency below the frequency of 20 Hz. Sound having sound waves with frequency below 20 Hz may be referred to as the infrasonic sound range.

With reference to Figures 2a and 2b, the pest control device 10 is configured to reproduce a sound pattern selected or received by a remote device 23 so as to attract a specific pest species.

Figure 3 shows a schematic drawing of a gateway device with an external data communication device 19 and an internal data communication device 18. The internal data communication device 18 is used to communicate with other pest control devices 10 in a local internal network while the external data communication device 19 is used to communicate externally with a remote server 50 (see Figure 5) or a remote electronic device 52 (see Figure 5), e.g. via an external network such as the internet or a custom cloud service.

According to some embodiments, and with reference to Figures 4a and 4b, the pest control device 10 further comprises a sound recording device 24; wherein the pest control device 10 is configured to record a further sound pattern from a pest species 17a,17b,17c or a sub-group thereof and save the further sound pattern to the one or more sound patterns of the memory 16. The sound recording device may further be used to determine a pest species

17a,17b,17c or a subgroup thereof by comparing the sound recording to sound patterns on the memory, wherein information regarding the determined pest species 17a,17b,17c or subgroup thereof is transmitted to the pest control device 10. The pest control device 10 can then select a sound pattern from the memory for the identified species to start emission of
5 the sound pattern for attracting the pest individual of the identified pest species.

Referring to Figures 4a and 4b, the pest control device 10 has a housing 12 in the form of a box arrangement into which the pest 11 may be lured. The box arrangement may have a predetermined size chosen to be suitable for a particular animal. The box arrangement may further have a cover and/or the entrance opening suitable for a certain type of animal. In
10 Figures 4a and 4b the box arrangement has a trap door 48 that, when closed, will entrap the pest 11, 17c within the pest control device housing.

The box arrangement may form a resonance chamber. As exemplified in Figures 4a and 4b a pest 11, 17c is present inside the box arrangement and the pest control device 10 may signal, via wireless data communication using the data communication device 18 that a pest
15 11 is present and/or recognized. With further reference to Figures 4a and 4b, it is exemplified that the pest control device 10, may further comprise a vibration sensor 46 arranged to vibrate in response to pest 11, 17c moving across a surface of the housing 12.

The pest control device 10 may further be configured to detect, by a vibration sensor 46, a vibrational pattern generated by the pest 11, 17c. The vibration pattern may be
20 understood as comprising data pertaining to the vibrations generated as the pest move on the surface of the vibration sensor 46. By way of example, the vibration pattern may be generated by the stride of a pest walking or moving on the vibration sensor 46. The recorded sound pattern of the pest may be based on the vibrational pattern.

According to some examples, the vibration sensor 46 may be configured to detect a
25 vibrational pattern generated by insects being stationary or moving on the vibration sensor. The beating of wings may by way of example cause vibrations that may be detected by the vibration sensor 46. According to some examples the vibration sensor may be arranged inside or on an outer surface of the housing and configured to detect vibrational pattern transmitted by a surface and/or wall of the housing to the vibration sensor.

30 The sound recording device 24 may be arranged to detect sound in the audio frequency range. The audio frequency range may be from about 20 Hz to 20 000 Hz. The audio frequency range may be understood as the corresponding to the audible sound for humans.

The sound recording device 24 may also or alternatively, be arranged to detect sound in the ultrasonic sound range. The ultrasonic sound range may be understood as comprising sound waves having a frequency above 20 000 Hz. The sound recording device may be arranged to also or alternatively detect sound waves having a frequency below the frequency of 20 Hz.

- 5 Sound having sound waves with frequency below 20 Hz may be referred to as the infrasonic sound range.

Insects may communicate by stridulation. Stridulation may produce sound by frictional mechanism such as movement of two body parts against each other in order to emit a sound. The sound generated may be characteristic for a specific pest species. The pest control device
10 10 may therefore be configured to identify the pest species by a sound pattern pertaining to the stridulation sound and emit the sound pattern for attracting pest of the pest species. By way of example, grasshoppers may emit a stridulation sound in the range of 5 000 Hz to 6 000 Hz.

Pest engaging in social groups may use acoustic signals, to communicate and play with
15 as well as to alarm or attract other individuals of the species. Rats, for example, may communicate at a frequency of about 20 000 - 50 000 Hz. Further, adult mice may emit ultrasonic vocalizations having frequencies in the range of 30 000 Hz to 100 000 Hz.

According to some embodiments, and with reference to Figure 2a, the remote device
23 comprises a camera 26 arranged to determine a pest species 17a,17b,17c or a subgroup thereof, wherein information regarding the determined pest species 17a,17b,17c or subgroup thereof is transmitted to the pest control device 10. The pest control device 10 can then select a sound pattern from the memory for the identified species to start emission of the sound pattern for attracting the pest individual of the identified pest species.

According to some embodiments, and with reference to Figure 6, the pest control
25 device further comprises at least one additional sound emitting device 22 and at least one sensor 24,26,28 for detecting pest. The processor 14 in combination with the memory 16 is arranged to receive signals from the at least one sensor 24,26,28, to link the signals to detection time points and to process the signals and the detection time points into sensor data sets. The pest control device 10 is configured to guide pest 11 within the pest control
30 device 10 by sequentially emitting a sound pattern from the multiple sound emitting devices 22,30. The pest 11 can then be guided to a trap, e.g. a glue board 61 as illustrated in the example pest control device 10 of Figure 6. Guiding the pest within the pest control device may also be used to divide up different types of species and guide them in different directions.

E.g. in case one species is considered pest and another is not, the species considered pest is guided towards a trap while the species not considered a pest is guided out from the pest control device to go free. This makes it possible to use sound patterns attracting several species while still differentiating between different species within the trap, e.g. in case they require different type of traps.

The passive sensor 28 may be a passive infra-red, PIR, sensor according to some examples. The passive sensor 28 may be used to wake up the pest control device 10 from an idle state to an active state. The pest control device 10 may be configured to in the idle state reduce energy consumption for an energy source of the pest control device 10 such as a battery for powering the pest control device. The pest control device 10 may be configured to in the active state activate the processor 14 and/or the sound recording device 24 such that one or more sound patterns may be recorded.

The pest control device 10 may also in some embodiments be configured to modify the sound pattern such that the sound pattern deviates from other sound patterns of the one or more sound patterns. A unique sound pattern may have a higher probability of attracting a pest.

With reference to Figure 5, disclosing the second aspect of this disclosure, a pest control system 36 is disclosed with multiple pest control devices 10 according to the first aspect configured in a network 38. As seen in Figure 5 the network contains pest control device 10 both in the form of monitoring devices 32 and in the form of trapping devices 34. The pest control system in the embodiment of Figure 5 also comprises a gateway 20 and remote server 50 or local server 40 where recordings of sound patterns are stored together with their respective corresponding pest species type. The network 38 of Figure 5 is further a mesh network as can be seen as not all pest control devices (or nodes) have direct access to the gateway 20, but are instead communicating with the gateway via another pest control device.

The wording gateway may be understood as device that connects networks together. The networks may have different transmission protocols. Put differently, the gateway 20 may be an entry point and exit point for data communication between different networks. By way of example, data communicated via wireless data communication between a pest control device 10 and the gateway 20 may be routed by the gateway 20 to a remote server 50 or the mobile device 52 via the mobile network 51. The network 38 may comprise a local server. The gateway 20 may further route data between two sub-networks or trees of pest control devices

10, where the pest control device of the sub-network or of the tree communicate via wireless data communication with other pest control devices in the same sub-network or tree of pest control devices. The pest control devices 10 may be monitoring devices 32 and/or trapping devices 34. According to some examples, the remote server 40 may comprise a remote
5 memory 17. The remote memory 17 may comprise a database 23.

A first pest control device 10 in the pest control system may be configured to attract a pest species 17a,17b,17c or subgroup thereof by emitting a reproduction of the at least one sound patterns for a specific pest species based on a detection of pest 11 made by a second pest control device 10. The pest may in that way be guided from one pest control device to
10 the next by sequentially attracting pest by emitting the sound pattern on a sequence of pest control devices. It could also be that a trap intended for insects detects a rodent. The rodent can then be guided from the insect trap towards a rodent trap within the network of pest control devices. In some embodiments the pest may be guided from pest control device 10 to pest control device 10 until it is lead away from the area that is pest controlled. Rodents may
15 e.g. be guided from an indoor environment to an outdoor environment or pest may be guided away from one pest controlled outdoor area towards another outdoor area where they are deemed to be allowed.

In some embodiments the second pest control device may identify the pest which identification is sent to the first pest control device so that the correct sound pattern may be
20 emitted.

The second pest control device may in some embodiments instead of identifying the pest record a sound pattern of the pest, which recording is sent to the first pest control device to attract the pest. A pest with no previous sound pattern may then still be guided by the pest control devices of the pest control system.

25 The first pest control device 10 may be configured to attract a pest species 17a,17b,17c by emitting a reproduction of the one or more sound patterns based on a determination of pest species 17a,17b,17c or subgroup thereof made by a second pest control device 10.

With reference to Figure 7, the third aspect of this disclosure is represented by a flow chart. The third aspect discloses a method for attracting pest 11 by running the pest control
30 system of the second aspect comprising pest control devices according to the first aspect of this disclosure. The method 70 comprises emitting 72, by the sound emitting device 22, a reproduction of one or more sound patterns corresponding to a pest species 17a,17b,17c or a

subgroup thereof. The emitted sound pattern may then attract a pest that will move towards the pest control device to check out the sound.

According to some embodiments the method 70 further comprises receiving 74 a sound pattern or information pertaining to a selected sound pattern from a remote device 23; and emitting 72, by the sound emitting device 22, the sound pattern received or selected by a remote device 23.

According to some embodiments the method 70 further recording 76 a further sound pattern from a pest species 17a,17b,17c or a sub-group thereof; and saving 78 the further sound pattern to the one or more sound patterns of the memory 16. Thereby the collection of sound patterns is expanded and also new pest species, not previously recorded can be added. The species type associated with the sound pattern may be determined by camera identification by a pest control device comprising a camera. If needed, the pest control device may request a remote identification by sending the image of the new pest to the remote server for an advanced computer image recognition identification or by human manual identification by an expert on pest species.

According to some embodiments the method 70 further comprises calibrating 80 the sound intensity emitted from of each pest control device 10 by: for each pest control device 10, emitting 82 a test sound signal at number of intensities; detecting 84 if a received intensity of the test sound at another pest control device 10 is within a predetermined intensity interval; selecting 86 the detected test sound determined to be within the predetermined intensity interval having the lowest sound intensity. The sound emission can then be calibrated to a sound level that is the lowest needed for one pest control device to be heard at the pest control device furthest away in the system or network. In that way it is ensured that pest control devices placed indoors, which is the normal operating scenario, will not attract pest further away, e.g. from an adjacent forest or other outdoor environments where animals and insects most often are not considered pest. But also when setting up an outdoor pest control system it may be advantageous not to attract pest outside the perimeter of the pest control system.

The person skilled in the art realizes that the present disclosure is not limited to the preferred embodiments described above. The person skilled in the art further realizes that modifications and variations are possible within the scope of the appended claims. For example, in the figures the pest control devices have for simplicity of then been equipped with one or two sensors and/or sound emission devices. The skilled person, however, realizes that

a pest control device may contain a combination of the sensors and devices disclosed in the Figures. One device may even comprise all of the disclosed sensors and emission devices. Additionally, variations to the disclosed embodiments can thus be understood and effected by the skilled person in practicing the claimed disclosure, from a study of the drawings, the
5 disclosure, and the appended claims.

CLAIMS

1. A pest control device (10) for attracting pest (11) comprising:
 - a housing (12);
 - a processor (14);
 - 5 a memory (16);
 - a data communication device (18) configured to communicate with a gateway (20) or another pest control device (10);
 - a sound emitting device (22);
 - wherein the memory (16) comprises recordings of one or more sound patterns
 - 10 corresponding to a pest species (17a,17b, 17c) or a subgroup thereof; and
 - wherein the sound emitting device (22) is configured to emit a reproduction of the at least one sound pattern for attracting the pest species or a subgroup thereof.
2. The pest control device according to claim 1, wherein the pest species (17a,17b, 15 17c) is an insect species (17a, 17b).
3. The pest control device according to claim 1 or 2, wherein the pest species (17a, 17b, 17c) is an animal species (17c).
- 20 4. The pest control device according to any one of the preceding claims,
 - wherein the pest control device (10) is configured to reproduce a sound pattern selected or received by a remote device (23).
5. The pest control device according to any one of the preceding claims,

wherein the pest control device (10) further comprises a sound recording device (24);

wherein the pest control device (10) is configured to record a further sound pattern from a pest species (17a,17b, 17c) or a sub-group thereof and save the further sound pattern to the one or more sound patterns of the memory (16).

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6. The pest control device according to claim 4 or 5, wherein the remote device

(23) comprising a camera (26) and/or a sound recording device (24) arranged to determine a pest species (17a,17b, 17c) or a subgroup thereof, wherein information regarding the determined pest species (17a,17b, 17c) or subgroup thereof is transmitted to the pest
10 control device (10).

7. The pest control device according to any one of the preceding claims,

further comprising:

at least one additional sound emitting device (22);

15 at least one sensor (24, 26, 28) for detecting pest, wherein the processor (14) in combination with the memory (16) is arranged to receive signals from the at least one sensor (24, 26, 28), to link the signals to detection time points and to process the signals and the detection time points into sensor data sets;

wherein the pest control device (10) is configured to guide pest (11) within the pest
20 control device (10) by sequentially emitting a sound pattern from the multiple sound emitting devices (22, 30).

8. The pest control device according to any one of the preceding claims,

wherein the pest control device (10) is configured to modify the sound pattern such
25 that the sound pattern deviates from other sound patterns of the one or more sound patterns.

9. A pest control system (36) comprising:

multiple pest control devices (10) according to any one of the preceding claims configured in a network (38).

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10. The pest control system according to claim 9, wherein a first pest control device (10) is configured to attract a pest species (17a, 17b, 17c) or subgroup thereof by emitting a reproduction of the at least one sound patterns based on a detection of pest (11) made by a second pest control device (10).

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11. The pest control system according to claims 9 or 10, wherein a first pest control device (10) is configured to attract a pest species (17a, 17b, 17c) by emitting a reproduction of the one or more sound patterns based on a determination of pest species (17a, 17b, 17c) or subgroup thereof made by a second pest control device (10).

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12. A method for attracting pest by running the pest control system (36) according to any one of claims 9-11 to attract a pest (11), the method (70) comprising:

- emitting (72), by the sound emitting device (22), a reproduction of one or more sound patterns corresponding to a pest species (17a, 17b, 17c) or a subgroup thereof.

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13. The method for attracting pest by running the pest control system (36) according to claim 12, the method (70) further comprising:

- receiving (74) a sound pattern or information pertaining to a selected sound pattern from a remote device (23); and

- emitting (72), by the sound emitting device (22), the sound pattern received or selected by a remote device (23).

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14. The method for attracting pest by running the pest control system (36) according to claim 12 or 13 to attract a pest (11), the method (70) further comprising:

- recording (76) a further sound pattern from a pest species (17a,17b, 17c) or a sub-group thereof; and

5 - saving (78) the further sound pattern to the one or more sound patterns of the memory (16).

15. The method according to any one of claims 12 to 14, further comprising:

- calibrating (80) the sound intensity emitted from of each pest control device (10) by:

10 - for each pest control device (10), emitting (82) a test sound signal at number of intensities;

- detecting (84) if a received intensity of the test sound at another pest control device (10) is within a predetermined intensity interval;

15 - selecting (86) the detected test sound determined to be within the predetermined intensity interval having the lowest sound intensity.