**Table 5.7.** Comparative guide to the applicability of decision-support tools and technologies discussed in **sections 5.2** and **5.4**

The table distinguishes application of decision-support tools and technologies to invasive alien plants, invertebrates, vertebrates or disease pathogen by sector. Decision-support tools and technologies were assessed with consideration to the contexts in which they are used, as discussed in the individual technology specific subsections. The assessment categories are: generally relevant (✓), not generally relevant (🗴) and some relevance (🗴✓), with footnotes providing additional information. In the context of zoonotic diseases this table refers to diseases transmissible between animals to humans rather than diseases of animal origin largely transmitted between people (e.g., COVID-19).

| **Technology** | Terrestrial invasive alien plants | Aquatic invasive alien plants | Agricultural invertebrate invasive alien species | Environ. invertebrate invasive alien species | Terrestrial vertebrate invasive alien species | Aquatic vertebrate invasive alien species | Plant pathogens | Terrestrial animal pathogens | Aquatic animal pathogens | Zoonotic/ Vector borne pathogens | Marine invasive alien species[[1]](#footnote-1) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Decision-support tools** |  |  |  |  |  |  |  |  |  |  |  |
| Qualitative and quantitative decision-support tools | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Management relevant databases and analytics | ✓ | ✓ | ✓ | 🗴[[2]](#footnote-2) | ✓ | ✓ | ✓ | 🗴9 | ✓ | 🗴9 | ✓ |
| **Surveillance, detection and diagnostics** |  |  |  |  |  |  |  |  |  |  |  |
| Digital data mining – crowdsourcing general surveillance | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Sensor-networks and smart traps | 🗴[[3]](#footnote-3) | 🗴10 | ✓ | ✓ | ✓ | ✓ | 🗴10 | ✓ | 🗴 | ✓ | 🗴10 |
| Screening technologies | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 🗴 | 🗴 | 🗴 | 🗴 | 🗴 |
| Environmental DNA | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Sentinel surveillance & monitoring | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Citizen surveillance – data input portals | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Earth observation – remote sensing detection | ✓ | ✓ | 🗴[[4]](#footnote-4) | 🗴 11 | ✓ | 🗴✓ | ✓11 | 🗴 | 🗴 | 🗴 | 🗴 |
| Automated image-based diagnostics and machine learning | ✓ | ✓ | ✓ | ✓[[5]](#footnote-5) | ✓ | ✓ | 🗴 | 🗴 | 🗴 | 🗴 | ✓ |
| Volatile detection technologies | ✓ | 🗴10 | ✓ | ✓ | ✓ | 🗴10 | ✓ | ✓10 | 🗴 | ✓10 | 🗴10 |
| Pheromone and semiochemical lures | 🗴 | 🗴 | ✓ | ✓ | 🗴 | 🗴 | 🗴 | 🗴 | 🗴 | 🗴 | 🗴 |
| Acoustic/ultrasound sensors | 🗴 | 🗴 | ✓[[6]](#footnote-6) | ✓13 | ✓ | ✓ | 🗴 | 🗴 | 🗴 | 🗴 | 🗴✓ |
| Point of Care / Lab on a chip, rapid test diagnostics | 🗴 | 🗴 | 🗴 | 🗴 | 🗴 | 🗴 | ✓ | ✓ | ✓ | ✓ | 🗴 |
| Track and trace genomics[[7]](#footnote-7) | 🗴 | 🗴 | ✓ | ✓ | 🗴 | 🗴 | ✓ | ✓ | ✓ | ✓ | 🗴 |
| **Intervention/control technologies** |  |  |  |  |  |  |  |  |  |  |  |
| Mechanical & manual approaches | ✓ | ✓ | 🗴15 | 🗴 | 🗴[[8]](#footnote-8) | 🗴 | 🗴 | 🗴 | 🗴 | 🗴 | 🗴 |
| Pesticide management of invasive alien animals and plants | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 🗴[[9]](#footnote-9) | 🗴16 | 🗴16 | 🗴16 | 🗴 |
| Robotic technology for targeted management measures | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓10 | 🗴 | 🗴 | 🗴 | ✓ |
| Lethal control of invasive alien vertebrate pests | 🗴 | 🗴 | 🗴 | 🗴 | ✓ | ✓ | 🗴 | 🗴 | 🗴 | 🗴 | 🗴10 |
| Fertility control for invasive alien vertebrates | 🗴 | 🗴 | 🗴 | 🗴 | ✓ | ✓ | 🗴 | 🗴 | 🗴 | 🗴 | 🗴 |
| Classical biological control of invasive plants & invertebrates | ✓ | ✓ | ✓ | ✓ | 🗴 | 🗴 | 🗴 ✓[[10]](#footnote-10) | 🗴 | 🗴 | 🗴 | 🗴 |
| Sterile insect technique etc. | 🗴 | 🗴 | ✓ | ✓10 | 🗴 | 🗴 | 🗴 | 🗴 | 🗴 | 🗴 ✓ | 🗴 |
| Viral biological control of invasive alien vertebrates | 🗴 | 🗴 | 🗴 | 🗴 | ✓ | ✓ | 🗴 | 🗴 | 🗴 | 🗴 | 🗴 |
| RNA Interference | 🗴 | 🗴 | ✓ | ✓ | 🗴 | 🗴 | ✓ | ✓ | ✓ | ✓ | 🗴 |
| Genetic-control approaches (including gene-drive) | ✓10 | ✓10 | ✓ | ✓ | ✓ | ✓ | 🗴[[11]](#footnote-11) | 🗴18 | 🗴18 | 🗴18 | ✓ |
| Adaptive integrated management strategies | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 🗴10 | 🗴10 | 🗴10 | ✓ |
| Ecosystem restoration | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 🗴✓ | 🗴 | 🗴 | 🗴 | 🗴 |

1. Intervention and control technologies are applied but have so far proved ineffective in marine systems beyond very short-term control [↑](#footnote-ref-1)
2. Databases for these sectors do not appear to be well developed [↑](#footnote-ref-2)
3. Appear not yet demonstrated as effective for these sectors, but where relevant considered to have potential. [↑](#footnote-ref-3)
4. Where there is a detectable signal e.g., in the attacked host plant for pathogens and invertebrate herbivores [↑](#footnote-ref-4)
5. Only where species are taxonomically defined, which is not always the case [↑](#footnote-ref-5)
6. Where noise making [↑](#footnote-ref-6)
7. Via pan-genomic full genome sequencing which can also track intraspecific genetic variation [↑](#footnote-ref-7)
8. Only exceptions are burrowing species like beetle grubs or rabbits [↑](#footnote-ref-8)
9. Only shows effectiveness for fungal pathogens in agriculture using fungicides no demonstrated effectiveness in native ecosystems invaded by invasive alien pathogens [↑](#footnote-ref-9)
10. Rarely effective (Scott, 1995) [↑](#footnote-ref-10)
11. Genetic-control approaches for disease resistant commercial plants and animals is widely used in agriculture but this is not discussed in **section 5.4.4.2**  [↑](#footnote-ref-11)