





Coffee Berry Borer
overview of status & impact


PS Baker
CABI UK

www.cabi.org
KNOWLEDGE FOR LIFE




Coffee berry borer – CBB
the problem

- It spends most of its life hidden inside the berry
- Natural enemies also find it hard to find – only a small guild of specialist parasites and predators
- Makes it difficult to spray – a small window of opportunity
- Farmers can't see it easily either – so they don't notice it building up
- Especially difficult to control at low altitudes and when there are several flowerings/year





Coffee berry borer – CBB
control methods - cultural

- Hand picking is still the most recommended method
- At some times of the year, most of the CBB population is in fallen berries which are especially difficult to find and remove
- CBB cultural control is very laborious, and difficult to monitor and evaluate the process as well
- With increasing labour costs and global competition (increasing mechanization) hand picking is not a sustainable solution


Coffee berry borer – CBB
control methods - chemical

- Sometimes effective, but has many downsides
- It's toxic, endosulfan is generally regarded as the most effective, but it's also the most dangerous
- Now banned in many countries
- It's expensive – can take five days to spray one hectare on a mountainside
- It's just not sustainable in the long term with consumer concern and high labour costs

Coffee berry borer – CBB
control methods - biological

- Several alternatives, none to date are effective
- There are four principal wasp species, we have tried three of them but the control they exert is not enough
- A main problem is that the wasps also live in coffee berries which are harvested every year
- Wasp populations are much higher in abandoned coffee, so this does help to keep CBB inoculum down in this case



Coffee berry borer – CBB

control methods - biological



- Fungal sprays, especially *Beauveria bassiana* (Bb) has also been tried, but also with limited success
- Mortality is not as high as an insecticide, so this doesn't enthruse farmers, since spraying costs are equally as high
- And quality control of commercial Bb products is difficult and costly especially in remote areas
- There are many other agents, including ants, birds, nematodes – but to date none have been convincingly shown to cause significant mortality

Coffee berry borer – CBB

control methods - trapping



- A number of traps have been developed initially in Brazil and most recently by CIRAD, these are based on a mix of methanol + ethanol, and some with added terpinenes
- Good trapping rates have been reported in some cases, but others have not found them effective
- Trapping is not a panacea, it could be effective when combined with other methods
- If regularly inspected they do help to warn of when CBB are emerging from their brood-berries

Coffee berry borer – CBB

control methods – Integrated Pest Management



- The idea is that through some combination of the previous (albeit inefficient) methods we arrive at a combination that is optimal = IPM
- The point is to attack CBB at critical points in its life-cycle with the most effective at that moment
- The problem is that this takes a lot more knowledge and effort by the farmer to sample, calculate and intervene

Coffee berry borer – CBB

control methods – IPM



- All this makes it very difficult for small farmers with scarce resources to dedicate regular IPM monitoring and intervention when for months at a time it may yield no visible pay-off
- It can be especially galling when the assiduous farmer sees his neighbours not bothering and then gets an influx of CBB at a later date.
- All this militates against full & effective IPM and what actually gets carried out is a combination of two or three techniques but often in a fairly *ad hoc* manner

Coffee berry borer – CBB

control methods – IPM



- And every year is different
 - A cool wet year with high prices (leads to more control by farmer) = low CBB populations
 - A hot year with alternate periods of wet and dry and low prices = high CBB populations
- This makes it difficult for the farmer to control
- Forecasts of CBB build-ups are rare – most/all (?) countries don't do regular field surveys to report build ups and broadcast warnings for example

Coffee berry borer – CBB

control methods - others



- The best solution would be a resistant variety
- Some indications of resistance from work in Colombia
- Difficult to imagine a completely resistant tree without a GM approach
- GM work in Brazil includes delayed ripening that would help to control CBB
- No specific GM CBB plant exists at present (?)



Above all perhaps, it's a labour problem

- Currently all methods require a lot of labour
- To control CBB well requires concerted action and attention to detail
- Such labour is in short supply
- We need a new approach



Another IPM project isn't going to solve it

- So try turning the problem upside down ...
- Try thinking of CBB as a sort of ally, it's trying to tell you something ...
- If your coffee is really suffering from infestations – and you're finding it very hard to control ...
- It's telling you that you are probably going to be out of coffee in 10 to 20 years
- So start thinking of radical solutions
- And areas where it's now not much of a problem – that's going to change too

Suitability for coffee production for 10 coffee-growing municipalities of Nicaragua



Peter Läderach, Andy Jarvis, Julian Ramirez
CIAT [for GTZ CafeDirect AdapCC project]

Afecta cambio climático las cosechas de café Fecha: 24 de febrero del 2009



Reportero: Redacción Once Noticias
Fuente: Once Noticias http://onctv-ipn.net/noticias/index.php?modulo=despliegue&dt_fecha=2009-02-24&numnota=30

- Muy pronto el café podrá consumirse sólo por temporadas. Según los **cafetaleros de San Pedro Cafetitlán, Oaxaca**, cada vez es más complicado tener buenas cosechas de café.
- "Ya la producción de nuestros cafetales bajó bastante, se cosechaban entre 15 y 20 hectáreas, ahora nada más de 3 a 4 hectáreas", comentó Domingo Silva, productor de café.
- Las causas de este problema son diversas, **la principal es el cambio climático**. La escasez de agua, que nos llueve fuera de tiempo", dijo Domingo Silva.
- "Entonces, el clima de una zona ya no es el mismo que hace 10 o 15 años y esto también los mismos productores lo observan, ya que en algunas zonas los árboles se están secando", dijo **Homero Bustamante, productor de café**.
- Además las plantas de café se han vuelto más susceptibles a las enfermedades.
- "Algunas aves de la zona caliente ahora se pasan a la zona media y algunas plagas también se han desarrollado más como la broca del café", agregó Homero Bustamante.



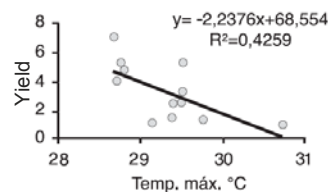
Mexico – Reuter's report 3rd March 2009

- **Ingrid Hoffman** (a coffee farmer in Tapachula, Chiapas) : "The land is very tired, it has faced hurricanes, winds, natural deterioration. Everyone here has a smaller harvest, less maintenance, less investment"
- "We sell all over Europe and the United states so obviously the exchange rate will help," said Hoffman, **whose series of plantations are producing 75 percent less coffee than they did 20 years ago**.
- "I think one day we will be able to recover," she said.



Yields are declining at low altitudes

Finca San Luis, Ciudad Colón 750 m asl, Costa Rica (1988 -1999)
Luis A. Fournier, José Fco. Di Stefano





The times they are a-changing

- If coffee is going to survive in many countries and cope with problems like CBB, it needs a thorough review of where and how it is grown
- Strategic withdrawals from lower areas – adaptation in higher zones
- Every aspect of coffee growing needs to be reconsidered from nursery to mill
 - how to get down labour costs
 - how to get down energy costs
 - how to cope with too little/too much water
- There are a lot of possibilities – needs considerable research, development, investment



So welcome to the world of post-normal science

- We can't go on as we have been
- Pretending we are in a static unchanging world where a problem has a straight-forward matching solution
- The world is changing very fast in many ways and coffee is going to change too
- Controlling CBB and remaining profitable in a changing future is like trying to hit a moving target



So welcome to the world of post-normal science

- In many countries CBB control has not been very successful, mostly an institutional failure – major reductions in budgets in recent years, just as production problems started to mount
- In retrospect we will see the millennial coffee crisis as the start of 'the great transformation'
- We are going to need much stronger institutions to solve our problems in the future



Its not just CBB Dendroctonus spp.

- USA losses to **Mountain Pine Beetle**
 - Montana = 1 million ha pine trees dead last year
 - Wyoming & Colorado 2006 = 1 million ha dead
 - Wyoming & Colorado 2007 = 1.5 million ha dead
 - Wyoming & Colorado 2008 = 2 million ha dead (est.)
 - Colorado in next 3 to 5 yrs ~ estimates 5 m ha dead
- Canada: by 2020 the pine beetle outbreak will have released 270 megatonnes of CO₂ into the atmosphere from Canadian forests.



Its not just CBB

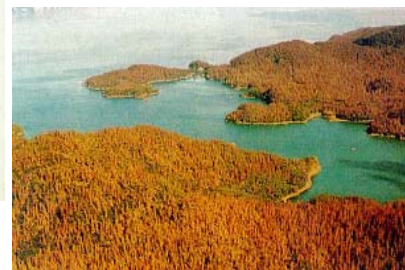
- Causes:
 - **Management:** all forests are roughly the same age
 - **Climate:** A decade of drought has weakened the trees
 - **Climate:** hard winters have softened, which allows the beetles to flourish and expand their range



"I've literally had people in my office crying,"
Gary Ellingson, forestry consultant [NYT 18th Nov 2008]



Its not just CBB Spruce bark beetle outbreak – Kenai, Alaska





Take-home message

- Think of the coffee berry borer not as a single problem
- But as a symptom of a much bigger problem
- We can't treat this as an issue where we are trying to restore the *status quo ante*
- Things will never be the same again



Thank you